



# Topological Variants of Vector Variational Inequality Problem

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## Abstract

In this paper, we provide a couple of solutions for the vector variational inequality problem, adopting a topological approach. We consider here a more general framework, where  $X$  and  $Y$  are topological vector spaces. Topological concepts including continuity, compactness, closedness, and so on are used for obtaining our results. The condition of admissibility of the function space topology is found to play an important role in achieving the results. It is found that the solution sets so obtained are closed as well as compact.

**Keywords** Vector variational inequality · KKM-mapping · Set-valued function · Topological vector space · Compactness

**Mathematics Subject Classification** 49J40 · 54H99 · 58E35

## 1 Introduction

The notion of variational inequality was initially introduced by Stampacchia [25] and Fichera [10] in 1964. Variational inequality theory has a variety of applications including in mathematics, physics, economics, and in engineering. In 1980, this concept was extended by F. Gianessi [11] for finite dimensional spaces. Since then, the vector

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variational inequalities (VVI) and their generalizations have become an important tool to solve vector optimization problems. In particular, several relations between vector variational inequalities and vector optimization problems have been investigated in [18, 19, 26, 28, 29]. Further, the concept of vector variational inequalities was studied and extended for abstract spaces by Chen along with Cheng and Craven [4–6] and many others [24, 27].

In [3] and in [1, 20], researchers have studied the generalized variational-type inequality and VVI, respectively, in the framework of topological vector spaces. Hung and others studied the concept of generalized quasi-variational inequalities [14–16]. In 2017, Salahuddin [23] provided the existence conditions for the solution of general set-valued vector variational inequalities. In the same year, Li and Yu [21] introduced a class of generalized invex functions, termed as  $(\alpha\text{-}\rho\text{-}\eta)$ -invex functions and proposed the existence results for two types of vector variational-like inequalities. On the other hand, in 2018, Kim et al. [17] introduced a class of  $\eta$ -generalized operator variational-like inequalities. In 2019, Farajzadeh, Chen, and others [7, 9] studied vector equilibrium problem for set-valued mappings. Recently, Gupta et al. [12] provided existence conditions for the solution of two variants of generalized non-linear vector variational-like inequality problem by adopting topological approach.

In [6, 30], the authors have studied vector variational inequalities for real Banach spaces  $X$  and  $Y$  by taking a mapping  $F : X \rightarrow \mathcal{L}(X, Y)$ , where  $\mathcal{L}(X, Y)$  is the space of all bounded linear operators from  $X$  to  $Y$ .

In the following, we denote a set-valued map  $F$  from  $X$  to  $Y$  by the notation  $F : X \rightrightarrows Y$ , where domain of  $F$  is  $X$  and co-domain is the power set of  $Y$ .

The vector variational inequality problem (VVIP) proposed by Chen in [6] can be presented as:

*Vector variational inequality problem:* Let  $X$  and  $Y$  be two real Banach spaces and let  $K$  be a nonempty closed convex subset of  $X$ . Let  $T : K \rightarrow \mathcal{L}(X, Y)$  be a mapping, where  $\mathcal{L}(X, Y)$  denotes the space of all continuous linear mappings from  $X$  to  $Y$ . Further, let  $C : X \rightrightarrows Y$  be a set-valued map such that for each  $x \in K$ ,  $C(x)$  is a closed convex pointed cone in  $Y$  with  $\text{int } C(x) \neq \emptyset$ , where  $\text{int } C(x)$  denotes the interior of  $C(x)$ . Then the vector variational inequality problem (VVIP) is to find  $x_0 \in K$  such that

$$\langle T(x_0), x - x_0 \rangle \notin -\text{int } C(x_0) \quad \forall x \in K.$$

Chen gave conditions for existence of solutions for the above-mentioned VVIP by using the monotonicity and hemicontinuity of the map  $T$ . In [4], Chen and Cheng have taken a closed convex pointed cone  $C$  instead of  $C(x)$  to study VVIP. Motivated by their work, we study here vector variational inequalities in a more general framework by taking  $X, Y$  as topological vector spaces instead of Banach spaces. In this paper, we consider two variants of VVIP as follows:

Let  $X$  and  $Y$  be two topological vector spaces and let  $K$  be a nonempty closed convex subset of  $X$ . Let  $T : K \rightarrow \mathcal{C}(X, Y)$  be a single-valued mapping, where  $\mathcal{C}(X, Y)$  is the space of all continuous linear mappings from  $X$  to  $Y$ .

**VVIP(I)** If  $C$  is a closed convex pointed cone in  $Y$  with  $\text{int } C \neq \emptyset$ , then the vector variational inequality problem is to find  $x_0 \in K$  such that

$$T_{x_0}(x - x_0) \notin -\text{int } C \quad \forall x \in K.$$

**VVIP(II)** If  $C : K \rightrightarrows Y$  is a set-valued map such that for each  $x \in K$ ,  $C(x)$  is a closed convex pointed cone in  $Y$  with  $\text{int } C(x) \neq \emptyset$ , then the vector variational inequality problem is to find  $x_0 \in K$  such that

$$T_{x_0}(x - x_0) \notin -\text{int } C(x_0) \quad \forall x \in K,$$

where  $T_{x_0}$  denotes the value of  $T$  at  $x_0$ , that is  $T_{x_0} = T(x_0)$ .

In this study, we provide the conditions for existence of solutions for both the variants of the VVIP by using topological approach by assuming the continuity of the map  $T$ . The concepts of net theory, topology of the function space (admissible topology) and KKM-Theorem play an important role in obtaining our results.

The remaining part of the paper is organized as follows: In section 2, we recall some preliminaries required in the sequel. In section 3, we provide the existence theorems for the VVIP(I) and VVIP(II). We then give some topological properties of the solution sets so obtained. Also, we give an example to illustrate our results.

## 2 Preliminaries

In this section, we provide some definitions and basic results which will be used later to obtain our main results.

**Definition 2.1** Suppose  $F : X \rightrightarrows Y$  is a set-valued map from  $X$  to  $Y$ . The *graph* of  $F$ , denoted by  $\mathcal{G}(F)$ , is

$$\mathcal{G}(F) = \{(x, y) \in X \times Y \mid x \in X, y \in F(x)\}.$$

**Definition 2.2** [8] Suppose  $S$  is a nonempty subset of some topological vector space  $X$ . A set-valued map  $F : S \rightrightarrows X$  is called a *KKM-mapping* if, for every nonempty finite set  $\{x_1, x_2, \dots, x_n\}$  of  $S$ , we have

$$\text{co}\{x_1, x_2, \dots, x_n\} \subseteq \bigcup_{j=1}^n F(x_j),$$

where  $\text{co}\{x_1, x_2, \dots, x_n\}$  denotes the convex hull of  $x_1, x_2, \dots, x_n$ .

The following result is taken from [8].

**Lemma 2.3** (*KKM-Theorem*) Suppose  $S$  is a nonempty subset of some topological vector space  $X$  and  $F : S \rightrightarrows X$  is a KKM-mapping such that for every  $x \in S$ ,  $F(x)$

is a closed subset of  $X$ . If there exists a point  $x_0 \in S$  such that  $F(x_0)$  is compact, then  $\bigcap_{x \in S} F(x) \neq \emptyset$ .

**Definition 2.4** [22] Let  $(X, \tau)$  be a topological space. Then

- (i) a set  $J$  is said to be *directed set* with a partial order  $\preceq$  such that for each pair  $\alpha, \beta$  in  $J$ , there exists an element  $\gamma$  in  $J$  such that  $\alpha \preceq \gamma$  and  $\beta \preceq \gamma$ .
- (ii) a *net* in  $X$  is a function  $f$  from a directed set  $J$  into  $X$ ;  
We usually denote  $f(\alpha)$  by  $x_\alpha$  and the net  $f$  itself is represented by  $\{x_\alpha\}_{\alpha \in J}$ .
- (iii) a net  $\{x_\alpha\}$  is said to *converge* to be the point  $x \in X$  if, for each neighborhood  $U$  of  $x$ , there exists some  $\alpha \in J$  such that for  $\alpha \preceq \beta$ , we have

$$x_\beta \in U.$$

**Definition 2.5** [2, 13] Let  $(Y, \mu_1)$  and  $(Z, \mu_2)$  be two topological spaces. Let  $\mathcal{C}(Y, Z)$  be the space of all continuous mappings from  $Y$  to  $Z$ . A topology  $\tau$  on  $\mathcal{C}(Y, Z)$  is called *admissible*, if the *evaluation map*  $e : \mathcal{C}(Y, Z) \times Y \rightarrow Z$ , defined by  $e(f, y) = f(y)$ , is continuous.

**Lemma 2.6** [13] A function space topology on  $\mathcal{C}(X, Y)$  is admissible if and only if for any net  $\{f_n\}_{n \in D_1}$  in  $\mathcal{C}(X, Y)$ , convergence of  $\{f_n\}$  to  $f$  in  $\mathcal{C}(X, Y)$  implies continuous convergence of  $\{f_n\}$  to  $f$ . That is, if  $\{f_n\}_{n \in D_1}$  converges to  $f$  in  $\mathcal{C}(X, Y)$ , then  $\{f_n(x_m)\}_{(n,m) \in D_1 \times D_2}$  converges to  $f(x)$  in  $Y$  and vice-versa, where  $\{x_m\}_{m \in D_2}$  is any net in  $X$  converging to  $x \in X$ .

Here, it may be mentioned that the above characterization of admissibility remains valid for the family of continuous linear mappings from  $X$  to  $Y$ , where  $X$  and  $Y$  are topological vector spaces.

### 3 Existence Theorems for VVI Problems

**Theorem 3.1** Let  $(X, \tau_1)$  and  $(Y, \tau_2)$  be any two topological vector spaces. Let  $\mathcal{C}(X, Y)$  denote the space of all continuous linear mappings from  $X$  to  $Y$ , equipped with an admissible topology. Let  $K \subseteq X$  be a nonempty closed convex compact subset of  $X$ . Let  $C \subseteq Y$  be a closed convex pointed cone with  $\text{int}C \neq \emptyset$ . Further, let  $T : K \rightarrow \mathcal{C}(X, Y)$  be a single-valued continuous mapping. Then the vector variational inequality problem (VVIP(I)) has a solution. That is, there exists  $x_0 \in K$  such that

$$T_{x_0}(u - x_0) \notin -\text{int}C,$$

for every  $u \in K$ .

**Proof** We define a set-valued map  $F : K \rightrightarrows K$  as

$$F(u) = \{x \in K : T_x(u - x) \notin -\text{int}C\}.$$



We complete the proof of the theorem in two parts:

(i)  $F$  is a KKM-mapping on  $K$ :

Let  $\{u_1, u_2, \dots, u_n\} \subseteq K$  be any finite subset of  $K$ . We show that  $\text{co}\{u_1, u_2, \dots, u_n\} \subseteq \bigcup_{i=1}^n F(u_i)$ . Let if possible,  $\bar{x} \notin \bigcup_{i=1}^n F(u_i)$  for some  $\bar{x} \in$

$\text{co}\{u_1, u_2, \dots, u_n\}$ . Then, we have  $\bar{x} = \sum_{i=1}^n \lambda_i u_i$  where  $\lambda_i \geq 0$  and  $\sum_{i=1}^n \lambda_i = 1$ .

As  $\bar{x} \notin F(u_i)$ , we have  $T_{\bar{x}}(u_i - \bar{x}) \in -\text{int}C$ , for each  $i = 1, 2, \dots, n$ .

Since  $-\text{int}C$  is convex and  $\lambda_i \geq 0$  with  $\sum_{i=1}^n \lambda_i = 1$ ,  $\sum_{i=1}^n \lambda_i (T_{\bar{x}}(u_i - \bar{x})) \in -\text{int}C$ .

We have,  $\hat{0} = T_{\bar{x}}(\bar{x} - \bar{x}) = T_{\bar{x}}\left(\sum_{i=1}^n \lambda_i u_i - \sum_{i=1}^n \lambda_i \bar{x}\right) = T_{\bar{x}}\left(\sum_{i=1}^n \lambda_i (u_i - \bar{x})\right)$

$= \sum_{i=1}^n \lambda_i (T_{\bar{x}}(u_i - \bar{x})) \in -\text{int}C$ , where  $\hat{0}$  is the zero vector in  $Y$ . This implies

$\hat{0} \in \text{int}C$ , which is a contradiction as  $C$  is pointed. Therefore, we have  $\text{co}\{u_1, u_2, \dots, u_n\} \subseteq \bigcup_{i=1}^n F(u_i)$ . Hence,  $F$  is a KKM-mapping on  $K$ .

(ii)  $F(u)$  is closed:

Let  $\{x_n\}$  be a net in  $F(u)$  with  $x_n \rightarrow x$ . As  $K$  is closed,  $x \in K$ . We shall show that  $x \in F(u)$ , that is,  $T_x(u - x) \notin -\text{int}C$ . Since  $T$  is continuous,  $x_n \rightarrow x$  implies  $T_{x_n} \rightarrow T_x$ . Also, we have,  $u - x_n \rightarrow u - x$ . As  $\mathcal{C}(X, Y)$  has an admissible topology, we have,  $T_{x_n}(u - x_n) \rightarrow T_x(u - x)$ . Now, if  $T_x(u - x) \in -\text{int}C$ , then  $T_{x_n}(u - x_n) \in -\text{int}C$  eventually, which leads to a contradiction as  $x_n \in F(u)$ . Hence,  $T_x(u - x) \notin -\text{int}C$ , that is,  $x \in F(u)$ .

Now,  $F(u)$  being a closed subset of a compact set  $K$  is compact. Therefore by the KKM-Theorem, we have  $\bigcap_{u \in K} F(u) \neq \emptyset$ . Hence, there exists  $x_0 \in K$  such

that  $x_0 \in \bigcap_{u \in K} F(u)$ , that is,  $T_{x_0}(u - x_0) \notin -\text{int}C$  for every  $u \in K$ .

□

In the next theorem, we provide an existence condition for a solution of VVIP(II).

**Theorem 3.2** *Let  $(X, \tau_1)$  and  $(Y, \tau_2)$  be two topological vector spaces and  $\mathcal{C}(X, Y)$  be the space of all continuous linear mappings from  $X$  to  $Y$ , equipped with an admissible topology. Let  $K$  be a nonempty closed convex compact subset of  $X$ . Let  $C : K \rightrightarrows Y$  be a set-valued map such that for every  $x \in K$ ,  $C(x)$  is a closed convex pointed cone with  $\text{int}C(x) \neq \emptyset$ . Also, let  $W : K \rightrightarrows Y$  be a set-valued map defined by  $W(x) = Y \setminus (-\text{int}C(x))$  such that the graph of  $W$ ,  $\mathcal{G}(W)$ , is a closed set in  $X \times Y$ . Let  $T : K \rightarrow \mathcal{C}(X, Y)$  be a single-valued continuous mapping. Then the vector variational inequality problem (VVIP(II)) has a solution. That is, there exists  $x_0 \in K$  such that*

$$T_{x_0}(u - x_0) \notin -\text{int}C(x_0),$$

for every  $u \in K$ .

**Proof** Consider a set-valued map  $F : K \rightrightarrows K$  defined as

$$F(u) = \{x \in K : T_x(u - x) \notin -\text{int}C(x)\}.$$

The proof of the theorem is divided into two parts:

- (i)  $F$  is a KKM-mapping on  $K$ .
- (ii)  $F(u)$  is closed for each  $u \in K$ .

The proof of part (i) is similar to that of the Theorem 3.1. So, we are giving the proof of part (ii) only.

Let  $\{x_n\}$  be a net in  $F(u)$  with  $x_n \rightarrow x$ . As  $K$  is closed,  $x \in K$ . We have to show that  $x \in F(u)$ , that is,  $T_x(u - x) \notin -\text{int}C(x)$ . Since  $x_n \in F(u)$ ,  $T_{x_n}(u - x_n) \notin -\text{int}C(x_n)$ , which implies  $T_{x_n}(u - x_n) \in W(x_n)$ , which gives  $\{(x_n, T_{x_n}(u - x_n))\} \subseteq \mathcal{G}(W)$ . Now, as  $x_n \rightarrow x$  and  $T$  is continuous, we have  $T_{x_n} \rightarrow T_x$ . Also,  $x_n \rightarrow x$ , implies  $u - x_n \rightarrow u - x$ . Since the topology of  $\mathcal{C}(X, Y)$  is admissible, we have  $T_{x_n}(u - x_n) \rightarrow T_x(u - x)$ , which gives  $\{(x_n, T_{x_n}(u - x_n))\} \rightarrow (x, T_x(u - x))$ . Since  $\mathcal{G}(W)$  is closed,  $(x, T_x(u - x)) \in \mathcal{G}(W)$ , which implies  $T_x(u - x) \notin -\text{int}C(x)$ . Hence,  $x \in F(u)$  and hence  $F(u)$  is closed.

Now, for each  $u \in K$ ,  $F(u)$  is a closed subset of  $K$ . As  $K$  is compact,  $F(u)$  is compact. Therefore by KKM-Theorem, we have  $\bigcap_{u \in K} F(u) \neq \emptyset$ . Hence, there exists  $x_0 \in K$  such that  $x_0 \in \bigcap_{u \in K} F(u)$ , that is,  $T_{x_0}(u - x_0) \notin -\text{int}C(x_0)$  for every  $u \in K$ . □

Here, we provide an example to illustrate our results as well as to show that our result is independent of the result obtained by Chen in [6].

**Example 3.3** Consider  $X = l^2$ , the set of all square summable sequences in  $\mathbb{R}$  under the usual norm  $\|\cdot\|$  and  $Y = \mathbb{R}$ , the set of all real numbers. Let  $K \subset X$ , be the Hilbert cube of  $l^2$ , that is,  $x \in K$  if and only if  $x = \{x_n\}_{n \in \mathbb{N}}$  with  $|x_n| \leq \frac{1}{n}$  for  $n \in \mathbb{N}$ . Clearly,  $K$  is nonempty, closed, convex, and compact. Let  $C : K \rightrightarrows Y$  be defined by  $C(x) = \mathbb{R}^+ \cup \{0\}$ , for every  $x \in K$ . Then  $C(x)$  is a closed convex pointed cone with  $\text{int } C(x) \neq \emptyset$ , and  $-\text{int}C(x) = (-\infty, 0)$ , for each  $x \in K$ . Let  $T : K \rightarrow \mathcal{C}(X, Y)$  be defined by  $T_x(u) = -\langle x, u \rangle = -\sum x_i u_i$ , where  $x = \{x_i\}$  in  $K$  and  $u = \{u_i\}$  is in  $X$ . That the induced topology of  $\mathcal{C}(X, Y)$  is admissible can be verified by the fact that if  $\{x_n\}$  converges to  $x$  in  $X$  and  $\{f_n\}$  converges to  $f$  in  $\mathcal{C}(X, Y)$ , then we have

$$\begin{aligned} \|f_n(x_n) - f(x)\| &= \|f_n(x_n) - f_n(x) + f_n(x) - f(x)\| \\ &\leq \|f_n(x_n) - f_n(x)\| + \|f_n(x) - f(x)\| \\ &\leq \|f_n\| \|x_n - x\| + \|f_n(x) - f(x)\|. \end{aligned}$$

Hence,  $f_n(x_n) \rightarrow f(x)$ .

We take  $x_0 = \{-\frac{1}{n}\}$ . Then for any  $x = \{x_n\}$  in  $K$ , we have,  $T_{x_0}(x - x_0) = -\langle x_0, x - x_0 \rangle = -\sum (-\frac{1}{n})(x_n + \frac{1}{n}) = \sum \frac{1}{n}(x_n + \frac{1}{n}) \geq 0$ , as  $|x_n| \leq \frac{1}{n}$ . Therefore  $T_{x_0}(x - x_0) \notin -\text{int}C(x_0)$ . Hence,  $x_0$  is a solution for the vector variational inequality problem.

$T$  is not  $C$ -monotone: Let  $T : X \rightarrow \mathcal{C}(X, Y)$  be a mapping and let  $C$  be a closed convex pointed cone.  $T$  is called  $C$ -monotone [6] if and only if for every pair  $x, u \in X$ , we have  $\langle T(u) - T(x), u - x \rangle \in C$ .

Now,  $\langle T(u) - T(x), u - x \rangle = \langle T(u - x), u - x \rangle = T_{u-x}(u - x) = -\sum (u_i - x_i)^2 \notin C$ , for  $u_i \neq x_i$  for some  $i$ . Hence,  $T$  is not  $C$ -monotone.

In the following result, we discuss some topological properties of the solution sets obtained above.

**Theorem 3.4** *The solution set for the vector variational inequality problem VVIP(I) (resp. VVIP(II)) obtained using the method provided in Theorem 3.1 (resp. Theorem 3.2) is closed as well as compact.*

**Proof** Let  $F : K \rightrightarrows K$ , be the set-valued map defined by

$$F(u) = \{x \in K : T_x(u - x) \notin -\text{int}C\}.$$

Then by Theorem 3.1, the solution set  $\mathcal{S}$  of the vector variational inequality problem (VVIP(I)) is given by  $\mathcal{S} = \bigcap_{u \in K} F(u)$ . As shown in Theorem 3.1 (resp. Theorem 3.2)

that  $F(u)$  is closed for every  $u \in K$ . Therefore  $\bigcap_{u \in K} F(u)$  is closed, that is,  $\mathcal{S}$  is closed.

Also,  $\mathcal{S}$  being a closed subset of a compact set  $K$ , is compact.  $\square$

## Conclusion

Our study here shows that the vector variational inequality problems can be studied from a purely topological point of view. The authors have not come across any such results so far in the literature where function space topology is being used to establish the existence of solution of such problems. It would be interesting to see whether this approach may be used for other variants of variational inequality problems.

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## MAHATMA GANDHI'S WRITINGS AND THE INDIAN IDENTITY IN SOUTH AFRICA

Dr. Sushmita Rajwar<sup>1</sup>Ms. Looke Kumari<sup>2</sup>

*Mahatma Gandhi's arrival in South Africa and the events that unfolded thereafter changed the course of history not only for the people of South Africa but also for the people of India. As is commonly said that, Gandhi became Mahatma only in South Africa when he was inspired to take up the cause of the South African Indians right during his visit to the country. The campaigns that he led in Natal, South Africa, the ideology that he developed during those years led the foundation of the Indian freedom struggle. Gandhi could also achieve and influence large number of South African Indians with the help of his writings. He was a brilliant writer and could bring together people from various walks of life to stand for some common issues. The documents he wrote and the newspapers he started acted like a tool to mobilise the Indian people as well as to alert the colonial ruler that they are not going to keep quiet and submit to all sorts of injustice. This spirit continued among the people of South Africa and the Indians have continued to fight for their rights and raise their voices against any kind of injustices, even after Gandhi left South Africa.*

**Keyword:** Mahatma Gandhi, Indian Diaspora, South African Indians, Indentureship, Indian Opinion.

Mahatma Gandhi's role in the history of South African Indians is well-known and well-documented. The 21-year long stay in South Africa brought a complete change in Gandhi as an individual and also brought about a change in the thinking of the South African Indian population. Gandhi gave the Indians various tools and taught them numerous methods to fight the injustice of the colonial rule and live a life of dignity. Accomplishing what he could in these decades was not an easy plight but a task in itself. Gandhi went to South Africa to work for an Indian businessman. He met many Indians in South Africa who were doing well for themselves but lacked perspective. They seemed quite lost because of the increasingly repressive policies of the British. Gandhi realised this quite early what the Indians of South Africa needed. He knew that they needed someone to bring them together, to mobilise them for common causes, to realise and feel each other's pain and to fight the oppressor together. Gandhi used the medium of writing in a bold manner to convey his thoughts and ideas. The ideas of Swaraj, Non-Violence were able to reach to a large audience with the help of his writings. In this paper, I would highlight the role and influence of his writings starting from *The Green Pamphlet* to *Hind Swaraj* in influencing the identity of the Indian Diaspora. Gandhi realised the importance of media especially print media in reaching out to the public widely. Therefore, he started his newspaper *Indian Opinion* which would be an Indian newspaper. Indian media became a powerful tool to mobilise the populations towards important ideas for the economy, society and polity of South Africa. *The Green Pamphlet: The Grievances of the British Indians in South Africa: An Appeal to the Indian Public* was published in 1896 became the most important publication that brought into light the conditions and treatment of the Indians in South Africa. This document was a very strong reply to some of the white newspapers published in South Africa, who also referred to Indians in derogatory languages. Gandhi wrote this document in Rajkot, Gujarat during one of his India visits. As Gandhi writes:

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“The man in the street hates him, curses him, spits upon him and often pushes him off the foot path. The Press cannot find a sufficiently strong word in the English dictionary to damn him with”..... “These parasites”.....“wily, wretched semi-barbarous Asiatics”, he is Ramysamy, he is Mr. Samy, he is Mr. Coolie, the black man”.

This document was an open appeal to the British rule stating the grievances of the Indians in South Africa. Gandhi talked about particular cases of injustice, cruelty against the Indians in South Africa by the administrators at various times in Durban as well as other places. This was the first time in the history of the Indians in South Africa that someone talked about such important issues in the public. The document appealed to the British to treat Indians as humans above all else. It raised the issue of disenfranchisement of the Indians through a Bill passed by the Natal Government. The Government had clearly stated that all those who are not of European origin will not be allowed to vote which was supported by Mr. Chamberlain. The Bill was passed on the grounds that the Indian Vote is going to swamp the European votes was high. Gandhi stated how Indians oppose this bill completely and their voting right should be recognised.

Gandhi also talked about the Bill passed by Natal Government that imposed a £3 tax on the Indians who chose not to return to India after the end of their indenture. This was inhumane and could not be accepted. In the document, Gandhi narrated an incidence that took place with an Indian man named Balasundaram in 1894 who was so ill-treated by his master that his teeth were broken and he was bleeding profusely. The man came to Gandhi who tried to help him by filing his complaint in the court. Gandhi gave the option of transfer of Balasundaram's service by his master and he would then take back his complaint. But later the Balasundaram had to take back his complaint and reach a mutual settlement with his master. This was the plight of an ordinary indenture Indian that he was unable to even avail justice for himself (Gandhi, 1896).

The documented highlighted the conditions of the British Indians. It brought into light the injustice by the British government towards their subjects in different provinces of South Africa. Gandhi provided all the details with substantial proof there were no assumptions or lies stated by him. The British considered it an anti-government publication and were so much infuriated by it that when Gandhi returned from his India visit to Durban, they didn't allow his ship to dock for three days.

### **Gandhi as an Influencer through Newspapers**

Gandhi turned into a freedom fighter and was successful in leading a political career but much before that, he became a flawless and intriguing writer in South Africa. His life and experiences in South Africa taught him to rely on writings and newspaper was the only medium to reach a wider audience during those times. His writings completely reflected the phase of the political struggle he was going through during that time. These writings not only made the public more informed and mobilised towards a common goal but also inspired him to do more. Gandhi had the best communication skills one could ask for in a writer. He was smart enough to publish in different languages as he understood that Indian Diaspora is multi-lingual and he needs to reach a wider audience. Gandhi had mentioned that he got hold of his first newspaper in England when he went to study law in the year 1888. But, in South Africa he launched the most successful newspaper in their history and wrote numerous articles for it.

When Gandhi reached South Africa, he realised that the South African Indians were being subjected to oppression by the colonial British government. Gandhi thought that media was a most important channel to communicate these events of oppression to the world. Thus, he came into contact with a large number of media houses and started writing to them and giving them interviews like *The Hindu*, *The Statesman*, *Pioneer*, *The Madras Standard* and many others in India as well as in South Africa. He tried to gain the

support of many editors in India during his visit to India from South Africa (Chatterjee, Mrinal & Sambit Pal, 2018). Gandhi expressed himself openly saying that publicity is the best and only defence that we have.

But writing in many newspapers, giving interviews to established media houses and writing letters to the editor was not giving Gandhi what he needed. He wanted to send out a loud and clear message to the world that the colonial government is exploiting the Indians and they do not deserve the treatment they are being given. He was hoping to spread the message as well as mobilise the South African Indians themselves who had no idea how to negotiate and what to ask from the government in their favour. With this came the idea of publishing the newspaper, *Indian Opinion* in 1903. It became the most successful newspaper in leading the political opinion amongst the Indian origin people of South Africa.

### **Newspaper as an Institution**

This first issue of *Indian Opinion* was published on 4<sup>th</sup> June 1903. The Natal Indian Congress also supported MK Gandhi for bringing together printing of the newspaper. The Secretary of Natal Indian Congress Mansukhlal Nazar served as the first editor of the newspaper. Later, Manilal Gandhi became the longest serving editor of the newspaper.

In the first issue of *Indian Opinion*, Gandhi set his agenda clear. He wrote:

“our countrymen in South Africa are without the guiding influence of the institutions that exist in India, and that impart the necessary moral tone when it is wanting” (Gandhi, 1903 a)

Gandhi was creating an influence among the Indians by stressing on some of the important aspects. Firstly, Gandhi was referring to *Indian Opinion* as an institution in itself which is going to guide, motivate, mobilise and keep the Indian identity together. In the inaugural issue of the newspaper he referred to the strength of the Indian community in South Africa, who are certainly going to impact the political regime and may also identify what is ‘good’ and what can be termed as ‘evil’. This was indicative of the strength to impact public opinion that the Indian community had in South Africa. According to Gandhi, it was extremely important for the Indians to know of their strength before they could start raising their voices for their due right (Pandey, 2018).

The newspaper did phenomenal work in establishing itself as an institution as people used to wait for the upcoming issue and were deeply touched by the various issues raised by Gandhi. In one of the articles Gandhi talked about how the number of Indentured Indian labour was increasing rapidly. Till the end of the year 1903, there was a total number of 81,390 Indian labour in South Africa. This brought in the need to look at the conditions in which the Indian labour was surviving. There were deaths due to many diseases like plague, pneumonia etc. which was alarming. However, it was noteworthy that the amount of savings of 2,029 Indians who returned to India in 1903 was £ 34,690 only. So, the argument given by the British government that Indians who have reached to the end of the indenture contract can return to India with a hefty amount of profit and can start a new venture (Gandhi, 1904 a).

Gandhi stated clearly that Indians are against the indenture labour system as it is a form of slavery and they would hail the day when the Indian immigration is completely stopped. He also stated that the Indians have not only benefitted the plantations of the colonial rulers by working as indentured labour but as free Indians they have also benefitted the economy of the colony in a great manner (Gandhi, 1904 b). There were many counter arguments like these which were given by Gandhi to reply to the British authorities. Through *Indian Opinion* Gandhi also raised the issue of education of Indian children. He mentioned how Indian children are being deprived of facilities that could develop them intellectually. Gandhi mentioned how Indian children could not attend the general schools after the age of thirteen and were only being given elementary education in the Indian schools. He was worried that they were not being given the best



education and it would hamper the overall development of the community (Gandhi, 1909).

### **Indians as 'One'**

Secondly, Gandhi did not refer to Indians by their regional or linguistic identities. The newspaper *Indian Opinion* was mainly for the Indian Diaspora centered around their issues and concerns. Gandhi decided to publish the paper in Hindi, English, Gujarati and Tamil so that, he could reach to all the different communities of the Indian Diaspora present in Natal during that time. There were significant number of Hindus, Mohammedans, Tamilians, Gujaratis who were being recognised as well as the English population. At the same time, Gandhi referred to all of the them as British Indians and not by their particular identity. The idea was not to neglect their distinct identity but to bring all of them together under a common agenda.

Referring to this diversity Gandhi wrote in his article 'The uses of adversity' *Indian Opinion* (Gandhi, 1903 d) that "...if we have brought from India these divisions and differences as a very valuable cargo.....there is no doubt that it would clog us at every step and hinder our progress".

Gandhi also fought for the rights of all communities separately, for example when a Mohammedan who had recently married in India tried to enter Transvaal with his wife, the administration refused her entry saying that they do not recognise the marriage. This became an issue of concern as Gandhi said that from now on all the marriages that took place in India and do not have a marriage certificate, will not be recognised by the colonial administration and they might deny to recognise all women living with their husbands. This issue though started from one particular community, was taken up by Gandhi for the welfare of all Indians living in Natal, South Africa (Gandhi, 1913).

### **The Oppressive Indenture Labour System**

Thirdly, Gandhi had also pointed out how the British economy was dependent on the indentured labour system and they would not end it by any means. Gandhi's famous editorial titled 'The Lion and the Lamb' (Gandhi, 1903 c) starts with the story of the lion and lamb where the lion starts accusing the lamb for the muddy water in the stream. Gandhi compared this with the Europeans who are now pin pointing every blame on the Indian. The Indians having prospered, have built palaces in the city which the British cannot allow. Therefore, the Asiatic Bazaar proposal and the Immigration Act changes were being opposed by the Indians. Gandhi proposed that Britishers should stop this immigration if it is difficult for them to manage Indians. He said:

"we say with all earnestness, we can command: stop the immigration..." (Gandhi, 1903 c)

Through his writing in the *Indian Opinion*, Gandhi was referring to the strength of the Indian community in South Africa. He talked in detail about the conditions of the Indian Indentured labour in South Africa and even proposed that the government should put an end to the immigration. His concern for the abolition of indentureship was completely evident in various columns of *Indian Opinion*. He made it clear that the conditions of the contract were not favorable for Indians and because of this indentureship, Indians are being treated in a particular derogatory way by the coloniser. He wrote many articles that talked about the problems, issues and proposed solutions for the problems of indentured Indians for example: The British Indians in South Africa, The Lion and the Lamb, Immigration Bill, The Labour Question in Transvaal.

Later, Gandhi fought hard for putting a permanent ban on the Indian immigration with the help of the Indian leaders. However, Gandhi started off his campaign against the indentureship system as a liberal rather than as a nationalist and his campaigning was centered on the fight against discrimination rather than on any political aspiration at this point of time. In South Africa, Gandhi's work gave special attention to the inequality that Indians were faced with in the Transvaal and the Orange Free State. His protests

were focused on the laws, which prevented Indians from obtaining employment other than in the menial tasks, and the poll tax of £3 for entry into Transvaal. He sought the aid of the Congress in bringing the indentured labour problem to the notice of the Government of India and even when he attempted to do this initially, he was only permitted a limited time to speak about it. The emigration of Indians to South Africa occupies much space in the Indian nationalist discourse because of the work of Gandhi in South Africa who was mainly responsible for communicating to India and to Gokhale and Naoroji in particular, about the conditions of Indians there. 1900-1910 was the period when the issue of Indentured labour acquired an important position in the Indian nationalist discourse. Many nationalist leaders were openly opposing indentureship.

The resolution moved in the Imperial Legislative Council in 1912, by Gopal Krishna Gokhale which was defeated (22 voting for and 33 against) says:

'... this Council recommends to the Governor-General-in-Council that the Government of India should now take the necessary steps to prohibit the recruitment of Indian labourers under contract of indenture, whether for employment at home or in any British Colony' (Gokhale, 1912). He also said that the indenture system is very much degrading for the people of India as they are merely reduced to 'coolies'<sup>3</sup> no matter what their position may be. Gandhi said Indian has been portrayed as a 'filthy being' without any virtue (Gandhi, 1903 b). Another resolution to stop indentureship was introduced by Madan Mohan Malaviya on 20<sup>th</sup> March, 1916 which was also defeated. In 1917 Gandhi threatened to call for a Satyagraha if the indentured emigration system was not abolished by the end of March of that year. Finally, the indentured labour migration was stopped on 20<sup>th</sup> March, 1917.

### **Political Mobilisation of Indians**

Fourthly, Gandhi also aimed at carrying forward the idea of Indianness and in the process uniting the regional fragmentations that existed within the South African Indians. Most of the columns of *Indian Opinion* attempted to unite Indians against the discriminatory practice of the Britishers. He also made attempts to negotiate with the colonisers and all his interactions were published in *Indian Opinion*. He brought out everything in the open and stressed that Indians should fight for their rights, better and humane working conditions from the British and not merely being treated as coolies. The *Indian Opinion* 11.06.1903 published a detailed discussion between the British Indian Association and Lord Milner on the issue of taxes and passes for Indians.

There were many instances where Indians were being arrested for defying the Asiatics Registration Act and many were arrested for hawking without licences including Gandhi's son. The arrest of the Indians after the defying the registrations law was being considered as an act of honor. The release of Imam Abdool Kadir and other Satyagrahis who were sentenced to four days imprisonment was being celebrated across the Indian population. The celebratory speeches united Indians belonging to different identities (Gandhi, 1908). There were many people being arrested one after the other for hawking without licenses and the magistrate gave most of them option of paying a fine or opting for rigorous imprisonment, each of them chose the latter (Gandhi, 1908).

Gandhi's writings in the newspaper motivated people to be more courageous than ever. He showed way to the Indian community, clearly taking them forward along the path. Why were they refusing the licenses from the British government? Was known to everyone and now refusing to accept the government's

<sup>3</sup> The term 'Coolie' came to be associated with the indentured labour who travelled to far flung locations mainly to work in different plantations like sugarcane, coffee. There were many negative connotations of the term as the term 'coolie' brought back all the oppression against the Indians and practice of racism by the colonisers. But there are scholars who have tried to push the positive meaning of this multi-layered term. For some it denotes a sense of identity and belonging which cannot be forgotten.

decision was important. Therefore, Gandhi urged them not to acquire certificates and even if they are asked to produce them, they should refuse. The option of going to jail was better than giving in to the demands of the British government (Gandhi, 1908).

Gandhi's letter to Gokhale provides sufficient evidence how he tied his best to politically mobilise the Indians in South Africa. He sought help from their home country as well and highlighted the fact that Indians in the colony of South Africa are in the worst condition as compared to any other colony around the world. His correspondence with Gokhale were helpful in pressuring the Indian National Congress to take up the issue of indentured Indians with the British which led to the abolition of indentureship.

### Conclusion

Mahatma Gandhi was a brilliant writer. He captivated the audience with his choice of words. When he realised that the Indians in South Africa needed him, he devoted his life and family towards the cause of the Indians living in South Africa. He took the help of pamphlets, documents, speeches and most importantly newspapers in different vernacular languages. His knowledge and experience as a lawyer helped not only the Indian community to regain their lost rights but also the black community who were all suffering under the colonial rule. His newspaper *Indian Opinion* had been the most impactful amongst all his other writing as this was the document which

The racial discrimination policy of the colonisers was so much evident in South Africa that Gandhi made every effort to fight it. With this fighting spirit, he gave the Indian community courage and hope for a better future where they can also enjoy rights under the colonial ruler. Therefore, even when Gandhi returned to India in 1914 and joined the national independence movement back home, the Indians in South Africa continued to be influenced by the promising ideas that Gandhi taught them. The protests and movements that continued even when Gandhi left South Africa had an imprint of Gandhi's methodology. This was the reason that the Indian community had a significant political contribution in the history of South Africa.

The formation of Natal Indian Congress paved the way for more and more political participation of Indians. As Gandhi left no stone unturned in analysing the proposed bills by the British government, he mobilised the Indians to read the legislations thoroughly in order to decide whether they should completely reject them or propose certain amendments in them. The newspaper *Indian Opinion* continued by his son, Manilal Gandhi after Mahatma Gandhi left for India, kept playing the leading role among Indians to politically motivate them. Therefore, one can say that if Mahatma Gandhi had not made the right efforts to consolidate the Indian community in South Africa at the right moment, the history of the Indian community in South Africa might have been different.

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Figure 3 demonstrates that the proposed plan achieved highest throughput than the other methods.

### Conclusion

In this paper, the performance of the existing algorithms like Directed Acyclic Graph (DAG), Queueing Network Based Traffic Flow Estimation (QNTFE), Load Balancing Based Route Optimization (LBRO), Queueing Network Based Edge Node Detection Using Pipelining (ENDUP) are compared with that of the proposed SALB-ED. The proposed piping stack approach has been fairly distributing the traffic among the nodes. Then the process performs 91% of delivery ratio as well as to gives 95% throughput ratio in the network. Also, the proposed stack approach achieved highest throughput than the other methods as far as progress rate, and delivery ratio.

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## Dalit Movement and Swami Achhutanand in Uttar Pradesh (1920s-1930s)

Dr. Mithilesh Kumar Mishra\*

This article concentrates on the Dalit movement in Uttar Pradesh during 1920s and 1930s and explores their experience of caste discrimination. It also examines the ways the Dalits in this region fashioned new identities and the nature and significance of caste and religion based social movements among them. Through this exploration I would like to understand how the Dalits of Uttar Pradesh comprehended their location in the caste society of colonial India. The historical enquiry into all these dimensions of Dalit movement and identity formation is based on the ideas and activities of a prominent Dalit leader, Swami Achhutanand, who was the founder of the Adi-Hindu movement.

Swami Achhutanand and other leaders of Adi-Hindu movement made Kanpur the centre of their activities in the 1920s and 1930s and attempted to create new forms of consciousness and identity among the Dalits. The Adi-Hindu ideology was formulated in the 1920s by a new generation of literate untouchables among whom Swami Achhutanand (1879-1933) was the most prominent. He was brought up at a military cantonment where his parents worked as a casual labourers. He later settled in Kanpur.<sup>1</sup>

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He along with many literate Dalit leaders who were concerned with the upliftment of the Dalits and to achieve this goal had initially joined the Arya Samaj which held the promise of liberating the Dalits from the bondage of the caste system through the process of 'Shuddhi' (purification). But since the 1920s these leaders gradually realized that the Arya Samaj was acting more like the 'army of high caste Hindus' and its only objective in working among the lowest caste groups was to rally the Hindu community against the Muslims.<sup>2</sup> Swami Achhutanand became critical of the Arya Samaj and resented that the Samaj merely aimed at making all Hindus "slaves of Vedas and the Brahmins."<sup>3</sup>

This realization coupled with the political reforms introduced by the British colonial government through the Montague- Chelmsford reform of 1919 convinced Swami Achhutanand and other Dalit leaders that the entry of untouchables into the hierarchical Hindu socio-religious order through the Arya Samaj would not further their interests.<sup>4</sup> Hence in search of a new ideology to repudiate the Vedic Hinduism and the caste system, they drew upon the Bhakti religion and formulated the ideology of Adi-Hinduism. Swami Achhutanand and other Adi Hindu leaders were of the opinion that Adi-Hindus were the inhabitants and rulers of India before the Aryan



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## Socio-Political Consciousness among Dalits: Struggle against Begari in UP

Dr. Mithilesh Kumar Mishra\*

*[The paper examines the protest by the Dalits against the continued practice of begari after the attainment of independence, and even after the abolition of untouchability. The legislative changes were not successful in bringing about major changes in the lives of Dalits. I would argue that the agitation by the Dalits was not acknowledged as a protest by the Congress government in the U.P. The official reports informed with this perspective, posited the distinction between the "Dalits" and the "public" in their reports of Dalits agitation. The paper shows how the different Dalit caste organizations, women and scheduled caste federations create the consciousness among Dalit society and they started to protest against this system. I would suggest that what is involved here is a particular understanding of the notion of politics. The government refused to recognize that the Dalits have any rights to protest. It is as if the Dalits were not part of the "public", which was constituted by the caste-Hindus, Muslims, Sikhs, and so forth, but not by the Dalits.]*

**W**hat is Begari? Begari or Begar was a system of forced labour practiced in the different regions of pre-Independence India where members of lower castes were compelled to perform unpaid work for the landlords or upper-caste elite people. It was practiced on a wide scale during the colonial period and it also continued even after independence. The person of the lower caste was forced to provide the service in the agricultural work, construction work, or any other domestic needs of the upper caste without any payment.

The socio-economic conditions of the members of Dalit community were not good; therefore, the upper caste people took this opportunity for begari and exploitation. We get different caste organizations and Scheduled Caste federations that create the consciousness among Dalit society and they started struggling against the exploitation of begari and demanded the proper wages in an organized manner in the post-independence years.

### The instances of Protest and Response

The protests by the Dalits were against the practice of begari. They were also in support of their demand for wages.<sup>2</sup> The Hindi newspaper Aaj (a popular newspaper published from Benaras) reported the clashes between the Chamars and Rajputs. The Police Abstract Intelligence reports mentioned that the Chamars had refused to perform begari and were demanding wages. The Dalits also wanted the Congress government to initiate measures that would improve "their standard of living", through better wages, housing and educational facilities for the Dalits, and reservation in the government posts.<sup>3</sup>

According to Police Intelligence reports the protest was organized by different Dalit castes, which constituted almost sixty percent of the total Scheduled Castes population in Uttar Pradesh. They provided the bulk of agricultural labour to the caste-Hindus and zamindars. In the zamindari areas of Awadh and Saryanpur Plain they constituted more than 90% of work force, in Eastern U.P. 96% of the workforce and in Western U.P. about 70% of agricultural labour.<sup>4</sup>

The Chamars protested against their supposed duty to remove dead bodies, either human or animal in a village. They also refused to

perform this task for the police, i.e. to remove a corpse. We can delineate two aspects of the Chamar protest, one against the caste-Hindus and the zamindar, the other against the police and state. In both cases, the opponent was the caste-Hindus or the Congress Government.

Their protest began in Jalaun district in early July 1948 and soon the Chamars from the adjoining districts began to participate in the protest.<sup>5</sup> The agitation, it seems, was limited to twelve districts of the province, comprising mainly the Western U.P. and Central U.P. The twelve districts consisted of Bijnor, Bulandshahr, Jalaun, Jaunpur, Jhansi, Etawah, Basti, Harodi, Hamirpur, Kanpur, Barielly and Sultanpur.<sup>6</sup>

The agitation continued until the middle of November, after which nothing was reported on these protests. There are no official reports available after 1948, especially the PAI reports. The paucity of sources is further compounded by absence of reports on Dalit in newspapers.

In the second kind of protests, the Dalits refused "to perform menial duties including removal of corpses connected with crimes."<sup>7</sup> The protest from Dalits created a major obstacle to the functioning of the police. In areas like Jainun, Kanpur and Hamirpur the police constables were compelled to perform the task of removing corpses.<sup>8</sup>

Like the caste-Hindus, the police in many areas did not hesitate to apply coercive measures to enforce the Dalits to work. In police station Bhutta of Bareilly, "the police forced four Chamars to take a dead body to the mortuary".<sup>9</sup> The Dalits were compelled to provide assistance to the police because they were Chamars, and not because they were appointed by the State.

Thus, the so-called menial duties undertaken for the police was begari imposed on Dalits for which they were also not paid. But this time the Dalits were determined to assert their rights. In Bareilly a group of 100 Chamars, organized a demonstration against the police, and approached the DM to initiate action against the culprits.<sup>10</sup> Similarly the Dalits were ready to fight the zamindars, in case they retaliated with violent methods.

In areas like Bijnor, Bulandshahr, Jaunpur, Etawah, Jalaun, the official reports mention such instances.<sup>11</sup> In Bijnor "the villagers retaliated by not permitting Dalits to graze cattle in their lands,

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## Research Article

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# Dual uniformities in function spaces over uniform continuity

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**Abstract:** The notion of dual uniformity is introduced on  $UC(Y, Z)$ , the uniform space of uniformly continuous mappings between  $Y$  and  $Z$ , where  $(Y, \mathcal{V})$  and  $(Z, \mathcal{U})$  are two uniform spaces. It is shown that a function space uniformity on  $UC(Y, Z)$  is admissible (resp. splitting) if and only if its dual uniformity on  $\mathcal{U}_Z(Y) = \{f^{-1}(U) \mid f \in UC(Y, Z), U \in \mathcal{U}\}$  is admissible (resp. splitting). It is also shown that a uniformity on  $\mathcal{U}_Z(Y)$  is admissible (resp. splitting) if and only if its dual uniformity on  $UC(Y, Z)$  is admissible (resp. splitting). Using duality theorems, it is also proved that the greatest splitting uniformity and the greatest splitting family open uniformity exist on  $\mathcal{U}_Z(Y)$  and  $UC(Y, Z)$ , respectively, and these two uniformities are mutually dual splitting uniformities.

**Keywords:** dual uniformity, uniform space, function space, splittingness, admissibility

**MSC 2020:** 54C35, 54A20

## 1 Introduction

In [1], Gupta et al. introduced the concept of uniform space over uniform continuity, wherein they introduced point-entourage uniformity and entourage-entourage uniformity on  $UC(Y, Z)$ , the family of uniformly continuous mappings between the uniform spaces  $(Y, \mathcal{V})$  and  $(Z, \mathcal{U})$  and gave a systematic study of properties of such uniform structures. Any metric on  $X$  generates a uniformity on  $X$ ; similarly, a uniformity on  $X$  generates a topology on  $X$ . The reverse of either of them is not true. In that sense, uniform spaces are positioned between metric spaces and topological spaces. Hence, structures in one of them are expected to have their counterpart in the other and *vice versa*. This is further evident from the fact that in [1], various concepts of function space topologies including admissibility, splittings, etc. have been introduced and successfully investigated for uniformities over uniform spaces (see also [2–9]). Some more relevant literature can be found in [10–12]. Recently, it has been shown that the admissibility of the function space topology for a pair of topological vector spaces provides sufficient conditions for the existence of a solution to variational inequality problems [13,14]. This motivates us for further study of this concept for uniform spaces too.

In this article, we introduce and study the concept of dual uniformity for the uniformities on  $UC(Y, Z)$ . We have come up with a good number of results of interest. It is found that a uniformity on  $UC(Y, Z)$  is admissible (resp. splitting) if and only if its dual uniformity on  $\mathcal{U}_Z(Y)$  is admissible (resp. splitting).

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Similarly, a uniformity on  $\mathcal{U}_Z(Y)$  is admissible (resp. splitting) if and only if its dual uniformity on  $UC(Y, Z)$  is admissible (resp. splitting). We have also proved the existence of the greatest splitting uniformity on  $\mathcal{U}_Z(Y)$  as well as the greatest splitting family open uniformity on  $UC(Y, Z)$ . In addition, it is shown that these two uniformities are mutually dual splitting uniformities. We also provide few examples to illustrate the concept of dual uniformity and how admissibility and splittingness of dual uniform spaces are connected with the uniform spaces.

## 2 Preliminaries

**Definition 2.1.** [15,16] A *uniform structure* or *uniformity* on a non-empty set  $X$  is a family  $\mathcal{U}$  of subsets of  $X \times X$  satisfying the following properties:

- (2.1.1) if  $U \in \mathcal{U}$ , then  $\Delta X \subseteq U$ ;  
where  $\Delta X = \{(x, x) \in X \times X \text{ for all } x \in X\}$ ;
- (2.1.2) if  $U \in \mathcal{U}$ , then  $U^{-1} \in \mathcal{U}$ ;  
where  $U^{-1}$  is called *inverse relation* of  $U$  and is defined as :

$$U^{-1} = \{(x, y) \in X \times X \mid (y, x) \in U\};$$

- (2.1.3) if  $U \in \mathcal{U}$ , then there exists some  $V \in \mathcal{U}$  such that  $V \circ V \subseteq U$ ;  
where the composition  $U \circ V = \{(x, z) \in X \times X \mid \text{for some } y \in X, (x, y) \in V \text{ and } (y, z) \in U\}$ ;
- (2.1.4) if  $U, V \in \mathcal{U}$ , then  $U \cap V \in \mathcal{U}$ ;
- (2.1.5) if  $U \in \mathcal{U}$  and  $U \subseteq V \subseteq X \times X$ , then  $V \in \mathcal{U}$ .

The pair  $(X, \mathcal{U})$  is called a *uniform space* and the members of  $\mathcal{U}$  are called *entourages*.

**Definition 2.2.** [17] A subfamily  $\mathcal{B}$  of a uniformity  $\mathcal{U}$  is called a *base* for  $\mathcal{U}$  if each member of  $\mathcal{U}$  contains a member of  $\mathcal{B}$ .

**Definition 2.3.** [17] A subfamily  $\mathcal{S}$  of a uniformity  $\mathcal{U}$  is called a *sub-base* for  $\mathcal{U}$  if the family of finite intersections of members of  $\mathcal{S}$  is a base for  $\mathcal{U}$ .

The finite intersection of the members of a sub-base generates a base. A uniformity is obtained by taking the collection of supersets of the members of its base.

**Theorem 2.4.** [17] A non-empty family  $\mathcal{U}$  of subsets of  $X \times X$  is a base for some uniformity on  $X$  if and only if conditions (2.1.1)–(2.1.4) defined above hold.

**Theorem 2.5.** [17] A non-empty family  $\mathcal{U}$  of subsets of  $X \times X$  is a sub-base for some uniformity on  $X$  if and only if conditions (2.1.1)–(2.1.3) defined above hold.

In particular, the union of any collection of uniformities on  $X$  forms a sub-base for a uniformity for  $X$ .

**Definition 2.6.** [17] Let  $(X, \mathcal{U})$  and  $(Y, \mathcal{V})$  be two uniform spaces. A mapping  $f : X \rightarrow Y$  is called *uniformly continuous* if for each  $V \in \mathcal{V}$ , there exists  $U \in \mathcal{U}$  such that  $f_2[U] \subset V$  (where  $f_2 : X \times X \rightarrow Y \times Y$  is a map corresponding to  $f$  defined as  $f_2(x, x') = (f(x), f(x'))$  for  $(x, x') \in X \times X$ ), that is,  $f(U_1) \times f(U_2) \subseteq V$ , where  $U = U_1 \times U_2$ .

The following concepts and definitions were introduced in [1]:

The collection of all uniformly continuous functions from  $X$  to  $Y$  is denoted by  $UC(X, Y)$ . Let  $\mathcal{A}$  be a uniformity on  $UC(X, Y)$ . Then the pair  $(UC(X, Y), \mathcal{A})$  is called a *uniform space over uniformly continuous mappings* or *uniform space over uniform continuity*.

**Definition 2.7.** Let  $(Y, \mathcal{U})$  and  $(Z, \mathcal{V})$  be two uniform spaces and let  $(X, \mathcal{W})$  be another uniform space. Then for a map  $g : X \times Y \rightarrow Z$ , we define  $g^* : X \rightarrow UC(Y, Z)$  by  $g^*(x)(y) = g(x, y)$ .

The mappings  $g$  and  $g^*$  related in this way are called *associated maps*.

**Definition 2.8.** [1] Let  $(Y, \mathcal{U})$  and  $(Z, \mathcal{V})$  be two uniform spaces. A uniformity  $\mathcal{A}$  on  $UC(Y, Z)$  is called

- (1) *admissible* if for each uniform space  $(X, \mathcal{W})$ , uniform continuity of  $g^* : X \rightarrow UC(Y, Z)$  implies uniform continuity of the associated map  $g : X \times Y \rightarrow Z$ ;
- (2) *splitting* if for each uniform space  $(X, \mathcal{W})$ , uniform continuity of  $g : X \times Y \rightarrow Z$  implies uniform continuity of  $g^* : X \rightarrow UC(Y, Z)$ , where  $g^*$  is the associated map of  $g$ .

### 3 Main results

#### 3.1 Dual uniformity concerning $UC(Y, Z)$

In this section, we introduce the concept of dual uniform spaces for the uniform spaces over  $UC(Y, Z)$ .

**Definition 3.1.** Let  $(Y, \mathcal{V})$  and  $(Z, \mathcal{U})$  be two uniform spaces. Then we define:

$$\mathcal{U}_Z(Y) = \{f_2^{-1}(U) \mid f \in UC(Y, Z), U \in \mathcal{U}\}.$$

**Definition 3.2.** Let  $(Y, \mathcal{V})$  and  $(Z, \mathcal{U})$  be two uniform spaces and  $UC(Y, Z)$  be the class of all uniformly continuous mappings from  $Y$  to  $Z$ . Then for subsets  $\mathbb{H} \subset \mathcal{U}_Z(Y) \times \mathcal{U}_Z(Y)$ ,  $\mathcal{H} \subset UC(Y, Z) \times UC(Y, Z)$ , and  $U \in \mathcal{U}$ , we define:

$$\begin{aligned}\mathbb{H}_U &= \{(f, g) \mid (f_2^{-1}(U), g_2^{-1}(U)) \in \mathbb{H}, f, g \in UC(Y, Z)\}, \\ \mathcal{H}_U &= \{(f_2^{-1}(U), g_2^{-1}(U)) \mid (f, g) \in \mathcal{H}\}.\end{aligned}$$

**Definition 3.3.** Let  $(Y, \mathcal{V})$  and  $(Z, \mathcal{U})$  be two uniform spaces. Let  $\mathfrak{U}$  be a sub-base for a uniformity on  $\mathcal{U}_Z(Y)$ . Then we define:

$$S(\mathfrak{U}) = \{\mathbb{H}_U \mid \mathbb{H} \in \mathfrak{U}, U \in \mathcal{U}\}.$$

**Theorem 3.4.**  $S(\mathfrak{U})$  is a sub-base for a uniformity on  $UC(Y, Z)$ .

**Proof.** By Theorem 2.5, it is enough to show that  $S(\mathfrak{U})$  satisfies conditions (2.1.1)–(2.1.3).

- (1) Let  $\mathbb{H}_U \in S(\mathfrak{U})$  and  $f \in UC(Y, Z)$ . Since  $\mathbb{H} \in \mathfrak{U}$  and  $\mathfrak{U}$  is a sub-base for a uniformity on  $\mathcal{U}_Z(Y)$ , we have  $(f_2^{-1}(U), f_2^{-1}(U)) \in \mathbb{H}$  for all  $f \in UC(Y, Z)$  and  $U \in \mathcal{U}$ . Thus, we have  $(f, f) \in \mathbb{H}_U$  for all  $f \in UC(Y, Z)$ . Hence,  $\Delta \subset \mathbb{H}_U$ .
- (2) Let  $\mathbb{H}_U \in S(\mathfrak{U})$  and  $(f, g) \in \mathbb{H}_U$ . Then we have  $(f_2^{-1}(U), g_2^{-1}(U)) \in \mathbb{H}$ . Since  $\mathbb{H} \in \mathfrak{U}$ , there exists  $\mathbb{H}^{-1} \in \mathfrak{U}$ . Thus, we have  $(g_2^{-1}(U), f_2^{-1}(U)) \in \mathbb{H}^{-1}$ . Hence, we have  $(g, f) \in \mathbb{H}_U^{-1} \in S(\mathfrak{U})$ .
- (3) Let  $\mathbb{H}_U \in S(\mathfrak{U})$ . Since  $\mathbb{H} \in \mathfrak{U}$  and  $\mathfrak{U}$  is a sub-base for a uniformity on  $\mathcal{U}_Z(Y)$ , there exists an entourage  $\mathbb{G} \in \mathfrak{U}$  such that  $\mathbb{G} \circ \mathbb{G} \subset \mathbb{H}$ . Now, we claim that  $\mathbb{G}_U \circ \mathbb{G}_U \subset \mathbb{H}_U$ , where  $\mathbb{G}_U \in S(\mathfrak{U})$ . Let  $(f, g) \in \mathbb{G}_U \circ \mathbb{G}_U$ . Then there exists  $h \in UC(Y, Z)$  such that  $(f, h) \in \mathbb{G}_U$  and  $(h, g) \in \mathbb{G}_U$ . Then we have  $(f_2^{-1}(U), h_2^{-1}(U)) \in \mathbb{G}$

and  $(h_2^{-1}(U), g_2^{-1}(U)) \in \mathbb{G}$  and so  $(f_2^{-1}(U), g_2^{-1}(U)) \in \mathbb{G} \circ \mathbb{G}$ . Since  $\mathbb{G} \circ \mathbb{G} \subset \mathbb{H}$ , we have  $(f_2^{-1}(U), g_2^{-1}(U)) \in \mathbb{H}$ , that is,  $(f, g) \in \mathbb{H}_U$ . Hence, we have  $\mathbb{G}_U \circ \mathbb{G}_U \subset \mathbb{H}_U$ .

Therefore,  $S(\mathfrak{U})$  forms a sub-base of a uniformity over  $UC(Y, Z)$ .  $\square$

Uniformity generated by the sub-base  $S(\mathfrak{U})$  is called the *dual uniformity* to  $\mathfrak{U}$  and it is denoted by  $\mathfrak{U}(\mathfrak{U})$ . Similarly, we define:

**Definition 3.5.** Let  $(Y, \mathcal{V})$  and  $(Z, \mathcal{U})$  be two uniform spaces. Let  $\mathfrak{V}$  be a sub-base for a uniformity on  $UC(Y, Z)$ . Then we define:

$$S(\mathfrak{V}) = \{\mathcal{H}_U \mid \mathcal{H} \in \mathfrak{V}, U \in \mathcal{U}\}.$$

**Theorem 3.6.** Let  $\mathfrak{V}$  be a sub-base for a uniformity on  $UC(Y, Z)$ . Then  $S(\mathfrak{V})$  is a sub-base for a uniformity on  $\mathcal{U}_Z(Y)$ .

**Proof.** By Theorem 2.5, it is enough to show that  $S(\mathfrak{V})$  satisfies conditions (2.1.1)–(2.1.3).

- (1) Let  $\mathcal{H}_U \in S(\mathfrak{V})$ , and  $f_2^{-1}(U) \in \mathcal{U}_Z(Y)$  so that  $f \in UC(Y, Z)$ . Since  $\mathcal{H} \in \mathfrak{V}$  and  $\mathfrak{V}$  is a sub-base for a uniformity on  $UC(Y, Z)$ , we have  $(f, f) \in \mathcal{H}$ . Thus,  $(f_2^{-1}(U), f_2^{-1}(U)) \in \mathcal{H}_U$  for all  $f_2^{-1}(U) \in \mathcal{U}_Z(Y)$  and (2.1.1) holds.
- (2) Let  $\mathcal{H}_U \in S(\mathfrak{V})$  and  $(f_2^{-1}(U), g_2^{-1}(U)) \in \mathcal{H}_U$ . Then we have  $(f, g) \in \mathcal{H}$ . Since  $\mathcal{H} \in \mathfrak{V}$ , there exists  $\mathcal{H}^{-1} \in \mathfrak{V}$ . Thus, we have  $(g, f) \in \mathcal{H}^{-1}$ . Hence, we have  $(g_2^{-1}(U), f_2^{-1}(U)) \in \mathcal{H}_U^{-1} \in S(\mathfrak{V})$ .
- (3) Let  $\mathcal{H}_U \in S(\mathfrak{V})$ . Since  $\mathcal{H} \in \mathfrak{V}$  and  $\mathfrak{V}$  is a sub-base for a uniformity on  $UC(Y, Z)$ , there exists an entourage  $\mathcal{A} \in \mathfrak{V}$  such that  $\mathcal{A} \circ \mathcal{A} \subset \mathcal{H}$ . Now, we claim that  $\mathcal{A}_U \circ \mathcal{A}_U \subset \mathcal{H}_U$ , where  $\mathcal{A}_U \in S(\mathfrak{V})$ . Let  $(f_2^{-1}(U), g_2^{-1}(U)) \in \mathcal{A}_U \circ \mathcal{A}_U$ . Then there exists  $h \in UC(Y, Z)$  such that  $(f_2^{-1}(U), h_2^{-1}(U)) \in \mathcal{A}_U$  and  $(h_2^{-1}(U), g_2^{-1}(U)) \in \mathcal{A}_U$ . Then we have  $(f, h) \in \mathcal{A}$  and  $(h, g) \in \mathcal{A}$  and so  $(f, g) \in \mathcal{A} \circ \mathcal{A}$ . Since  $\mathcal{A} \circ \mathcal{A} \subset \mathcal{H}$ , we have  $(f, g) \in \mathcal{H}$ , that is,  $(f_2^{-1}(U), g_2^{-1}(U)) \in \mathcal{H}_U$ . Hence, we have  $\mathcal{A}_U \circ \mathcal{A}_U \subset \mathcal{H}_U$ .

Therefore,  $S(\mathfrak{V})$  forms a sub-base of a uniformity over  $\mathcal{U}_Z(Y)$ .  $\square$

Uniformity generated by the sub-base  $S(\mathfrak{V})$  is called *dual uniformity* to  $\mathfrak{V}$  and is denoted by  $\mathfrak{U}(\mathfrak{V})$ . We explain the above with the help of the following examples:

**Example 3.7.** Let  $Y = \mathbb{R}$  be the set of all real numbers. Then, consider the family of subsets of  $\mathbb{R} \times \mathbb{R}$

$$U_\varepsilon = \{(x, y) \mid |x - y| < \varepsilon\}$$

for  $\varepsilon > 0$ . The uniform structure generated by the subsets  $U_\varepsilon$  for  $\varepsilon > 0$  is called the *Euclidean uniformity* of  $\mathbb{R}$ . We say, a subset  $D \subseteq \mathbb{R} \times \mathbb{R}$  is an entourage if for some  $\varepsilon > 0$ , we have  $U_\varepsilon \subseteq D$ .

Let  $Z = \mathbb{Z}$  be the set of integers. Then the *p-adic uniform* structure on  $\mathbb{Z}$ , for a given prime number  $p$ , is the uniformity  $\mathcal{U}$  generated by the subsets  $\mathbb{Z}_n$  of  $\mathbb{Z} \times \mathbb{Z}$ , for  $n = 1, 2, 3, \dots$ , where  $\mathbb{Z}_n$  is defined as follows:

$$\mathbb{Z}_n = \{(k, m) \mid k \equiv m \pmod{p^n}\}.$$

Let  $Y = \mathbb{R}$  be the set of real numbers with Euclidean uniformity  $\mathcal{V}$  and  $Z = \mathbb{Z}$  be the set of integers with *p-adic uniform* structures  $\mathcal{U}$ . Let  $UC(\mathbb{R}, \mathbb{Z})$  be the collection of all the uniformly continuous functions from the uniform space  $Y$  to  $Z$ . Consider the point-entourage uniformity for  $UC(\mathbb{R}, \mathbb{Z})$  defined in [1], having a sub-base defined as:

$$S_{p, \mathcal{U}} = \{(x, \mathbb{Z}_n) \mid x \in \mathbb{R}, \mathbb{Z}_n \in \mathcal{U}\},$$

where

$$(x, \mathbb{Z}_n) = \{(f, g) \in UC(Y, Z) \times UC(Y, Z) \mid (f(x), g(x)) \in \mathbb{Z}_n\}.$$

Here, structure of the point-entourage uniformity is the collection of all the pair  $(f, g)$  of uniformly continuous functions from  $\mathbb{R}$  to  $\mathbb{Z}$  such that  $f(x) - g(x)$  is divisible by  $p^n$  for some  $x \in \mathbb{R}$  and  $n \in \mathbb{N}$ .

Now, we define the dual of the point-entourage uniformity as follows:

Consider

$$((x, \mathbb{Z}_n), \mathbb{Z}_m) = \{(f_2^{-1}(\mathbb{Z}_m), g_2^{-1}(\mathbb{Z}_m)) \mid (f, g) \in (x, \mathbb{Z}_n)\},$$

for some  $n, m \in \mathbb{N}$ .

Let  $\mathfrak{V}$  denote a sub-base for the point-entourage uniformity defined as above, on  $UC(Y, Z)$ . Then, consider

$$S(\mathfrak{V}) = \{((x, \mathbb{Z}_n), \mathbb{Z}_m) \mid \text{for some } n, m \in \mathbb{N} \text{ and } x \in \mathbb{R}\}.$$

It can be easily verified that  $S(\mathfrak{V})$  satisfies the first three conditions of Definition 2.1. Thus,  $S(\mathfrak{V})$  forms a sub-base for the dual of the point-entourage uniformity.

**Example 3.8.** Let  $Y = \mathbb{R}$  be the set of real numbers with Euclidean uniformity  $\mathcal{V}$  and  $Z = \mathbb{Z}$  be the set of integers with  $p$ -adic uniform structures  $\mathcal{U}$ . Let  $UC(\mathbb{R}, \mathbb{Z})$  be the collection of all the uniform continuous functions from the uniform space  $Y$  to  $Z$ .

Now, consider the entourage-entourage uniformity for  $UC(\mathbb{R}, \mathbb{Z})$  defined in [1] having a sub-base defined as:

$$S_{\mathcal{V}, \mathcal{U}} = \{(U_\varepsilon, \mathbb{Z}_n) \mid U_\varepsilon \in \mathcal{V}, \mathbb{Z}_n \in \mathcal{U}\},$$

where

$$(U_\varepsilon, \mathbb{Z}_n) = \{(f, g) \in UC(Y, Z) \times UC(Y, Z) \mid (f(U_1), g(U_2)) \subseteq \mathbb{Z}_n\} \cup \{(f, f) \mid f \in UC(Y, Z)\},$$

where  $U_\varepsilon = U_1 \times U_2$ .

Now, we define the dual of this entourage-entourage uniformity as follows.

Consider

$$((U_\varepsilon, \mathbb{Z}_n), \mathbb{Z}_m) = \{(f_2^{-1}(\mathbb{Z}_m), g_2^{-1}(\mathbb{Z}_m)) \mid (f, g) \in (U_\varepsilon, \mathbb{Z}_n)\},$$

for some  $\varepsilon > 0$ , and  $n, m \in \mathbb{N}$ .

Let  $Y = \mathbb{R}$  and  $Z = \mathbb{Z}$  be the set of real numbers and integers, respectively. Let  $\mathfrak{V}_1$  be a sub-base for the entourage-entourage uniformity defined above on  $UC(Y, Z)$ .

Then, consider

$$S(\mathfrak{V}_1) = \{((U_\varepsilon, \mathbb{Z}_n), \mathbb{Z}_m) \mid \text{for some } n, m \in \mathbb{N} \text{ and } \varepsilon > 0\}.$$

It can be easily verified that  $S(\mathfrak{V}_1)$  satisfies the first three conditions of Definition 2.1. Thus,  $S(\mathfrak{V}_1)$  forms a sub-base for the dual of the entourage-entourage uniformity.

### 3.2 Duality theorems

Now we introduce the notion of admissibility and splittingness on  $\mathcal{U}_Z(Y)$  and investigate them between a uniformity on  $UC(Y, Z)$  and its dual.

**Definition 3.9.** Let  $(Y, \mathcal{V})$  and  $(Z, \mathcal{U})$  be two uniform spaces. Let  $(X, \mathcal{W})$  be another uniform space. Let  $g : X \times Y \rightarrow Z$  and  $g^* : X \rightarrow UC(Y, Z)$  be two associated maps. Then we define a map  $\bar{g} : X \times \mathcal{U} \rightarrow \mathcal{U}_Z(Y)$  as  $\bar{g}(x, U) = [g^*(x)]_2^{-1}(U)$ , for every  $x \in X$  and  $U \in \mathcal{U}$ .

**Definition 3.10.** Let  $(Y, \mathcal{V})$  and  $(Z, \mathcal{U})$  be two uniform spaces. Let  $(X, \mathcal{W})$  be another uniform space. A map  $M : X \times \mathcal{U} \rightarrow \mathcal{U}_Z(Y)$  is called *uniformly continuous with respect to the first variable* if the map



$M_U : X \rightarrow \mathcal{U}_Z(Y)$  defined by  $M_U(x) = M(x, U)$  is uniformly continuous for every  $x \in X$  and for some fixed  $U \in \mathcal{U}$ .

Now we define the admissibility and splittingness of the uniform space  $(\mathcal{U}_Z(Y), \mathfrak{U})$ .

**Definition 3.11.** Let  $(Y, \mathcal{V})$  and  $(Z, \mathcal{U})$  be two uniform spaces. The uniform space  $(\mathcal{U}_Z(Y), \mathfrak{U})$  is

- (1) *admissible* if for any uniform space  $(X, \mathcal{W})$  and every map  $g : X \times Y \rightarrow Z$ , uniform continuity with respect to the first variable of the map  $\bar{g} : X \times \mathcal{U} \rightarrow \mathcal{U}_Z(Y)$  implies the uniform continuity of the map  $g : X \times Y \rightarrow Z$ ;
- (2) *splitting* if for any uniform space  $(X, \mathcal{W})$  and every map  $g : X \times Y \rightarrow Z$ , uniform continuity of the map  $g : X \times Y \rightarrow Z$  implies uniform continuity with respect to the first variable of the map  $\bar{g} : X \times \mathcal{U} \rightarrow \mathcal{U}_Z(Y)$ .

In this section, we investigate how duality links the admissibility and splittingness of a uniform space  $UC(Y, Z)$  and that on  $\mathcal{U}_Z(Y)$ .

**Theorem 3.12.** Let  $(Y, \mathcal{V})$  and  $(Z, \mathcal{U})$  be two uniform spaces and  $\mathfrak{B}$  be a sub-base for a uniformity  $\mathfrak{U}$  on  $\mathcal{U}_Z(Y)$ . Then the uniform space  $(\mathcal{U}_Z(Y), \mathfrak{U})$  is splitting if and only if the dual uniform space  $(UC(Y, Z), \mathfrak{V}(\mathfrak{U}))$  generated by  $\mathfrak{U}$  is splitting.

**Proof.** Let the uniformity  $\mathfrak{U}$  on  $\mathcal{U}_Z(Y)$  be splitting, that is for every uniform space  $(X, \mathcal{W})$ , uniform continuity of the map  $g : X \times Y \rightarrow Z$  implies uniform continuity with respect to the first variable of the map  $\bar{g} : X \times \mathcal{U} \rightarrow \mathcal{U}_Z(Y)$ . We have to show that its dual uniform space  $(UC(Y, Z), \mathfrak{V}(\mathfrak{U}))$  is splitting. That is, uniform continuity of the map  $g : X \times Y \rightarrow Z$  implies the uniform continuity of its associated map  $g^* : X \rightarrow UC(Y, Z)$ . Let  $g : X \times Y \rightarrow Z$  be uniformly continuous. Since  $(\mathcal{U}_Z(Y), \mathfrak{U})$  is splitting, by definition  $\bar{g} : X \times \mathcal{U} \rightarrow \mathcal{U}_Z(Y)$  is uniformly continuous with respect to the first variable. Let  $H_U$  be any entourage in the dual uniformity of  $UC(Y, Z)$ , where  $H$  is an entourage of the uniform space  $(\mathcal{U}_Z(Y), \mathfrak{U})$ . Since the map  $\bar{g} : X \times \mathcal{U} \rightarrow \mathcal{U}_Z(Y)$  is uniformly continuous with respect to the first variable, that is, the map  $\bar{g}_U : X \rightarrow \mathcal{U}_Z(Y)$  is uniformly continuous and  $H \in \mathfrak{U}$ , we have the set  $A = \{(x, x') \in X \times X \mid (\bar{g}_U(x), \bar{g}_U(x')) \in H\} \in \mathcal{W}$ . We have to show that the map  $g^* : X \rightarrow UC(Y, Z)$  is uniformly continuous. It is sufficient to show that there exists a set  $B = \{(x, x') \in X \times X \mid (g^*(x), g^*(x')) \in H_U\}$  is an entourage in  $(X, \mathcal{W})$ . We claim that  $A = B$ . Let  $(x, y) \in B$ , that is,  $(g^*(x), g^*(y)) \in H_U$ . Thus we have,  $([g^*(x)]_2^{-1}(U), [g^*(y)]_2^{-1}(U)) \in H$  and  $(\bar{g}(x, U), \bar{g}(y, U)) \in H$ . Hence, we have  $(\bar{g}_U(x), \bar{g}_U(y)) \in H$  and  $B \subset A$ . Similarly, let  $(x, x') \in A$ . Therefore, we have  $(\bar{g}_U(x), \bar{g}_U(x')) \in H$ . Thus,  $(\bar{g}(x, U), \bar{g}(x', U)) \in H$ , which implies  $([g^*(x)]_2^{-1}(U), [g^*(x')]_2^{-1}(U)) \in H$ . We have  $(g^*(x), g^*(x')) \in H_U$ . Hence, we have  $A \subset B$  and thus  $A = B$ . Therefore, the map  $g^*$  is uniformly continuous.

Conversely, suppose  $(UC(Y, Z), \mathfrak{V}(\mathfrak{U}))$  is splitting. We show that  $(\mathcal{U}_Z(Y), \mathfrak{U})$  is splitting. Let  $g : X \times Y \rightarrow Z$  be uniformly continuous. We will show that  $\bar{g} : X \times \mathcal{U} \rightarrow \mathcal{U}_Z(Y)$  is uniformly continuous with respect to the first variable. Since  $(UC(Y, Z), \mathfrak{V}(\mathfrak{U}))$  is splitting, by definition  $g^* : X \rightarrow UC(Y, Z)$  is uniformly continuous. Let  $U \in \mathcal{U}$  and  $H$  be any entourage in  $(\mathcal{U}_Z(Y), \mathfrak{U})$ . Therefore,  $H_U$  is an entourage in the dual uniform space  $(UC(Y, Z), \mathfrak{V}(\mathfrak{U}))$ . As the map  $g^*$  is uniformly continuous, the set  $\{(x, x') \in X \times X \mid (g^*(x), g^*(x')) \in H_U\}$  is an entourage in uniform space  $(X, \mathcal{W})$ . By applying similar logic as in the previous part, we obtain that the  $\{(x, x') \in X \times X \mid (\bar{g}_U(x), \bar{g}_U(x')) \in H\}$  is a member of  $(X, \mathcal{W})$ . Hence, the map  $\bar{g}$  is uniformly continuous with respect to the first variable. Therefore,  $(\mathcal{U}_Z(Y), \mathfrak{U})$  is splitting.  $\square$

**Theorem 3.13.** Let  $(Y, \mathcal{V})$  and  $(Z, \mathcal{U})$  be two uniform spaces,  $\mathfrak{A}$  be a sub-base for a uniformity  $\mathfrak{A}$  on  $UC(Y, Z)$ . Then the uniform space  $(UC(Y, Z), \mathfrak{A})$  is splitting if and only if the dual uniform space  $(\mathcal{U}_Z(Y), \mathfrak{U}(\mathfrak{A}))$  generated by  $\mathfrak{A}$  is splitting.

**Proof.** Let  $(UC(Y, Z), \mathfrak{A})$  be a splitting uniform space. We have to show that its dual uniform space  $(\mathcal{U}_Z(Y), \mathfrak{U}(\mathfrak{A}))$  is also splitting. For this, it is sufficient to show that for any uniform space  $(X, \mathcal{W})$ , uniform continuity of the map  $g : X \times Y \rightarrow Z$  implies uniform continuity with respect to the first variable of the map

$\bar{g} : X \times \mathcal{U} \rightarrow \mathcal{U}_Z(Y)$ . Suppose  $g : X \times Y \rightarrow Z$  is uniformly continuous. Since  $(UC(Y, Z), \mathfrak{A})$  is splitting, by definition  $g^* : X \rightarrow UC(Y, Z)$  is uniformly continuous. We will show that  $\bar{g} : X \times \mathcal{U} \rightarrow \mathcal{U}_Z(Y)$  is uniformly continuous with respect to the first variable. Let  $\mathcal{H}_U$  be any entourage in the dual uniform space  $(\mathcal{U}_Z(Y), \mathfrak{U}(\mathfrak{V}))$ . Then we have  $\mathcal{H} \in \mathfrak{U}$  is an entourage in uniform space  $(UC(Y, Z), \mathfrak{A})$ . Since the map  $g^* : X \rightarrow UC(Y, Z)$  is uniformly continuous, there exists an entourage  $A \subset X \times X$  such that  $g_2^*(A) \subset \mathcal{H}$ . Consider  $(x, y) \in A$ . Therefore, we have  $(g^*(x), g^*(y)) \in \mathcal{H}$ . Since  $U \in \mathcal{U}$ , we have  $([g^*(x)]_2^{-1}(U), [g^*(y)]_2^{-1}(U)) \in \mathcal{H}_U$ , which implies  $(\bar{g}(x, U), \bar{g}(y, U)) \in \mathcal{H}_U$ , which further implies  $(\bar{g}_U(x), \bar{g}_U(y)) \in \mathcal{H}_U$ . Hence, we have  $[\bar{g}_U]_2(A) \subset \mathcal{H}_U$ . Therefore, the map  $\bar{g}$  is uniformly continuous with respect to the first variable. Hence, the result.

Conversely, suppose the uniform space  $(\mathcal{U}_Z(Y), \mathfrak{U}(\mathfrak{V}))$  is splitting. We show that the space  $(UC(Y, Z), \mathfrak{A})$  is also splitting. Let  $g : X \times Y \rightarrow Z$  be uniformly continuous. Since  $(\mathcal{U}_Z(Y), \mathfrak{U}(\mathfrak{V}))$  is splitting, by definition the map  $\bar{g} : X \times \mathcal{U} \rightarrow \mathcal{U}_Z(Y)$  is uniformly continuous with respect to the first variable. We have to show that the map  $g^* : X \rightarrow UC(Y, Z)$  is also uniformly continuous. Let  $\mathcal{H} \in \mathfrak{A}$  be any entourage in  $(UC(Y, Z), \mathfrak{A})$ . For a fixed  $U \in \mathcal{U}$ ,  $\mathcal{H}_U$  is an entourage in the dual uniform space  $(\mathcal{U}_Z(Y), \mathfrak{U}(\mathfrak{V}))$ . For this fixed  $U \in \mathcal{U}$ , the map  $\bar{g}_U$  is uniformly continuous and since  $\mathcal{H}_U$  is an arbitrary entourage, there exists an entourage  $A \in \mathcal{W}$  of  $(X, \mathcal{W})$  such that  $[\bar{g}_U]_2(A) \subset \mathcal{H}_U$ . Consider  $(x, y) \in A$ . We have  $(\bar{g}_U(x), \bar{g}_U(y)) \in \mathcal{H}_U$ , that is,  $(\bar{g}(x, U), \bar{g}(y, U)) \in \mathcal{H}_U$ . Hence, we have  $([g^*(x)]_2^{-1}(U), [g^*(y)]_2^{-1}(U)) \in \mathcal{H}_U$ , which implies  $(g^*(x), g^*(y)) \in \mathcal{H}$  for all  $(x, y) \in A$ . Thus, we have  $g_2^*(A) \subset \mathcal{H}$ . Hence, the map  $g^*$  is uniformly continuous and the space  $(UC(Y, Z), \mathfrak{A})$  is splitting.  $\square$

Now, we illustrate the above results with the help of the following result. Here, we prove that the dual of the point-entourage uniformity defined in Example 3.7 is splitting.

**Proposition 3.14.** *Let  $Y = \mathbb{R}$  and  $Z = \mathbb{Z}$  be the set of real numbers and integers, respectively. Let  $\mathfrak{U}(\mathfrak{V})$  be the uniformity defined by the sub-base  $S(\mathfrak{V})$  on  $\mathcal{U}_Z(\mathbb{R})$ . Then the space  $(\mathcal{U}_Z(\mathbb{R}), \mathfrak{U}(\mathfrak{V}))$  is splitting.*

**Proof.** Let  $(X, \mathcal{W})$  be any uniform space. Since the point-entourage uniformity is splitting [1], it is sufficient to show that the uniform continuity of the map  $g^* : X \rightarrow UC(\mathbb{R}, \mathbb{Z})$  implies uniform continuity of the map  $\bar{g} : X \times \mathcal{U} \rightarrow \mathcal{U}_Z(\mathbb{R})$ .

Let for some  $x \in \mathbb{R}$  and for some given  $n, m \in \mathbb{N}$ ,  $((x, \mathbb{Z}_n), \mathbb{Z}_m)$  be any entourage in  $\mathcal{U}_Z(\mathbb{R})$ . Now,  $(x, \mathbb{Z}_n)$  is an entourage in  $UC(\mathbb{R}, \mathbb{Z})$  and the map  $g^*$  is uniformly continuous. Therefore, there exists an entourage  $A \subseteq X \times X$  such that  $g_2^*(A) \subseteq (x, \mathbb{Z}_n)$ . Let  $(a, b) \in A$ , then we have,  $(g^*(a), g^*(b)) \in (x, \mathbb{Z}_n)$ . Since  $\mathbb{Z}_m$  belongs to  $\mathcal{U}$ , we have  $([g^*(a)]_2^{-1}(\mathbb{Z}_m), [g^*(b)]_2^{-1}(\mathbb{Z}_m)) \in ((x, \mathbb{Z}_n), \mathbb{Z}_m)$ . Thus,  $(\bar{g}(a, \mathbb{Z}_m), \bar{g}(b, \mathbb{Z}_m)) \in ((x, \mathbb{Z}_n), \mathbb{Z}_m)$ , which implies  $(\bar{g}_{\mathbb{Z}_m}(a), \bar{g}_{\mathbb{Z}_m}(b)) \in ((x, \mathbb{Z}_n), \mathbb{Z}_m)$ . As  $(a, b) \in A$  was chosen arbitrarily; therefore, we have  $[\bar{g}_{\mathbb{Z}_m}]_2(A) \subseteq ((x, \mathbb{Z}_n), \mathbb{Z}_m)$ . Hence, the map  $\bar{g}$  is uniformly continuous with respect to the first variable. Therefore, the dual of point-entourage uniformity is also splitting.  $\square$

In the next set of theorem, we investigate that how admissibility links uniform space and its dual uniform space.

**Theorem 3.15.** *Let  $(Y, \mathcal{V})$  and  $(Z, \mathcal{U})$  be two uniform spaces. Let  $\mathfrak{B}$  be a sub-base for a uniformity  $\mathfrak{U}$  on  $\mathcal{U}_Z(Y)$ . Then the uniform space  $(\mathcal{U}_Z(Y), \mathfrak{U})$  is admissible if and only if its dual uniform space  $(UC(Y, Z), \mathfrak{V}(\mathfrak{U}))$  generated by  $\mathfrak{U}$  is admissible.*

**Proof.** Let the uniform space  $(\mathcal{U}_Z(Y), \mathfrak{U})$  be admissible. We show that its dual uniform space  $(UC(Y, Z), \mathfrak{V}(\mathfrak{U}))$  is also admissible, that is, for any uniform space  $(X, \mathcal{W})$  and the map  $g : X \times Y \rightarrow Z$ , uniform continuity of the map  $g^* : X \rightarrow UC(Y, Z)$  implies the uniform continuity of its associated map  $\bar{g} : X \times Y \rightarrow Z$ . Let  $g^* : X \rightarrow UC(Y, Z)$  be uniformly continuous and  $\mathbb{H} \in \mathfrak{B}$  be any entourage. Therefore, for a fixed  $U \in \mathcal{U}$ ,  $\mathbb{H}_U$  is an entourage in the dual uniform space  $(UC(Y, Z), \mathfrak{V}(\mathfrak{U}))$ . Since the map  $g^* : X \rightarrow UC(Y, Z)$  is uniformly continuous, there exists an entourage  $A \in \mathcal{W}$  such that  $g_2^*(A) \subset \mathbb{H}_U$ . For  $(x, x') \in A \subset X \times X$ , we have  $(g^*(x), g^*(x')) \in \mathbb{H}_U$ . Therefore,  $([g^*(x)]_2^{-1}(U), [g^*(x')]_2^{-1}(U)) \in \mathbb{H}$ , which implies  $(\bar{g}(x, U), \bar{g}(x', U)) \in \mathbb{H}$ . Hence, we have  $(\bar{g}_U(x), \bar{g}_U(x')) \in \mathbb{H}$ . Thus, we have  $\bar{g}_U(A) \subset \mathbb{H}$  and the map  $\bar{g}$  is uniformly continuous with

respect to the first variable. Then since  $(\mathcal{U}_Z(Y), \mathfrak{U})$  is admissible, by definition  $g : X \times Y \rightarrow Z$  is uniformly continuous and hence  $(UC(Y, Z), \mathfrak{V}(\mathfrak{U}))$  is admissible.

Conversely, suppose  $(UC(Y, Z), \mathfrak{V}(\mathfrak{U}))$  is admissible. We show that  $(\mathcal{U}_Z(Y), \mathfrak{U})$  is admissible. Let the map  $\bar{g} : X \times \mathcal{U} \rightarrow \mathcal{U}_Z(Y)$  be uniformly continuous with respect to the first variable and  $\mathcal{H}_U$  be any entourage in the dual uniform space  $(UC(Y, Z), \mathfrak{V}(\mathfrak{U}))$ . For  $U \in \mathcal{U}$ , the map  $\bar{g}_U : X \rightarrow \mathcal{U}_Z(Y)$  is uniformly continuous and  $\mathcal{H} \in \mathfrak{B}$ . Therefore, there exists an entourage  $A \subset X \times X$  in  $(X, \mathcal{W})$  such that  $[\bar{g}_U]_2(A) \subset \mathcal{H}$ . For  $(x, x') \in A$ , we have  $(\bar{g}_U(x), \bar{g}_U(x')) \in \mathcal{H}$ , that is,  $(\bar{g}(x, U), \bar{g}(x', U)) \in \mathcal{H}$ . Hence, we have  $([g^*(x)]_2^{-1}(U), [g^*(x')]_2^{-1}(U)) \in \mathcal{H}$ , which implies  $(g^*(x), g^*(x')) \in \mathcal{H}_U$  for all  $(x, x') \in A$ . Hence,  $g_2^*(A) \subset \mathcal{H}_U$ . Therefore, the map  $g^*$  is uniformly continuous and since  $(UC(Y, Z), \mathfrak{V}(\mathfrak{U}))$  is admissible, by definition  $g : X \times Y \rightarrow Z$  is uniformly continuous. Hence, the result.  $\square$

**Theorem 3.16.** *Let  $(Y, \mathcal{V})$  and  $(Z, \mathcal{U})$  be two uniform spaces. Then a uniform space  $(UC(Y, Z), \mathfrak{V})$  is admissible if and only if its dual uniform space  $(\mathcal{U}_Z(Y), \mathfrak{U}(\mathfrak{V}))$ , generated by  $\mathfrak{V}$ , is admissible.*

**Proof.** Let the uniform space  $(UC(Y, Z), \mathfrak{V})$  be admissible, that is, for each uniform space  $(X, \mathcal{W})$ , uniform continuity of  $g^* : X \rightarrow UC(Y, Z)$  implies uniform continuity of the associated map  $g : X \times Y \rightarrow Z$ . We show that its dual uniform space  $(\mathcal{U}_Z(Y), \mathfrak{U}(\mathfrak{V}))$  is admissible, that is, for every map  $g^* : X \rightarrow UC(Y, Z)$ , uniform continuity with respect to the first variable of the map  $\bar{g} : X \times \mathcal{U} \rightarrow \mathcal{U}_Z(Y)$  implies the uniform continuity of the map  $g : X \times Y \rightarrow Z$ . Let  $\bar{g} : X \times \mathcal{U} \rightarrow \mathcal{U}_Z(Y)$  be uniformly continuous with respect to the first variable and  $\mathcal{H} \in \mathfrak{V}$  be any entourage. Then, for a fixed  $U \in \mathcal{U}$ ,  $\mathcal{H}_U$  is an entourage in the dual uniform space  $(\mathcal{U}_Z(Y), \mathfrak{U}(\mathfrak{V}))$ . Since the map  $\bar{g} : X \times \mathcal{U} \rightarrow \mathcal{U}_Z(Y)$  is uniformly continuous with respect to first variable, we have  $U \in \mathcal{U}$  and the map  $\bar{g}_U : X \rightarrow \mathcal{U}_Z(Y)$  is uniformly continuous. Thus, for entourage  $\mathcal{H}_U$ , there exists an entourage  $A \in \mathcal{W}$  such that  $[\bar{g}_U]_2(A) \subset \mathcal{H}_U$ . For  $(x, x') \in A \subset X \times X$ , we have  $(\bar{g}_U(x), \bar{g}_U(x')) \in \mathcal{H}_U$  for all  $(x, x') \in A$ . Therefore,  $([g^*(x)]_2^{-1}(U), [g^*(x')]_2^{-1}(U)) \in \mathcal{H}_U$ , for all  $(x, x') \in A$ , which implies  $(g^*(x), g^*(x')) \in \mathcal{H}$ . Hence, we have  $g_2^*(A) \subseteq \mathcal{H}$ . Thus, the map  $g^* : X \rightarrow UC(Y, Z)$  is uniformly continuous. By definition  $g : X \times Y \rightarrow Z$  is uniformly continuous and hence the result.

Conversely, suppose  $(\mathcal{U}_Z(Y), \mathfrak{U}(\mathfrak{V}))$  is admissible. We show that the dual space  $(UC(Y, Z), \mathfrak{V})$  is admissible. Let  $g^* : X \rightarrow UC(Y, Z)$  be uniformly continuous and  $\mathcal{H}_U$  be any entourage in the dual uniform space  $(\mathcal{U}_Z(Y), \mathfrak{U}(\mathfrak{V}))$ . Then, for the entourage  $\mathcal{H} \in \mathfrak{V}$  and uniform continuity of the map  $g^* : X \rightarrow UC(Y, Z)$ , there exists an entourage  $A \subset X \times X$  in  $(X, \mathcal{W})$  such that  $g_2^*(A) \subset \mathcal{H}$ . For  $(x, x') \in A$ , we have  $(g^*(x), g^*(x')) \in \mathcal{H}$ , that is,  $([g^*(x)]_2^{-1}(U), [g^*(x')]_2^{-1}(U)) \in \mathcal{H}_U$ . Hence, we have  $[\bar{g}_U]_2(A) \subseteq \mathcal{H}_U$ , which implies that the map  $\bar{g}$  is uniformly continuous with respect to first variable. Then by definition  $g : X \times Y \rightarrow Z$  is uniformly continuous and hence the result.  $\square$

In the following, we show that the dual of entourage-entourage uniformity defined in Example 3.8 is admissible.

**Proposition 3.17.** *Let  $Y = \mathbb{R}$  and  $Z = \mathbb{Z}$  be the set of real numbers and integers, respectively. Let  $\mathfrak{U}(\mathfrak{V}_1)$  be the uniformity defined by the sub-base  $S(\mathfrak{V}_1)$  on  $\mathcal{U}_{\mathbb{Z}}(\mathbb{R})$ . Then the space  $(\mathcal{U}_{\mathbb{Z}}(\mathbb{R}), \mathfrak{U}(\mathfrak{V}_1))$  is admissible.*

**Proof.** Let  $Y = \mathbb{R}$  and  $Z = \mathbb{Z}$  be the set of real numbers and integers, respectively. Let  $\mathfrak{U}(\mathfrak{V}_1)$  be the uniformity defined by the sub-base  $S(\mathfrak{V}_1)$  on  $\mathcal{U}_{\mathbb{Z}}(\mathbb{R})$ . We have to show that the space  $(\mathcal{U}_{\mathbb{Z}}(\mathbb{R}), \mathfrak{U}(\mathfrak{V}_1))$  is admissible.

Let  $(X, \mathcal{W})$  be any uniform space. Then, we have to show that, for every map  $g^* : X \rightarrow UC(\mathbb{R}, \mathbb{Z})$ , uniform continuity with respect to the first variable of the map  $\bar{g} : X \times \mathcal{U} \rightarrow \mathcal{U}_{\mathbb{Z}}(\mathbb{R})$  implies the uniform continuity of the map  $g : X \times \mathbb{R} \rightarrow \mathbb{Z}$ .

Since the space  $UC(\mathbb{R}, \mathbb{Z})$  is admissible under entourage-entourage uniformity [1], it is sufficient to show that the map  $g^* : X \rightarrow UC(\mathbb{R}, \mathbb{Z})$  is uniformly continuous. Let for some  $\varepsilon > 0$ ,  $n \in \mathbb{N}$ ,  $(U_\varepsilon, \mathbb{Z}_n)$  be any entourage in  $UC(\mathbb{R}, \mathbb{Z})$ . Then for any given fixed  $\mathbb{Z}_m$ ,  $((U_\varepsilon, \mathbb{Z}_n), \mathbb{Z}_m)$  is an entourage in the dual space  $\mathcal{U}_{\mathbb{Z}}(\mathbb{R})$ . Since the map  $\bar{g} : X \rightarrow \mathcal{U}_{\mathbb{Z}}(\mathbb{R})$  is uniformly continuous with respect to the first variable, thus map  $\bar{g}_{\mathbb{Z}_m} : X \rightarrow \mathcal{U}_{\mathbb{Z}}(\mathbb{R})$  is uniformly continuous. Therefore, for the entourage  $((U_\varepsilon, \mathbb{Z}_n), \mathbb{Z}_m)$ , there exists

an entourage  $A \in \mathcal{W}$  such that  $[\bar{g}_{Z_m}]_2(A) \subseteq ((U_\varepsilon, Z_n), Z_m)$ . Let  $(a, b) \in A \subseteq X \times X$ , we have  $(\bar{g}_{Z_m}(a), \bar{g}_{Z_m}(b)) \in ((U_\varepsilon, Z_n), Z_m)$  for all  $(a, b) \in A$ . Therefore,  $([g^*(a)]_2^{-1}(Z_m), [g^*(b)]_2^{-1}(Z_m)) \in ((U_\varepsilon, Z_n), Z_m)$ . Thus, we have  $(g^*(a), g^*(b)) \in (U_\varepsilon, Z_n)$ . Hence,  $g^*(A) \subseteq (U_\varepsilon, Z_n)$ . Thus, the map  $g^* : X \rightarrow UC(\mathbb{R}, Z)$  is uniformly continuous. Hence, the proof.  $\square$

### 3.3 Mutually dual uniformities

In this section, we discuss about the mutually dual uniformities over the uniform spaces.

**Lemma 3.18.** *Let  $(Y, \mathcal{V})$  and  $(Z, \mathcal{U})$  be two uniform spaces. Then for  $\mathbb{H} \subseteq \mathcal{U}_Z(Y) \times \mathcal{U}_Z(Y)$ , we have  $\mathbb{H} = \bigcup \{(\mathbb{H}_U)_U \mid U \in \mathcal{U}\}$ .*

**Proof.** Let  $U \in \mathcal{U}$ . Then we have  $(\mathbb{H}_U)_U = \{(f_2^{-1}(U), g_2^{-1}(U)) \mid (f, g) \in \mathbb{H}_U\} = \{(f_2^{-1}(U), g_2^{-1}(U)) \mid (f_2^{-1}(U), g_2^{-1}(U)) \in \mathbb{H}\} \subseteq \mathbb{H}$ . Hence,  $\bigcup \{(\mathbb{H}_U)_U \mid U \in \mathcal{U}\} \subseteq \mathbb{H}$ .

Similarly, let  $V \in \mathbb{H}$ . Then for some  $U \in \mathcal{U}$  and  $f, g \in UC(Y, Z)$ , we have  $V = (f_2^{-1}(U), g_2^{-1}(U))$ . Since  $(f_2^{-1}(U), g_2^{-1}(U)) \in (\mathbb{H}_U)_U$ , we have  $\mathbb{H} \subseteq \bigcup \{(\mathbb{H}_U)_U \mid U \in \mathcal{U}\}$ . Therefore,  $\mathbb{H} = \bigcup \{(\mathbb{H}_U)_U\}$ .  $\square$

**Lemma 3.19.** *Let  $(Y, \mathcal{V})$  and  $(Z, \mathcal{U})$  be two uniform spaces. Let  $\mathfrak{U}_1$  and  $\mathfrak{U}_2$  be two uniformities on the set  $\mathcal{U}_Z(Y)$  such that  $\mathfrak{U}_1 \subset \mathfrak{U}_2$ . Then  $\mathfrak{V}(\mathfrak{U}_1) \subset \mathfrak{V}(\mathfrak{U}_2)$ .*

**Proof.** Let  $(Y, \mathcal{V})$  and  $(Z, \mathcal{U})$  be two uniform spaces and  $\mathfrak{U}_1, \mathfrak{U}_2$  be two uniformities on the set  $\mathcal{U}_Z(Y)$  such that  $\mathfrak{U}_1 \subset \mathfrak{U}_2$ . We have to show that  $\mathfrak{V}(\mathfrak{U}_1) \subset \mathfrak{V}(\mathfrak{U}_2)$ .

Let  $\mathbb{H}_U$  be any entourage in the dual uniform space  $\mathfrak{V}(\mathfrak{U}_1)$ . Thus,  $\mathbb{H}$  is an entourage in  $\mathfrak{U}_1$ . Therefore,  $\mathbb{H} \in \mathfrak{U}_2$  as well. Hence,  $\mathbb{H}_U \in \mathfrak{V}(\mathfrak{U}_2)$ . Hence, the result.  $\square$

**Lemma 3.20.** *Let  $(Y, \mathcal{V})$  and  $(Z, \mathcal{U})$  be two uniform spaces and  $\mathfrak{V}_1, \mathfrak{V}_2$  be two uniformities over  $UC(Y, Z)$  such that  $\mathfrak{V}_1 \subset \mathfrak{V}_2$ . Then  $\mathfrak{U}(\mathfrak{V}_1) \subset \mathfrak{U}(\mathfrak{V}_2)$ .*

**Proof.** Let  $(Y, \mathcal{V})$  and  $(Z, \mathcal{U})$  be two uniform spaces and  $\mathfrak{V}_1, \mathfrak{V}_2$  be two uniformities over  $UC(Y, Z)$  such that  $\mathfrak{V}_1 \subset \mathfrak{V}_2$ . Then we have to show that  $\mathfrak{U}(\mathfrak{V}_1) \subset \mathfrak{U}(\mathfrak{V}_2)$ .

Let  $\mathcal{H}_U$  be any entourage in the corresponding dual uniform space  $\mathfrak{U}(\mathfrak{V}_1)$ . Thus,  $\mathcal{H}$  is an entourage in  $\mathfrak{V}_1$ . Therefore,  $\mathcal{H} \in \mathfrak{V}_2$  as well. Hence,  $\mathcal{H}_U \in \mathfrak{U}(\mathfrak{V}_2)$ . Hence, the result.  $\square$

**Theorem 3.21.** *Let  $(Y, \mathcal{V})$  and  $(Z, \mathcal{U})$  be two uniform spaces and  $\mathfrak{U}$  be a uniformity over  $\mathcal{U}_Z(Y)$ . Then we have the following:*

- (1)  $\mathfrak{U} \subset \mathfrak{U}(\mathfrak{V}(\mathfrak{U})) \subset \mathfrak{U}(\mathfrak{V}(\mathfrak{U}(\mathfrak{V}(\mathfrak{U})))) \subset \dots$
- (2)  $\mathfrak{V}(\mathfrak{U}) \subset \mathfrak{V}(\mathfrak{U}(\mathfrak{V}(\mathfrak{U}))) \subset \mathfrak{V}(\mathfrak{U}(\mathfrak{V}(\mathfrak{U}(\mathfrak{V}(\mathfrak{U})))) \subset \dots$

**Proof.**

- (1) First, we show that  $\mathfrak{U} \subset \mathfrak{U}(\mathfrak{V}(\mathfrak{U}))$ . For this, let  $\mathbb{H} \in \mathcal{U}_Z(Y) \times \mathcal{U}_Z(Y)$ . Then from Lemma 3.18, we have  $\mathbb{H} = \bigcup \{(\mathbb{H}_U)_U \mid U \in \mathcal{U}\}$ . Therefore,  $\mathfrak{U} \subset \mathfrak{U}(\mathfrak{V}(\mathfrak{U}))$ . Thus, by using Lemmas 3.19 and 3.20, we obtained the required result.
- (2) Can be proved in a similar way.  $\square$

Now, we provide our main theorem of this section.

**Theorem 3.22.** *Let  $(Y, \mathcal{V})$  and  $(Z, \mathcal{U})$  be two uniform spaces. There exists the greatest splitting uniformity over  $\mathcal{U}_Z(Y)$ .*

**Proof.** Let  $\{\mathfrak{U}_i \mid i \in I\}$  be the set of all splitting uniformities over  $\mathcal{U}_Z(Y)$ . Consider  $\mathfrak{U} = \vee \{\mathfrak{U}_i \mid i \in I\}$ . We claim that  $\mathfrak{U}$  is the greatest splitting uniformity over  $\mathcal{U}_Z(Y)$ . From Theorem 3.12, it is sufficient to show that its dual uniform space  $(UC(Y, Z), \mathfrak{V}(\mathfrak{U}))$  is splitting.

Since  $(\mathcal{U}_Z(Y), \mathfrak{U}_i)$ ,  $i \in I$  are splitting uniform spaces, by Theorem 3.12, their dual uniform spaces  $(UC(Y, Z), \mathfrak{V}(\mathfrak{U}_i))$  are splitting. Let  $\sigma = \bigcup \{\mathfrak{U}_i \mid i \in I\}$ . Then  $\sigma$  forms a sub-base for  $\mathfrak{U}$ . In the light of Theorem 3.4,  $S(\sigma)$  is a sub-base for a uniformity on  $(UC(Y, Z), \mathfrak{V}(\mathfrak{U}))$ . On the other hand, we have  $S(\sigma) = \bigcup \{S(\mathfrak{U}_i) \mid i \in I\}$ . Since  $S(\mathfrak{U}_i)$  is sub-base for  $\mathfrak{V}(\mathfrak{U}_i)$ , we have  $S(\sigma)$  is a sub-base for  $\vee \{\mathfrak{V}(\mathfrak{U}_i) \mid i \in I\}$ , thus we have  $\mathfrak{V}(\mathfrak{U}) = \vee \{\mathfrak{V}(\mathfrak{U}_i) \mid i \in I\}$ . Since  $\mathfrak{V}(\mathfrak{U}_i)$  is splitting for every  $i \in I$ ,  $\vee \{\mathfrak{V}(\mathfrak{U}_i) \mid i \in I\}$  is also splitting. Therefore,  $\mathfrak{V}(\mathfrak{U})$  is also splitting and hence  $\mathfrak{U}$  is splitting.  $\square$

**Definition 3.23.** Let  $(Y, \mathcal{V})$  and  $(Z, \mathcal{U})$  be two uniform spaces. Then a uniformity on  $UC(Y, Z)$  (respectively  $\mathcal{U}_Z(Y)$ ) is said to be a *family-open uniformity* if it is a dual to a uniformity on  $\mathcal{U}_Z(Y)$  (respectively  $UC(Y, Z)$ );

**Definition 3.24.** Let  $(Y, \mathcal{V})$  and  $(Z, \mathcal{U})$  be two uniform spaces and let  $\mathfrak{U}$  and  $\mathfrak{V}$  be uniformities over  $\mathcal{U}_Z(Y)$  and  $UC(Y, Z)$ , respectively. Then the pair  $(\mathfrak{U}, \mathfrak{V})$  is called a *pair of mutually dual uniformities* if  $\mathfrak{U} = \mathfrak{U}(\mathfrak{V})$  and  $\mathfrak{V} = \mathfrak{V}(\mathfrak{U})$ , respectively.

Now we provide few more results regarding greatest splitting uniformities in the light of dual uniform spaces.

**Theorem 3.25.** Let  $(Y, \mathcal{V})$  and  $(Z, \mathcal{U})$  be two uniform spaces. Then there exists the greatest splitting family-open uniformity on  $UC(Y, Z)$ .

**Proof.** Let  $\mathfrak{U}$  be the greatest splitting uniformity on  $\mathcal{U}_Z(Y)$ . Now, we claim that the family-open uniformity  $\mathfrak{V}(\mathfrak{U})$  is the greatest splitting family open uniformity on  $UC(Y, Z)$ .

Let  $\mathfrak{U}' = \mathfrak{V}(\mathfrak{U}')$  be a splitting family-open uniformity on  $UC(Y, Z)$ . Thus from Theorem 3.12,  $\mathfrak{U}'$  is a splitting uniformity on  $\mathcal{U}_Z(Y)$ . Thus,  $\mathfrak{U}' \subset \mathfrak{U}$ . By Lemma 3.19,  $\mathfrak{V}(\mathfrak{U}') \subset \mathfrak{V}(\mathfrak{U})$ . Thus,  $\mathfrak{V}(\mathfrak{U})$  is the greatest splitting family open uniformity.  $\square$

**Theorem 3.26.** Let  $(\mathcal{U}_Z(Y), \mathfrak{U})$  and  $(UC(Y, Z), \mathfrak{V})$  be two uniform spaces. Let also  $\mathfrak{U}$  be the greatest-splitting uniformity and  $\mathfrak{V}$  be the greatest family-open uniformity on  $UC(Y, Z)$ . Then the pair  $(\mathfrak{U}, \mathfrak{V})$  is a pair of mutually dual splitting uniformities.

**Proof.** Let  $\mathfrak{U}$  be the greatest-splitting uniformity on  $\mathcal{U}_Z(Y)$  and  $\mathfrak{V}$  be the greatest family-open uniformity on  $UC(Y, Z)$ . Then from the last theorem, we have  $\mathfrak{V}(\mathfrak{U}) = \mathfrak{V}$ . In the view of Theorem 3.21, we have  $\mathfrak{U} \subset \mathfrak{U}(\mathfrak{V}(\mathfrak{U})) = \mathfrak{U}(\mathfrak{V})$ . Thus by Theorem 3.13, the uniformity  $\mathfrak{U}(\mathfrak{V})$  is also splitting. Thus,  $\mathfrak{U}(\mathfrak{V}) \subset \mathfrak{U}$ . Therefore, we have  $\mathfrak{U} = \mathfrak{U}(\mathfrak{V})$ . Hence, the pair  $(\mathfrak{U}, \mathfrak{V})$  forms a pair of mutually dual splitting uniformities.  $\square$

## 4 Conclusion

This article is a sequel to the authors' earlier investigations on uniformities on the space of uniformly continuous mappings between uniform spaces [1]. Here, it is shown that properties of splittingness and admissibility of uniformity on  $UC(Y, Z)$  implies the same for its dual uniformity on  $\mathcal{U}_Z(Y)$  and *vice versa*. The existence of the greatest splitting uniformity on  $UC(Y, Z)$  and the greatest family open splitting uniformity on  $\mathcal{U}_Z(Y)$  are established and their duality relations are examined. Similar studies were carried out earlier for function space topologies [4], but not for uniformities. Our investigation has shown that the same can be achieved for function space uniformities as well. However, it still remains open to investigate the relationship between a uniformity on  $UC(Y, Z)$  and that of the dual of its dual on  $\mathcal{U}_Z(Y)$ .

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# CRYPTO CONUNDRUM: BAN OR LIMITED NOD

## Abstract

*This article tries to find out the current concerns regarding the crypto currency. India has been engaged in a fierce debate over crypto currency. In India, crypto currency has been treated very conservatively, with the RBI imposing a ban. Although the ban has been reversed, the central bank's position has not changed. India is on a dual path of trying to regulate or even ban crypto currencies while at the same time encouraging the use of block chain technologies. The Government of India adopted a conservative stance on taxation by announcing a flat 30 per cent tax rate on income from digital virtual assets, or crypto, in the Budget 2022. The Government has also launched e rupee. One of the issues in G20 summit in September, 2023 is regulation of crypto currency. But still, it's impossible to predict when or in what form the crypto law will get through in India's Parliament. Different countries have their own ways of regulating crypto currency, but it is safe to say that India has so far been among the most closed to crypto currencies. Considering the global nature of trade nowadays even an international crypto currency can be evolved & regulated by international agencies like IMF and World Bank.*

## INTRODUCTION

Crypto currency is a digital currency which is used as a medium of exchange through a computer network. Crypto currency is an ever evolving and constantly changing technology that calls for a collective global response for regulatory action of ever-changing technology and technology-driven payment systems. In recent years, virtual currencies have become widely used by a wide range of systems [4]. In the e-business and e-commerce industries, exchanging virtual currency for real currency is a hot topic. It has been noted by authors that trading crypto currency for money is outright prohibited in certain countries and either permitted or unregulated in others [6]. Crypto currencies are unlikely to become a replacement for traditional fiat currency,



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but they could change the way global markets interact due to their internet connectivity, removing barriers between normative national currencies and exchange rates [5]. Block chain technology can have wider applications across many segments of the economy, most notable in financial services. Some countries might not support its use because of its lack

of control and illicit connections, but many have introduced regulations in an effort to reduce its use. Government of India has been rumored to be prepared to ban all private crypto-currencies, but allows for some exceptions in order to promote its application and underlying technology [1]. A legal status for bitcoin will require that businesses accept it as a means of payment alongside fiat currencies - such as the dollar, the rupee, etc.

### **OBJECTIVE OF THE STUDY**

The G20 is led by India from December 1, 2022, to November 30, 2023. India will hold 40 meetings across the nation as part of its G20 presidency's finance track. Crypto currencies and their regulation are one of the topics that will be discussed. Since the Government intends to introduce a Bill on crypto currencies in Parliament, there has been a heated debate about crypto currencies in India recently. The Finance Ministry has already imposed a 30 per cent tax on income from crypto currency from the assessment year 2022-23. As per the statement of the Finance Minister Ms Nirmala Sitharaman there was a need for taxation on income earned on crypto currencies as income was being earned from these currencies. There was no need to wait for any law to be framed to regulate crypto currencies to impose tax. Many crypto currency scams like bitconnect, Morriscoin, Ether Trade Asia, gainbitcoin, regalcoin, dekad, Karnataka Bitcoin scam have taken place in India. Indian citizens have lost over INR 72,000 Cr in these scams. In the wake of all these developments this research study will try to find out the current concerns regarding the crypto currency in India and put forth some suggestions for its regulation.

### **CONCERNS ABOUT CURRENT FORM OF CRYPTO CURRENCIES**

In its current form, crypto currencies pose a "systemic risk" not only to security but even to the Indian economy, according to several Financial Ministry officials, the RBI, tax departments, and even the financial intelligence unit (FIU). Many officials have also raised concerns over how crypto currencies are used and in case of a law allowing them will be continued to be used for

"illegitimate untraceable transactions" and this could "substantially reduce regulatory effectiveness." Some have raised issues regarding national security if crypto currencies are allowed. Concerns were raised over how in most cases cyber hackers and several others always demanded money in crypto currencies following cyber-attacks. Many stakeholders have said that only way crypto currencies can be allowed that too limitedly is if it is completely traceable. RBI has also raised concern over the impact on foreign exchange. The only way such transactions can be fully traceable is if the KYC of everyone involved in the transaction is known to the regulators. "That is from the person buying crypto currency in India, exchanges and corresponding seller outside India should submit their KYC details. Many officials also feel that only those crypto currencies that are mined in India should be allowed.

### **TREATMENT OF CRYPTO OR DIGITAL ASSETS/TOKENS**

There has been a major confusion over crypto assets in India due to multiple messaging by different stakeholders. The Confederation of Indian industry stated that the Government should treat crypto or digital tokens as a special class of 'securities'. In the context of crypto/digital tokens, the provisions of existing securities laws should not apply, and a new set of securities laws should be developed and implemented that is appropriate to the context of crypto/digital currencies and their jurisdictionless, decentralized nature. The regulatory focus would primarily be on dealing and custody, rather than on issuances, except where issuance entails an Initial coin offering to the public by an issuer established in India. The CEI suggested that the Government could establish centralized exchanges and centralized custody providers under SEBI.

The Government of India is yet to disclose its official position on block chain products. Technology backed by cryptography will be critical in the future and we need to understand how the Government will regulate it. A question that needs to be answered is whether crypto assets can be purchased outside India by using the liberalized remittance scheme (LRS) route, or if this will be

restricted.

### **TAXATION OF CRYPTOCURRENCIES**

The Government of India adopted a conservative stance on taxation by announcing a flat 30 per cent tax rate on income from digital virtual assets, or crypto, in the Budget 2022-23. The revenue from the transfer of virtual digital assets will now be subject to a 30 per cent tax, and losses cannot be offset against any other income. Furthermore, the recipient would be taxed if they received presents in the form of virtual digital assets. Except for acquisition costs, no deduction for any expense or allowance shall be permitted when calculating such revenue. The finance minister also suggested including TDS at a rate of 1 per cent of any payment made in connection with the transfer of a virtual digital asset above a certain level.

In India, the Government aims to track the income from crypto currency and investments both within and outside the country. It is also suggested that a few provisions of the Income Tax Act be amended to include words like crypto currency, crypto assets, and digital currency. The Government is also looking to amend foreign asset disclosure norms so that Indians will have to declare overseas, whether they hold crypto currency. Thus, those filing tax returns will be required to disclose their crypto currency investment and trading income specifically.

We are waiting to see what the government will do to regulate crypto exchanges, clarify the non-fungible token (NFT) and block chain technologies, as well as the transition period for crypto in India and holdings outside the country.

### **LAUNCH OF E-RUPEE**

On December 1, 2022 the Reserve Bank of India has launched e-rupee, a digital currency which is backed by block chain technology. e-Rupee is fiat currency backed by central bank of the country and is just like cash, the only difference being that it is a digital currency.

It is CBDC – Central Bank Digital Currency in the form of tokens having same denominations as current paper currencies. e-Rupee is very safe as it is based on block chain technology; can be instantly transferred as there is



no involvement of intermediaries like bank, no need of printing or managing the currency notes. Payments can be made through QR codes at merchant locations or from one wallet to another.

### REGULATION OF CRYPTO EXCHANGES

Currently there are around 25-30 Indian crypto exchanges, all almost offering similar services and backed by similar technology. Crypto currency exchanges may be required to seek licences from the designated regulators, as is the case with equity and commodity trading platforms, to ensure full oversight of the digital assets. They will be subject to net-worth norms and have to meet 'fit and proper' criteria like other exchanges under the proposed law. Crypto platforms would need to meet the minimum eligibility criteria like governance guidelines, and they may also need to present a business plan to satisfy the concerned regulator about long-term sustainability. Several platforms such as CoinDCS, WazirX and Zebpay facilitate trading in crypto currency. Under the regime being considered, existing crypto exchanges would be given time to comply with the eligibility norms. Further, the crypto platforms registered with the designated regulator would have to ensure know your customer requirement. Stock exchanges such as NSE and the BSE, could also be allowed to have separate crypto segments, much like the commodity and currency windows they have now.

It is claimed that there are 15 million registered users with a total investment at Rs 638crore [2]. Concerns have been rising over the increasing popularity of crypto currency as an investment. In order to protect our youth from the potential harm that can result from crypto currency, it is important that all democratic nations work together on cryptocurrency.

### MISLEADING COMMERCIALS PROMOTING CRYPTO CURRENCY.

In the light of concerns over misleading commercials promoting crypto currency, the Government is examining the advertising monitor's guidelines. To address investor concerns about regulatory uncertainty surrounding

**e-Rupee is fiat currency backed by central bank of the country and is just like cash, the only difference being that it is a digital currency**

virtual currencies, crypto currency exchanges have turned to targeted advertising and marketing campaigns [3]. During March 2021, exchanges experienced unprecedented growth and most of it was due to young people coming from smaller towns in India, who had little experience with the asset class and were attracted by ad campaigns featuring celebrities and to become overnight rich with small investments. Some advertisements of the crypto currency had been indicating as if it's like a deposit and said that the returns are four times that of fixed deposit rates. Especially in times of bad news, they are more likely to panic.

Government has raised concerns over transparency in crypto currency advertisements. As part of the Government's discussion, the Advertising Standards Council of India asked advertisers to disclose the risks associated with crypto advertisements so that consumers don't incorrectly view these products as legal tender, get allured by exaggerated returns and unfairly comparing crypto investments with regulated instruments.

### CRYPTO CURRENCY AND G 20

G 20 is a group of 20 countries formed after the Asian financial crisis of 1999 to resolve global economic and financial issues. India holds the Presidency of the G20 from 1 December 2022 to 30 November 2023. The G 20 summit will be held in September 2023. This forum is very important because it brings together 20 nations which represent 85 per cent of global GDP and have also invited the International Monetary Fund (IMF) and the Financial Stability Board (FSB). The Finance Minister of India has already announced that one of the agenda in financial sector of G20 will be regulation of crypto assets.

### SUGGESTIONS

- i. Crypto currencies have their own set of advantages and disadvantages. The issue of crypto currencies is a cheaper way of issuing currency in the country as it is digital wallet and does not require printing of currency and is also a safer mode as compared to printed notes as legal tender.
- ii. The theme of G20 summit is "Vasudhaiva Kutumbakam" which means "One Earth. One Family, One Future" which is based on Maha Upanishad. Keeping this motto in mind, the G20 countries may delve upon 'one digital currency' in all the countries issued on the basis of gold reserves. The trade amongst these countries can be done in terms of that digital currency thereby removing the problem of fluctuations in exchange rates of trading countries.
- iii. The transactions can be faster.
- iv. The world regulating bodies can make rules to regulate that currency so that no proliferation takes place.
- v. FDI laws and ancillary regulations should clarify whether crypto exchanges will be considered intermediaries and ecommerce marketplaces.
- vi. The crypto currency exchanges advertisements should specify associated risks similar to what mutual funds do.
- vii. A new agency can be formulated by Government to regulate crypto currency just as the SEBI regulates stock exchanges.

### CONCLUSION

The Government is not wholly opposed to digital money. It is a good thing that the Government has now included crypto currency in the 30 per cent tax bracket because it no longer appears to be completely illegal. Additionally, the fact that trading profits will now also be subject to taxation will increase investors' confidence. The introduction of e-rupee by the Government only shows that it is cognizant of global changes and will take the initiative in improving investments.

Additionally, this reassures people that digital money won't be banned. One of the opaque areas in the crypto world is the movement of coins to and from private wallets, and from one private wallet to another through peer to peer transactions. The crypto exchanges are of the view that they need to be more cautious, and prepare themselves for the regulations as and when they come. They need a self-governing framework, so that when the rules come it won't be tough for them to adopt. It's impossible to predict when or in what form the crypto law will pass in India's Parliament. Regulation of crypto currency varies from country to country. However, India is currently among the countries with conservative attitude towards crypto currencies. **MA**

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## किन्नर और सिनेमा (सड़क, तमन्ना, दरमियाँ, शबनम मौसी)

डॉ. अनीता सिंहमार  
भारती कॉलेज  
दिल्ली विश्वविद्यालय

भारतीय समाज में थर्ड जेंडर को कभी अच्छा नहीं समझा गया। थर्ड जेंडर मतलब जिसे किन्नर, हिजड़ा, अतरलिंगी भी कहा जाता है। जहाँ महिलाओं को 'देवी', 'ताड़न की अधिकारी' और पुरुषों को स्वयं घोषित 'देवता' माना जाता रहा है, लेकिन जिनकी गिनती न पुरुषों में होती है न महिलाओं में, वहाँ इनके हालात कैसे होंगे इसकी कल्पना की जा सकती है। भारतीय समाज पितृसत्तात्मक (पूँज्यपंतबील) समाज है जहाँ बेटे को सर्वोत्तम माना जाता है जो वंश को आगे ले जाने वाला, बुढ़ापे की लाठी, पिता की मृत्यु पर अंतिम संस्कार के समय उनको मोक्षद्वार तक भेजने वाला कहा जाता है। जिसके यहाँ बेटा न हो तो समाज ऐसी महिलाओं को ताने मार-मार कर जीना हराम कर देता है। लड़कियों को पराया धन मानने वाला उनका अपना घर परिवार, उनके साथ कितना अन्याय करता है तो वह किन्नरों के साथ कैसा व्यवहार करता करता होगा, इसका अंदाजा लगाया जा सकता है। भारतीय समाज में पुरुषों की पितृसत्तात्मक मानसिकता का आधार यही अन्याय रहा है। पितृसत्तात्मकता ने समाज को एक अमानवीय क्रूर व्यवस्था में जकड़ रखा है। ये व्यवस्था स्त्रियों को खुलकर हँसने, खाने और पहनने नहीं देती, पुरुषों को खुलकर रोने नहीं देती तो किन्नरों के बारे में इस व्यवस्था ने कितना क्रूर प्रावधान कर रखा होगा आप सोच सकते हैं। समाज किन्नरों को लगभग बहिष्कृत करके रखता है जैसे वे मनुष्य नहीं हैं। इनको किसी के जन्म के समय और शादी के बाद नाचकर गा कर मांगने, देह व्यापार करने के अलावा दूसरा कोई काम करने नहीं दिया जाता था जिससे यह वर्ग हमेशा अपमानित और तिरस्कृत होता रहा। समाज का इस वर्ग के प्रति यह व्यवहार एक दिन के लिए नहीं है बल्कि इनके साथ सदियों से ऐसा होता आ रहा है।

उत्तर से दक्षिण भारत तक किन्नरों के लिए अलग अलग शब्द व्यवहार में लाये जाते हैं—

"भारत की विभिन्न भाषाओं में किन्नर के लिए ...जैसे तेलगू में नपुंसकुडु, कोज्जा या मादा, तमिल में थिरु, नंगई, अरावनी, गुजराती में पवैया, पंजाबी में खुसरा, कन्नड़ में जोगप्पा। इसी प्रकार भारत के विभिन्न क्षेत्रों में छक्का, खोजा, किन्नर, हिजरा, नपुंसक, थर्ड जेंडर, ट्रांसजेंडर इत्यादि शब्द भी किन्नरों के लिए प्रयोग किए जाते हैं।"—1

भारतीय समाज ने किन्नरों को हमेशा उपेक्षा की दृष्टि से देखा है। जिससे साहित्य में भी इनके बारे में उतना नहीं लिखा गया जितना इस वर्ग पर लिखा जाना चाहिए। ये वर्ग भी साहित्य में दलित साहित्य की तरह सदैव हाशिये पर ही रहा।

समाज ने इस वर्ग को लेकर कभी कोई अच्छी धारणा नहीं बनने दी। बचपन से ही सिखाया जाता है कि समाज में बस दो ही लिंग होते हैं स्त्रीलिंग और पुल्लिंग। जबकि भाषा के मामले में तीन लिंग बताए हैं—

"वैदिक संस्कृत में देखते हैं तो एक तीसरा लिंग नपुंसक लिंग का प्रयोग भी भाषा में देखा जा सकता है। भाषा का यही प्रयोग मनुष्य के विभाजन में भी सहायक हुआ।"—2

साहित्य में भी जब से विमर्श या हाशिये के समुदायों पर चर्चा होनी शुरू हुई, उसी के अंतर्गत इस वर्ग (किन्नर) पर भी बात होनी शुरू होती है। सिनेमा भी साहित्य की तर्ज



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# **SUSTAINABLE ACCOUNTING CONTROL SYSTEM FOR AATMANIRBHAR BHARAT**

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Dr. Sonia Kaushik<sup>4\*</sup>**

## **Abstract**

Recent business failures and corporate scandals, the world over, and particularly in India, point towards greed and financial irregularities by top leaders of these corporate entities. In the post-covid crisis scenario, when many businesses suffered because of lockdown, all that is needed is revisiting of governance model and make it more purposeful and achievable for a new beginning which is free from corruption envisioned by Prime Minister Modi for Aatmanirbhar Bhatat. Since manipulation of accounting practices and reporting are at the core of most of these frauds and they are committed by not only non-owner managers but also by owners, the corporate governance framework needs to be examined for the Sustainable accounting practices specially accounting control system. The study recognizes four most important entities- top managers, statutory auditors, members of audit committee and independent directors, who are most important entities in management and control by exercising internal control as well as external control. The methodology has been administered by developing a structured questionnaire to gather responses on perceptions and attitudes of the four entities. The principal component analysis and factor analysis gives the measurements of various significant factors of this framework. Four indices are constructed at two levels, the most important being Index of Accounting Control System (IACS). Major findings of the study suggest that Index of Adequately Safeguarded Assets (IasA) and Index of Simplified Transactions (IsT) are important factors of accounting control system for effective corporate governance. The main contribution of the study is, whereas extant literatures focus on internal control only, this study brings in the role of external control too in minimizing the fraud risk factors. Hence, the earlier studies done in the corporate

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governance framework do not explain the framework adequately; whereas the present study explains satisfactorily the framework of sustainable accounting control system for aatmamirbhar bharat.

Key words: Internal Control, External Control, Independent Directors, Members of Audit Committee, Statutory Auditors, Fraud Risk Factors.

## **1.0 Introduction**

Corporate scandals and failures have become a routine phenomenon in corporate affairs of India. Recent one to join the long list of such failures is Vijaya Mallya's Kingfisher Airlines. Vijaya Mallya, known as 'King of Good Times', is despised for his flamboyant lifestyle. He has a total debt of \$1.3 Billion from various banks. He is a recklessly selfish criminal, who misused money that does not belong to him (Nag, 2017).

The latest scandal discovered in 2018, has Nirav Modi at the centre of it who became the first Indian jeweller to be featured on the cover of Sotheby's and Christie's auction catalogues in 2010 has been involved in India's biggest banking fraud to the tune of Rs. 11,300 crore at Punjab National Bank. He with his uncle Mehul Choksi connived with certain bank officers for fraudulently issuing Letter of Undertakings which has prompted Serious Fraud Investigation Office (SFIO) to investigate the group companies for possible fund diversion (Business Today, 2018).

Not very long ago in 2009, failure of Satyam has been an example of how greed of individuals like Ramalinga Raju, resulted in India's biggest corporate fraud known till that date, to the tune of Rs. 7000 crores. This happened due to the falsification and window dressing of its (Satyam's) accounts. It was also a case of complete failure of Sustainable corporate governance (Bhasin, 2015).

As we discuss these scams, the concept of accounting malpractices comes into the forefront. This concept has become all the more relevant in the light of various scams world over including Enron and WorldCom in US and Satyam in India.

Through the extant studies, it appears that business practices have emerged from implications of corporate governance norms under Clause 49 of listing agreements and later the Listing Obligations and Disclosure Requirements (LODR) enactment. The available literature makes it appear that the legal framework makes corporate scandals happen and are still taking place because of ineffective

accounting practices. The problems of corporate failures are attributed to the conflicts between ownership and control which essentially may not be the case. It is assumed that non-owner managers do not look after the interest of owner non-managers. Whereas in recent times, the accounting scandals and the complete undermining of the accounting system has been done by the owners (Satyam is a case in point). At times there is an ethical breach on the part of the owners. With this background in view, this study attempts to look into the role played by top industry players- Top Managers, Independent Directors, Members of Audit Committee and Statutory Auditors in developing the Sustainable or Ethical Accounting Control System.

This study focuses the perceptions of top management and other three entities of accounting control system in particular as they are responsible for Sustainable corporate practices. To become sustainable, it essentially has to be ethical. The sustainable corporate practices include many dimensions, for example corporate governance, structural processes, legal aspects, accounting disclosure norms etc. We restrict our study to most important dimension of accounting practices, i.e., its accounting control system. The study is restricted to the four most important entities responsible for direction and control in the accounting control system, namely, Top Managers, Statutory Auditors, Members of Audit Committee and Independent Directors, who build the corporate governance framework.

Aatmanirbhar Bharat means we are trying to make India more self-reliant by recovering from corporate corruptions and failures. This will lead to ethical as well as sustainable model for healthy accounting practices. Developing sustainable model of accounting practices is essential for an Aatmanirbhar Bharat envisioned by our Prime Minister Narendra Modi. How the internal and external control of accounting control system (ACS) is tapped through the four entities for containing accounting frauds, what are the significant factors such as Fraud Risk Factors responsible for Protecting Organization Assets and measuring the impact of these factors will be the central theme of this study. However, this study is restricted to the Indian scenario as per the theme of self-reliant India.

Accounting control system is defined as methods, procedures that form the complete internal control system of an organization. This system is concerned with:

1. Ensuring compliance with accounting policies and procedures
2. Protecting the organization's assets.
3. Preparing reliable and timely financial reports (Business Dictionary, 2018).

The above definition takes into the narrow definition of accounting control system whereas this study takes into account the broader outlook of control which is two pronged, **internal** as well **external**.

The present study recognizes that sustainable accounting control system can be developed by taking into account both internal and external control. An important factor contributing to the integrity of the financial reporting process is the tone set by those in management and control of accounting information and internal and external framework of the accounting control system. It is dependent upon perception of the top management, independent directors, members of audit committee and statutory auditors (others not included for the purpose of this study). These perceptions are based on the organizational climate and culture created by these entities which in turn depends considerably on the code of ethics being created in the institution and not thereby dependent on their personal ethics.

## 1.1 Research Objectives

The specific research objectives examined in this study are drawn from the investigations discussed above.

The objectives are:

1. To identify the significant factors of minimizing fraud risk factors for Sustainable accounting control system.
2. To measure the significant factors of minimizing fraud risk factors for Sustainable accounting control system.

## 1.2 Literature Review

Global Scenario	
Cadbury Committee Report, UK (1992)	The first reference about the ethical or sustainable framework of accounting practices that we can find in literature is about Cadbury Committee report, UK, 1992. This report was published following the scams in late 80s and early 90s. Its objectives included: “(i) uplift the low level of confidence both in financial reporting and in the ability of auditors to provide the safeguards which the users of company’s reports sought and expected; (ii) review the structure, rights and roles of board of directors, shareholders and auditors by making them more effective and accountable; (iii) address various aspects of accountancy profession



	and make appropriate recommendations, wherever necessary; (iv) raise the standard of corporate governance; etc.”. (Cadbury, 1992) (p. 10)
Galloway (1994)	Galloway (1994) developed a control model which can be discussed in perspective of financial reporting. He defined control in a new way. He says that a control as a comprehensive term has foundation on three legs – process of control should be right; it should be done in a way to survive or it needs to be viable; and doing the right thing ethically. If auditors do so at local level, they play a vital role in avoiding bureaucratic problems of control. The complex problem is solved at the very level it belongs, i.e., at the local level (Galloway, 1994).
D’Aquila (2001)	The organizational climate created by top management and those in control is most important. “This tone should be communicated through management’s own actions as well as through management’s expectations of the employees” (D'Aquila, 2001) (p.236).
Sarbanes-Oxley Act (2002)	The enactment of Sarbanes-Oxley Act (2002) highlights the importance of internal control environment and the ethical aspect attached to it. It was only after this, that external auditors were expected to specifically design their audit procedures to detect all frauds (Wagner & Dittmar, 2006).
Castka & Balzarova (2008)	At the same time, farsighted organizational leaders recognize that lasting success must be built on credible business practices and the prevention of such activities as fraudulent accounting which contributes to sustainable development. At the same time, it encouraged the development of national standards that are more specific and more demanding (Castka & Balzarova, 2008).
Sinnet (2009)	Sinnett (2009), in his article “Does internal control improve operations and prevent fraud?” says that Sarbanes-Oxley Act, 2002, requires that a complying organization should identify a framework of internal control for its use. However, it was also felt that compliance had resulted in unintended consequences, such as excessive costs, diversion of management attention from running the business and a changed relationship with their external auditors.
ISO 26000 (2010)	Next important reference is about ISO 26000 which was brought in 2010. Organizations around the world, and their stakeholders, are becoming increasingly aware of the need for and benefits of socially responsible behavior. The objective of social responsibility is to contribute to sustainable development. Pressure to do so comes from customers, consumers, governments, associations and the public at large.
<b>Indian Scenario</b>	
Gupta (2009)	In the Indian Scenario, for over two decades since April 1998, releasing a Task Force report entitled “Desirable Corporate Governance: A Code”,

	<p>which outlined a series of voluntary recommendations, Confederation of Indian Industries (CII) has remained in the fore front of establishing corporate governance norms. Most of its codes were incorporated in SEBI's committee headed by Kumar Mangalam Birla and later in Clause 49 and Listing Obligations and Disclosure Requirements (LODR), 2015 of SEBI. The quality review board, set up by the government in July 2007 reviews the quality of services rendered by the members of the Institute of Chartered Accountants of India (ICAI) (Gupta, 2009). Securities and Exchange Board of India (SEBI) too works hand-in-hand to ensure effective governance. CII, Narayan Murthy Committee and Naresh Chandra Committee which all led to formation of famous Clause 49 Guidelines of Corporate Governance.</p>
Mandal (2012)	<p>According to Mandal (2012), there must be three elements in the ethical process for principle-based accounting: 'What to act', 'How to act' and 'By whom to act' of operating system. It is also important that value system and ethical standards of management people as corporate participants should be of high level. "The key elements of good corporate governance of corporate participants are honesty, integrity, mutual respect and transparency." (Mandal, 2012) (p.345) It is believed that Indian ethos of value-based ethics and spiritual approach is beneficial to all.</p>
Ravi (2016)	<p>KFA had many corporate Governance issues relating to number of board of directors, transparency in financial reporting, unpaid salaries of employees, non-compliance of Provident fund norms, non-compliance of deposits of TDS of income-tax authorities and many other corporate governance issues. The role of the banks in granting the loans to KFA seems questionable in many cases. Mallya according to reports provided 'personal' guarantee to SBI and Punjab National Bank by mortgaging Kingfisher Villa in Goa, his family home and Kingfisher House in Mumbai. But the value of the properties is so meagre that one wonders how commercial banks have extended such huge loans on such properties." (Ravi, 2016)</p>
Murthy (2007)	<p>The emphasis has been how managers can improve ethical leadership by learning about their own values. How they perceive their environment and effects of their perception on employees have been well documented. Most of these studies were talking about business ethics as personal ethics, until a path breaking study by Murthy (2007), "Business Ethics and Corporate Responsibility- A New Perspective". The paper stresses the need to understand business ethics as organizational ethics. It is this understanding of business ethics that has been used in this study. (Murthy K. V., 2007)</p>

### **1.3 Present study**

An important purpose of sustainable accounting practices is to provide structure that works for the benefit of everyone concerned by ensuring that the enterprise adheres to accepted ethical standards and best practices, as well as to formal laws and regulations. It also places emphasis on economic efficiency and catering to welfare of shareholders. These functions are prescribed by Company Law, regulations and codes of practices.

It has been found that even the best practices could not prevent the frauds as has happened in WorldCom, Enron, & Tyco at global front and Satyam-Maytas at domestic front in India make the Corporates Unsustainable in the long run. The root cause of corporate troubles lies in the problem of corporate governance, concerning ethics, morality and legality of governance.

Goals must be honest, inclusive of all stakeholders and the society where it operates. There could be a scenario where business may target faulty goals despite the best intentions of top executives and hence the business finds itself in trouble. Here is the role for Sustainable accounting practices to put a check on these faulty goals. Sustainable governance has been found to take care of compliance with legal system. The framework should be about ethicality of systems and resources being employed by the company; the quality and value system of the people who run the company; and the sensitivity of the board for its stakeholders and the society it serves.

The paper ponders over sustainable accounting control system by restricting the study to fraud risk factors which can prevent accounting failures and thereby scams.

We are looking at the possibility of preventing frauds and financial irregularity by developing a framework which focuses at protecting assets as pointed in the definition of accounting control system by minimizing fraud risk factors. This is done by gauging the perceptions of four important entities of accounting control system both internal as well as external control.

### **1.4 Basic Construct: The Questionnaire**

The questionnaire is designed to draw out responses from the four concerned entities- Top Managers, Independent directors, Audit Committee Members and Statutory Auditors. On the basis of their perception, experience and understanding, the attempt is to verify, test and validate the construct of

corporate governance framework as applied to accounting control system. The questionnaire is attached as an Appendix to this paper<sup>5</sup>.

## **Data and Sample**

The whole study is based on Primary Survey. For data collection and sampling, proportional sampling technique has been used to collect the data. The sample size is 100 entities representing top managers (CFOs/ Managing Directors/ General Managers/ Company Secretaries), statutory auditors, members of audit committee and the independent directors. About 25 samples from each of the four categories have been approached for taking responses on the questionnaire. Eventually 28 Top Managers, 24 Statutory Auditors, 24 Independent Directors and 24 Members of Audit Committee responded and total 100 responses received.

There is no source amongst whom the respondents belonging to these categories of entities can be drawn for study. They were chosen at random. Therefore, the sampling process attempted to minimize the purposiveness by not having a predetermined set of companies, though snowballing technique was also used in limited way. There was no particular bias either towards private sector or public sector companies. There was neither any bias in terms of larger and smaller companies. Furthermore, the responses have no bias in terms of choice of regions for respondents. Many of the respondents have responded through email as they were not present in NCR.

## **1.5 Methodology**

The methodology used for the analysis is Principal Component Analysis which tries to collate and draw meaningful results from the huge data collected from all the four entities, namely, Independent Directors, Top Managers, Audit Committee Members and External Auditors. Two very important analyses are done here:

1. Construction of Composite Indices
2. Impact of Composite Indices

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<sup>5</sup>The questionnaire used for this research paper is part of full questionnaire of thesis submitted by the authors.



In the context of present study, the Composite Index is a grouping of variables or other factors that combine in a standardized way to provide a useful statistical measure of overall responses for the Sustainable ACS.

Construction of Composite Indices helps in analyzing the data by combining the raw variables by a suitable technique. The technique used is Principal Component Analysis which further allows the Factor Analysis by allowing grouping of logically related variables.

The construction and analysis of Composite Indices becomes more meaningful when its impact (Index of factors developed through construction of Composite Indices) on Sustainable ACS is interpreted. The technique that can lead to meaningful interpretations is Regression Analysis.

### **1.5.1 Construction of Composite Indices**

The Construction of Composite Index involves step by step explanation of Principal Component Analysis, Factor Analysis and then constructing the Composite Indices (Murthy & Jha, 2006).

#### **Principal Component Analysis (PCA)**

Principal Component Analysis allows dealing with reduced number of variables or it can be said that it allows data reduction. For doing so, there is need to find a common thread. This thread is called a latent factor. The need of Principal Component Analysis arises because it helps in (i) data reduction and (ii) making the dependent variables uncorrelated with other. Unlike OLS wherein the procedure is to minimize the sum of the squares of deviations, in the case of PCA the procedure is to maximize the variance. The second feature of PCA is that it segregates inter-correlated variables into the separate orthogonal factors or principal components. (iii) Thirdly, PCA can be used for developing a composite index which collapses a set of variables into a single variable that represents a complex phenomenon like Corporate Governance framework.

### **1.5.2 Impact of Composite Indices**

A multidimensional phenomenon like Sustainable Accounting Control System can be measured by constructing a composite index as explained above. Further, the Indices of factors affecting them will also be developed. It will be interesting to draw meaningful interpretations out of it. One of the techniques to measure their impact is Regression Analysis.

## Regression Analysis

Regression estimates are used to describe data and to explain the relationship between one dependent variable and one or more independent variables. The Overall Composite Index is Dependent Variable whereas Indices of Factors are Independent Variables.

### Interpretation through Regression Analysis

The following terms are used in this analysis:

**Regression Coefficients:** Regression coefficients represent the mean change in the response variable for one unit of change in the predictor variable while holding other predictors in the model constant.

**Standard Error:** The standard error of the estimate is a measure of the variability of predictions in a regression. A low value of Standard Error means that there is a consistent pattern.

**T-stat:** The t statistic is the coefficient divided by its standard error. The standard error is an estimate of the standard deviation of the coefficient, the amount it varies across cases. It can be thought of as a measure of the precision with which the regression coefficient is measured. There is a T 2 rule, a rule-of-thumb of  $|t| \geq 2.00$  to determine whether or not a variable is statistically significant.

**P-value:** The p-value for each term tests the null hypothesis that the coefficient is equal to zero (no effect). A low p-value ( $< 0.05$ ) indicates that the null hypothesis can be rejected. In other words, a predictor that has a low p-value is likely to be a meaningful addition to this model because changes in the predictor's value are related to changes in the response variable. Conversely, a larger (insignificant) p-value suggests that changes in the predictor are not associated with changes in the response.

**R-square:** R-squared is a statistical measure of how close the data are to the fitted regression line. It is also known as the coefficient of determination, or the coefficient of multiple determinations for multiple regressions. It varies from 0%-100%. 0% indicates that the model explains none of the variability of the response data around its mean. 100% indicates that the model explains fully the variability around its mean. It is also called Goodness-of-fit statistics.

**Adjusted R-squared:** Adjusted R-squared is a measure that tells goodness of fit adjusted for degrees of freedom. It gives the net picture. The adjusted R-squared is a modified version of R-squared that

has been adjusted for the number of predictors in the model. The adjusted R-squared increases only if the new term improves the model more than would be expected by chance. It decreases when a predictor improves the model by less than expected by chance (Minitab, 2013).

## 1.6 Analysis and Interpretation of Components of Accounting Control System:

There is need to find which components of Accounting Control System are important constituents for sustainability. This is further analysed through factor analysis. With the help of highest representation in each factor, a composite index is developed.

### 1.6.1 Principal Component Analysis

1. The first step involves testing for sampling adequacy and sphericity. For this the KMO and Bartlett's Test is estimated.

Table No. 1: **KMO and Bartlett's Test- Fraud Risk Mangement**

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.876
Bartlett's Test of Sphericity	Approx. Chi-Square	757.836
	Df	78
	Sig.	.000

In the case of nominal determinants, the KMO measure is 0.876 which is on higher side. Bartlett's Test is highly significant. On the whole, the test indicates that PCA is applicable.

2. Selection of principal variables: PCA was applied on independent variables. The principal components to be retained are determined. In this step, the Kaiser criterion is used to retain six principal components where eigen values were greater than one. Three variables are selected in the descending order beginning with the largest component.

**Table No. 2:** Total Variance Explained- Fraud Risk Factors

Components	Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.251	48.081	48.081	3.273	25.174	25.174
2	1.804	13.876	61.957	3.207	24.669	49.843
3	1.090	8.388	70.345	2.665	20.503	70.345

**Error! Reference source not found.**shows the total variance explained by the extracted principal component. It is evidenced that 70% of the information is captured by the retained component.

3. Rotation of components: With the help of Varimax rotation with Kaiser Normalization the components were rotated. This was done with a view to obtain the clear interpretation of the components. This resulted in a set of component scores with respect to the three retained components.

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9. Table No. 3 reports the rotated component scores matrix.



**Table No. 3:** Rotated Component Matrix<sup>a</sup> – Fraud Risk Factors

**Rotated Component Matrix<sup>a</sup>**

	Component		
	1	2	3
E.3.1. (xiii)	.869		
E.3.1. (xii)	.829		
E.3.1. (xiv)	.798		
E.3.1. (xv)	.705		
E.3.1.(iv)		.794	
E.3.1.(iii)		.743	
E.3.1.(ii)		.738	
E.3.1.(x)		.708	
E.3.1.(i)		.705	
E.3.1.(vi)			.791
E.3.1.(v)			.695
E.3.1. (vii)			.685
E.3.1.(xi)			.541

Extraction Method: Principal Component Analysis.  
Rotation Method: Varimax with Kaiser Normalization.

## **1.6.2 Factor Analysis**

At this stage, the components scores are isolated and factors of Accounting Control System are identified:

**Table No. 4:** Constituents of Fraud Risk Factors

Component	Variables	Identifier	Factor
1	E.3.1. (xiii)	Industry standard wage structure	Company specific positive attributes
	E.3.1. (xii)	Happy employees	
	E.3.1. (xiv)	Less pressure on target	
	E.3.1. (xv)	Solvent company	
2	E.3.1.(iv)	Proper documentation	Adequately safeguarded assets
	E.3.1.(iii)	Adequately safeguarded assets	
	E.3.1.(ii)	Clear Job Description	
	E.3.1.(x)	Strong internal audit	
	E.3.1.(i)	Minimum pilferage	
3	E.3.1.(vi)	Simplified transactions	Simplified transactions
	E.3.1.(v)	Few related party transactions	
	E.3.1. (vii)	Simplified valuation	
	E.3.1.(xi)	Small span of control	

This results in identifying three latent factors of Fraud Risk Factors, namely, Company specific positive attributes, adequately safeguarded assets and Simplified transactions.

Company specific attributes following industry standard wage structure, happy employees, solvent companies and putting less pressure to achieve targets.

By adequately safeguarded assets, we intend proper documentation of assets, clear job description of assets, minimum pilferage and their strong internal audit.

By simplified transaction is meant the few related party transactions, easy valuation of assets and where the span of control for supervision is small.

### 1.6.3 Composite Index

Following the method suggested by Murthy and Jha (2006), composite Index for System of Ethics is constructed with the help of Factor Analysis/ Principal Components and Rotated Component Matrix as follows (Murthy & Jha, 2006):

**Table No. 5:** Composite Index Constituents- Fraud Risk Factors

Component	Retained Variable No.	Highest Loading Factor	Retained Variable Identifier
1	E.3.1.(xiii)	.869	Industry Standard Wage Structure
2	E.3.1.(iv)	.794	Proper Documentation
3	E.3.1.(vi)	.791	Simplified Transactions

On the basis of retained components, the highest component scores are selected. By using highest loading factor as weights and variable identifiers given in Table No. 5, the index of dependent variables is constructed as follows:

$$Index = \sum_j^n w_j x_j$$

Two sets of composite Indices are developed:

1. Composite Index of Accounting Control System (IACS):

IACS= Industry Standard Wage Structure\* 0.869 + Proper Documentation\*0.794+ Simplified Transactions\*0.791

$$IACS = N2 * 0.869 + E2 * 0.794 + G2 * 0.791 = 9.128486$$

2. Thereafter, composite index is constructed for each factor of Accounting Control System in the context of Fraud Risk Factors. These Indices are: Index of Company Specific Positive Attributes (IcspA), Index of Adequately Safeguarded Assets (IasA) and Index of Simplified Transactions (IsT).

Index of Company Specific Positive Attributes (IcspA)

$$= N2 * 0.869 + M2 * 0.829 + O2 * 0.798 + P2 * 0.705 = 11.301$$

Index of Adequately Safeguarded Assets

$$(IasA)=E2*0.794+D2*0.743+C2*0.738+K2*0.708+B2*0.705=15.404$$

$$\text{Index of Simplified Transactions (IsT)}=G2*0.791+F2*0.695+H2*0.685+L2*0.541=8.29$$

Similarly, Composite Indices are obtained for all 100 respondents.

### **1.6.4 Analysis through Construction of Composite Indices and Findings**

PCA is applied on independent variables of Accounting Control System using Kaiser Criteria and three principal components are retained which explain 70% of variation by rotated sum of square loadings.

These 15 variables extracted 3 principal components. With the help variable identifiers three latent factors are isolated and identified. The data reduction technique is based on the following selection criterion:

- (i) Eigenvalue should be greater than 1.
- (ii) There should be at least three coefficients in each retained factor.
- (iii) Coefficient value should be at least 0.5.
- (iv) There should not be any sub-item having value less than 0.

In the first iteration of running PCA, 4 Principal Components are found with a component having only two coefficients. After dropping these one by one and running PCA, 3 Principal Components are obtained. After running the PCA again, 13 variables and 3 principal components are extracted and retained which satisfy the above-mentioned criterion.

Further, two sets of composite indices are obtained:

1. Composite Index of Accounting Control System (IACS) is found by using the method of Jha& Murthy (2006). The three variables so selected are included in the formula for composite Index. These variables are: Company specific positive attributes, adequately safeguarded assets and Simplified transactions.
2. Thereafter, composite index is also developed for each Principal Component or factor of Accounting Control System: Index of Company Specific Positive Attributes (IcspA), Index of Adequately Safeguarded Assets (IasA) and Index of Simplified Transactions (IsT).



### 1.6.5 Analysis through Regression Analysis and Findings

Regression of Independent variables: Index of Company Specific Positive Attributes (IcspA), Index of Adequately Safeguarded Assets (IasA) and Index of Simplified Transactions (IsT) on Dependent variable- Index of Accounting Control System (IACS) is explored to find significant factors out of the three factors.

**Table No. 6:** Regression Analysis- Accounting Control System

Dependent Variable - Index of Accounting Control System (IACS)

Regression Statistics	
Multiple R	0.907713342
R Square	0.823943512
Adjusted R Square	0.818441747
Standard Error	1.738917716
Observations	100

	Coefficients	Standard Error	t Stat	P-value
<b>Intercept</b>	-9.466077449	1.39330495	-6.79397	<b>9.14E-10</b>
IcspA	0.051289416	0.086178383	0.595154	0.553141
<b>IasA</b>	0.73366162	0.110092618	6.66404	<b>1.68E-09</b>
<b>IsT</b>	1.145206162	0.120644105	9.492434	<b>1.83E-15</b>

### Regression Equations

1. Functional Relationship:

$$IACS = f(IcspA, IasA, IsT)$$

2. Estimating Equation:

$$IACS = \alpha + \beta_1(IcspA) + \beta_2(IasA) + \beta_3(IsT) + \varepsilon_i$$

3. Estimated Equation:

$$IACS = -9.47 + 0.05(IcspA) + 0.73(IasA) + 1.14(IsT)$$

Intercept: Its coefficient being -9.47, higher Standard Error, higher t-stat and very significant P-value make it a significant factor. At the same time this coefficient has negative impact. There are some unaccounted factors that are not measured by this regression model.

Index of Simplified Transactions: This factor has highest coefficient (1.12), lower Standard Error, higher t-Stat and very significant P-value. This is the most significant factor among the three factors.

Index of Adequately Safeguarded Assets: The magnitude of adequately safeguarded assets to Accounting control system is 0.73 which is high. It has relatively lower Standard Error, high t-Stat and very significant P-value. This factor is very important in making its impact in corporate governance in accounting control system.

Index of Company Specific Positive Attributes: Its coefficient is 0.05 which is low, lower Standard Error, somewhat low t-Stat and insignificant P-value. This factor is not as important in comparison to other two factors.

The overall assessment is Index of Adequately Safeguarded Assets (IasA) and Index of Simplified Transactions (IsT) are important factors of minimizing fraud risk factors for effective accounting control system and Index of Company Specific Positive Attributes (IcspA) is relatively less important factor based on the direction, significance and magnitude. Intercept or some unknown factors are also important and negatively related. The significance of simplified transactions is largest. It indicates to have effective corporate governance in accounting control, it's better to have few related party transactions, simplified valuation of assets and to keep the span of control for supervision small. It is also good to have proper documentation of assets, clear job description and strong internal control system.

$R^2$  measures how good the regression line fits the actual data. A high percentage indicates that a model has good fit.  $R^2$  here is 0.82 which means 82% of the variability in composite Index of Accounting Control System (IACS) is explained by independent variables: Index of Adequately Safeguarded Assets (IasA), Index of Simplified Transactions (IsT) and Index of Company Specific Positive Attributes (IcspA). Adjusted  $R^2$  is 0.81 which is even better.

## **1.7 Conclusion and Practical Implications**

The accounting control system which is observed through compliance of internal control or rules and regulations is not adequate for sustainable development. To fill the gap external control is also required which can be provided by other entities of accounting control system such as Independent Director, Member of Audit Committee and External Auditor.

Principal component analysis helped in identifying three latent factors for minimizing fraud risk factors: adequately safeguarded assets factor, simplified transactions factor and company specific positive attributes factor.

This led to creation of two sets of composite Indices as suggested by Murthy and Jha. In all four Composite indices were formulated: IACS, IasA, IsT and IcspA.

The Regression analysis helped in identifying significant factors: Simplified transactions factor and company specific positive attributes factor.

The overall conclusion is Index of Adequately Safeguarded Assets (IasA) and Index of Simplified Transactions (IsT) are important factors of accounting control system for sustainable corporate governance and Index of Company Specific Positive Attributes (IcspA) is relatively less important factor. The significance of simplified transactions is largest. It indicates to have effective sustainable accounting control, it's better to have few related party transactions, simplified valuation of assets and to keep the span of control for supervision small. It is also good to have industry standard wage structure, proper documentation of assets, clear job description and strong internal control system.

Self-reliance built upon strong corporate structures will increase levels of economic activity. Strong corporate structures will promote ethical and sustainable accounting control system which can be achieved by protecting assets through minimizing fraud risk factors. Ethical accounting practices will result in social and economic links with local communities and thereby lead to Aatmanirbhar Bharat. In the post-covid crisis scenario, when many businesses suffered because of lockdown, all that is needed is revisiting of governance model and make it more purposeful and achievable for a new, firm and sustainable beginning. It should be ensured that managers employ the principles of value-based management that protects the interest of all stakeholders. In the backdrop of interdependence of

notions for economic and social growth, there may be many ways to do so, but the chosen way should be ethically sustainable in the interest of all stakeholders.

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## APPENDIX 1: QUESTIONNAIRE

		Questionnaire									
S. No.	Q. No.										
		<b>Instructions for questions based on 5-point scale:</b> 1. The verbal and interval scale would help you in identifying the number from 5 to 1 (where 5 is the highest in order and 1 is the lowest). 2. The most appropriate and in-depth response can be expressed by referring to all three scales. For instance, if your response is "Fully Aware", you should tick on '5' in case you feel that "Fully" means within the range of 81% - 100%.									
		Ordinal Scale	5	4	3	2	1				
		Verbal scale	Fully Aware	Somewhat Aware	Cannot Say	Somewhat Ignorant	Completely Ignorant				
		Interval Scale	100%-81%	80%-61%	60%-41%	40%-21%	20%-1%				
Section II											
	<b>E</b>	<b>Accounting Control System</b>									
		In the context of ethical framework of Accounting Control System, mark the options as per the given scale:									
	<b>E.1</b>	<b>Attitude</b>									
	<b>E.2</b>	<b>Knowledge</b>									
	<b>E.3</b>	<b>Protecting Assets (Fraud Risk Factors)</b>									
	E.3.1	Fraud Risk Factors can be minimized by managers.	5	4	3	2	1				
	E.3.1.(i)	Fraud Risk Factors can be minimized by managers when there is minimum pilferage of valuable assets.	5	4	3	2	1				
	E.3.1.(ii)	Fraud Risk Factors can be minimized by managers when there is clearly defined job description.	5	4	3	2	1				
	E.3.1.(iii)	Fraud Risk Factors can be minimized by managers when there are adequate physical safeguards to assets.	5	4	3	2	1				
	E.3.1.(iv)	Fraud Risk Factors can be minimized by managers when there is proper documentation of assets.	5	4	3	2	1				
	E.3.1.(v)	Fraud Risk Factors can be minimized by managers when there are few related party transactions.	5	4	3	2	1				

E.3.1.(vi)	Fraud Risk Factors can be minimized by managers when the nature of a company's business involves simplification of transactions.	5	4	3	2	1
E.3.1.(vii)	Fraud Risk Factors can be minimized by managers when the valuation of assets is easy.	5	4	3	2	1
E.3.1.(viii)	Fraud Risk Factors can be minimized by managers when there is decentralization of decision making power.	5	4	3	2	1
E.3.1.(ix)	Fraud Risk Factors can be minimized by managers when there are more automated operations.	5	4	3	2	1
E.3.1.(x)	Fraud Risk Factors can be minimized by managers when there is strong internal audit function.	5	4	3	2	1
E.3.1.(xi)	Fraud Risk Factors can be minimized by managers when the span of control is small.	5	4	3	2	1
E.3.1.(xii)	Fraud Risk Factors can be minimized by managers when the employees are happy with the company.	5	4	3	2	1
E.3.1.(xiii)	Fraud Risk Factors can be minimized by managers when the wage structure is commensurate with the industry standard.	5	4	3	2	1
E.3.1.(xiv)	Fraud Risk Factors can be minimized by managers when there is less pressure on meeting targets.	5	4	3	2	1
E.3.1.(xv)	Fraud Risk Factors can be minimized by managers when the company is solvent/ bouyant.	5	4	3	2	1
<b>E.4</b>	<b>Ensuring Compliance of Policies and Procedures</b>					
<b>E.5</b>	<b>Preparing Reliable and Timely Report</b>					



# The Indian Economic Journal

JOURNAL OF THE INDIAN ECONOMIC ASSOCIATION

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## LESSONS LEARNT FROM THE PAST FOR PLANNING RAPID GROWTH

- Market Reforms
- Growth Trends and Economic Policy Changes
- Trends in Inequality, Poverty and Hunger
- Agriculture-Productivity and Employment
- Modern Services- Role of Information Technology
- Manufacturing Productivity- Public Vs. Private Sectors
- Workforce Participation and Labour Flexibility
- Infrastructure Development
- Foreign Trade and Foreign Investment
- Actions to Spur High-growth Track and Create Gainful Jobs
- Financial-sector Reforms and Streamlining Fiscal Resources
- Banking sector issues



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### Abstract

Today India is moving towards having a multi modal transportation system. The idea is to put all modes of transport together and outline a matrix of Roadways, Waterways, Airways and Railways to make the conveyance more convenient for the people of the country. In this milieu of various modes of transportation, Railways play a key role in term of providing reasonably fast, economic and safer means of conveyance. There is greater need for efficiency evaluation of Indian Railways. The present study is dedicated to analyse the efficiency of Indian Railways for the period 1980-81 to 2018-19. The study have used CCR and BCC model to find efficient years and reference sets were introduced for every inefficient year and determine the amount of input decrease and output increase to make them efficient. The entire study period is divided into two sub-periods- Pre reorganization (1980-81 to 2002-03) and Post reorganization (2003-04 to 2018-19) so as to study the effect of reorganization on Indian Railways. In Pre Reorganization period, Indian Railways had worked efficiently in 3 years, i.e., 1980-81, 1981-82 and 1982-83 where they are technically efficient. During this period, the efficiency ranged between 0.72 to 1 where 0.72 is minimum (in the year 1996-97), and 1 is maximum (in years 1980-81, 1981-82 and 1982-83). On the other hand, in Post Reorganization period, Indian Railways had worked efficiently in 6 years, 2011-12, 2012-13, 2013-14, 2014-15, 2017-18 and 2018-19. During this period efficiency ranged between 0.77 to 1 where 0.77 is minimum (in the year 2004-05), and 1 is maximum in (in 2011-12, 2012-13, 2013-14, 2014-15, 2017-18 and 2018-19). These efficient years set the standard for the inefficient years to improve their performance. Indian railways confirm the existence of efficiency gaps in asset utilization, staff productivity, freight rates, and cost and revenue performance.

**JEL Classification:** L92, O3, R41

**Keywords:** Indian Railways, Railway Zones, Efficiency, Productivity, Data Envelopment Analysis

### Introduction

After attaining independence from British rule in 1947, railway development in India was reoriented with a view to promote a broad based regional industrial development for achieving distributive justice to all. This warranted the extension of railways to uneconomic routes for an effective movement of bulk raw materials and goods and services across the country. Simultaneously, various industries had been set up in different regions for sustaining the momentum of economic development. Railways effectively provided cheap transportation of bulk raw materials such as iron ore, finished steel, coal, cement and food grains. As a result of increased availability of rail transport facilities, passenger and freight movement increased rapidly.

Indian Railways is the biggest monopoly organization in India. Today, the rail network in India is the fourth biggest network in the world, with a track length of 117,996 km kilometres, 7,325 railway stations, 12,729 locomotives, 70,937 passenger coaches, 293,077 freight wagons. Indian Railways carried 8.26 billion passengers and transported 1.16 billion tonnes of freight in the year ending March 2018. It operates 12500 passenger trains and 7500 freight trains daily. In terms of employment, it is the eighth largest employer in the world, with 1.308 million employees as of March 2017.

"Today India is moving towards having a multi modal transportation system. The idea is to put all modes of transport together and outline a matrix of Roadways, Waterways, Airways and Railways to make the conveyance more convenient for the people of the country.

*Assistant Professor, Bharati College, DU, New Delhi*





# The Indian Economic Journal

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Special Issue, November 2022

**National Education Policy 2020:**  
With Special Reference to Jharkhand





## Analysis of the Indian National Education Policy 2020

Loveleen Gupta\*

*Education is essential for achieving full human potential, developing an equitable society, and promoting economic development. The key to economic growth, equality, social justice and national integration is the provision of quality education at the national level. Providing access to quality education is a prerequisite for India to achieve leadership on the global stage. The National Education Policy 2020 (NEP 2020), which was approved by the Union Cabinet of India on 29 July 2020, outlines the vision of India's new education system. The new policy replaces the previous National Policy on Education-1986, is an inclusive framework focusing on the elementary-level of education to higher education in the country. This paper highlights various policies announced in the higher education system and compare them with the currently adopted system. Various innovations and predicted implications of NEP 2020 on the Indian higher education system along with its merits are discussed.*

*JEL Classification: H51, H52, H53 and H75*

**Keywords:** National Education Policy 2020, NEP-2020, Overview & analysis, Implementation strategies, Challenges in its implementation.

### INTRODUCTION

Education is essential for achieving full human potential, developing an equitable society, and promoting economic development. The key to economic growth, equality, social justice and national integration is the provision of quality education at the national level. Providing access to quality education is a prerequisite for India to achieve leadership on the global stage. Over the next decade, India will have the highest youth population in the world and providing high-quality educational opportunities to them will shape the future of our country.

The National Education Policy 2020 (NEP 2020), which was approved by the Union Cabinet of India on 29 July 2020, outlines the vision of India's new education system. The new policy replaces the previous National Policy on Education- 1986, is an inclusive framework focusing on the elementary-level of education to higher education in the

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# PUBLIC SECTOR BANKS IN INDIA: A REVIEW OF LITERATURE

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## **Abstract**

This study aims to gain insight on various issues related to the public sector banking industry in India. For this study, forty research papers and studies related to market structure, conduct and performance of public sector banks in India have been examined. These studies made important contributions to the comparative analysis of profitability of public sector banking industry with respect to private and foreign banks, but none of them provided a rigorous analysis of the impact of reforms on the profitability of public sector banking industry over time. Issues explored in these studies are related to interest and non-interest income, bank size, technology issues, and formation of non-performing assets. In many studies, DEA, stochastic frontier analysis, ratio, regression, graphs and charts, production function have been used. In very few studies, the S-C-P framework has been used

# Self-Sufficiency through Development of Banking Market of Public Sector Banks in India

**Dr. Sonia Kaushik<sup>1</sup>, Prof. K. V. Bhanu Murthy<sup>2</sup>, Prof. Amit Kumar Singh<sup>3</sup>  
and Dr. Roopa Johri<sup>4\*</sup>**

## **Abstract**

*Banking is the backbone of economic development in India. The growth of banking is the most reliable source of self-sufficiency. The private banks and foreign banks enhances the dependency on promoters and foreign country respectively but public sector banks are the most dependable as far as self-sufficiency is concerned. Unlike the other two types, PSBs have dual objective of profitability and maintaining liquidity. Also, PSBs are the main source of priority sector lending in India. PSBs accept savings from household sector and channelise these deposits into loans and advances and provide it to industries (short-term, medium-term, and long-term loans), household sector (e.g. Housing loans) and also, invest in other industries and companies. It is clear that PSBs leads to economic development by promoting self-sufficiency through mobilising deposits into loans and advances.*

*In banking economics, the market structure is measured in terms of deposits plus advances. The structure of banking market refers to the study of nature of banking. Hence, market structure is defined in terms of nature of the market which could be competitive or monopolistic. A monopolistic market restricts the market size whereas a competitive market leads to the expansion of the market. Using the Structure-Conduct-Performance Approach, we attempt to analyse various aspects related to structure of PSBs. In the industrial economics, market structure can be studied through three elements namely, product differentiation, market concentration, and advertisement expenditure.*

*In the present paper, our objective is to analyse the market development of PSBs which are main source of self-sufficiency. We want to examine the nature of market structure to see*

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*whether it is a growing market; to see whether there is competition in the market in terms of rivalry. Here, market share is measured in terms of size which has been taken as the sum of deposit and advances because these are two core banking activities which defines banking business. Product differentiation is measured as the non-interest income in proportion to total income but advertising expense is taken in absolute terms (as a structure variable) because if it is taken in proportion to total operational expenditure, then it becomes a conduct variable because in that case it would show changes in one variable correspond to the change in the conduct of banks.*

*We have used Herfindahl's measure of concentration to measure competition in the public sector banking industry. In order to capture inter-bank competition and rivalry, all public sector banks are divided into two groups; Nationalized group and the SBI group. Murthy's Index of Rank Dominance is used to express a degree of dominance of an ordinal measure such as rank. The Relative Index of Rank Dominance is used to establish the close rivalry that existed amongst PSBs. Semi-growth log equations are used for analysing the trends in market share, diversification, and advertising expenses. We have used growth rates to examine the growth in size is not homogenous across strategic groups in PSBs. In one of research paper (Sonia, 2017), the evolution of strategic groups was examined and found that there are strategic groups amongst public sector banks in India. So, here in this paper, PSBs are examined in terms of strategic groups.*

*It is encouraging to see that the overall impact of liberalization has resulted in growth of size of banks; healthy rivalry and competition. The growth rate of market size has been statistically significant in both SBI group, Nationalized Banks group. The Murthy's Index of Rank Dominance has given exciting results. SBI has been on first place in each year. While the relative index of rank dominance of other top four banks is very close to that of state bank of India. The Relative Index of Rank Dominance shows close rivalry amongst four other banks (Punjab National Bank, Bank of Baroda, Bank of India and Canara Bank). Also, there is no major change in the relative index of remaining 20 banks. The overall result shows that there is competition within the public sector banks in terms of strategic groups.*

**Key Words:** Banking, Household, Household savings, Market structure, Advertising, Product-differentiation

**JEL Keywords:** G21, H31, G51, L10, M37



## **1.0 Introduction**

The five pillars of self-reliant India are economy (focus on quantum jumps, not incremental changes), infrastructure (representative of modern India), system (technology driven), demography (vibrant demography of the largest democracy) and demand (full utilisation of power of demand and supply). In Atmanirbhar Bharat Abhiyan, Rs.20 lakh crore which is nearly 10% of GDP (including recent economic measures and RBI announcements) has been kept as package where the focus is on land, labour, liquidity and laws. The main objective of this Abhiyan is to cater to labourers, middle class, cottage industry, MSMEs and industries among other.

Liquidity which is one of the focus point of Atamnirbhar Bharat Abhiyan is primarily maintained by banks under the stewardship of RBI. In India, there are public sector banks, private sector banks and foreign banks. In case of private and foreign banks, we have to depend on promoters capital and foreign capital respectively which does not go with the concept of self-reliance. So, we have taken public sector banks which can be depended upon as the primary source of self- reliance. The dual objective of profitability and maintaining liquidity besides priority sector lending leads to economic development and self-sufficiency eventually. Therefore, banking is the backbone of economic development in India. The growth of banking is the most reliable source of self-sufficiency. The private banks and foreign banks enhances the dependency on promoters and foreign country respectively but public sector banks are the most dependable as far as self-sufficiency is concerned. Unlike the other two types, PSBs have dual objective of profitability and maintaining liquidity. Also, PSBs are the main source of priority sector lending in India. PSBs accept savings from household sector and channelise these deposits into loans and advances and provide it to industries (short-term, medium-term, and long-term loans), household sector (e.g. Housing loans) and also, invest in other industries and companies. It is clear that PSBs leads to economic development by promoting self-sufficiency through mobilising deposits into loans and advances.

In banking economics, the market structure is measured in terms of deposits plus advances. The structure of banking market refers to the study of nature of banking. Hence, market structure is defined in terms of nature of the market which could be competitive or monopolistic. A monopolistic market restricts the market size whereas a competitive market leads to the expansion of the market. Using the Structure-Conduct-Performance Approach, we attempt to analyse various aspects related to structure of PSBs.

In the present research paper, our objective is to analyse the market development of PSBs which are main source of self-sufficiency.

## **1.1 Research Questions**

In the industrial economics, market structure can be studied through four elements namely market concentration, product differentiation, market share and advertisement expenditure. For this analysis, we have taken market size as the sum of deposit and advances which represent core banking business. The absolute advertisement expenditure is a proxy for selling

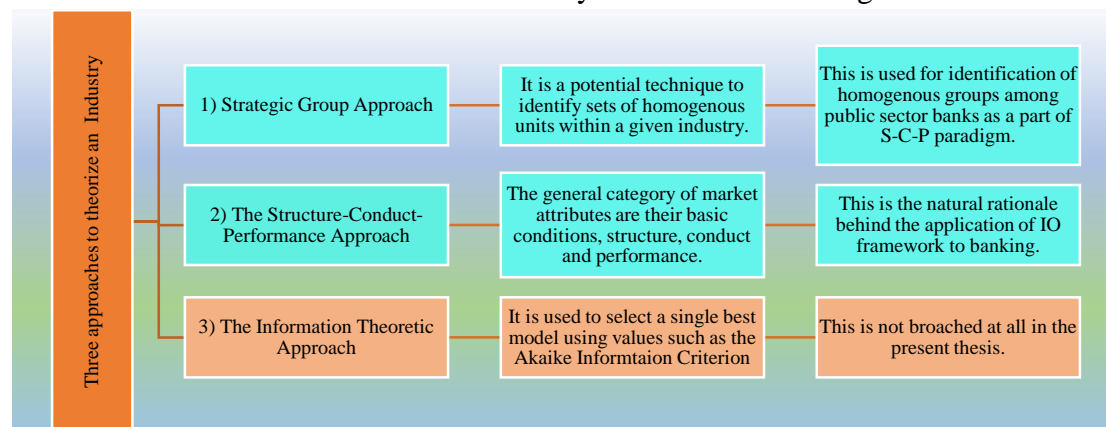
cost. It is taken in absolute terms as a structure variable because when it is taken in proportion then it becomes a conduct variable. The non-interest income has been taken as a proxy for product differentiation which is very much part of structure. Concentration ratio has been chosen to look into the nature of public sector banking market. The analysis has been done for the two strategic groups, SBI group and NB group which are present in the public sector banks in India (Sonia, 2017).

Our research questions are as follows:

1. To examine the nature of market.
2. To see whether it is growing market or a saturated market.
3. To see whether there is competition in the market in terms of rivalry.
4. To measure the rate of growth of structure variables amongst strategic groups within PSBs.
5. Is there significant difference between strategic groups in terms of market concentration?
6. To examine the market dominance pattern amongst strategic groups.

## 1.2 Theoretical Framework

The S-C-P framework has been used to study the nature of banking market.



The S-C-P paradigm assumes that there are certain attributes which are given and are referred as basic conditions. Furthermore, there is a chain of causation that logically determines all the other attributes in a sequence as follows: In the chain, basic conditions are the primary determinants of the market or industry structure. In the next step, the structure of the industry influences the conduct or behavior of the participants in the industry. Conduct, in turn influences performance finally. The schema of traditional S-C-P paradigm was like the flow chart below:



Source: Authors' own compilation

### **1.3 Literature Review**

While concentration is a crucial aspect of market structure, it is important to keep in mind the limitations of concentration as a measure of competition. These limitations are analyzed by (Deb A. T., 2005) and (Murthy & Deb, 2009). A fall in concentration ratio is equated with a rise in competition. However, an analysis of concentration ratio needs to be supplemented by an analysis of identities of the leading firms for an understanding of competition. If a fall in concentration is accompanied by a change in identities of leading firms, it indicates a greater degree of competition as compared to a situation characterized by a fall in concentration with no change in identities of leading firms. In the first case, there is reallocation of the market share among leading firms and the rest of the firms. In the second case, there is reallocation of market share among the leading firms as well. Clearly, an analysis of concentration ratio needs to be supplemented by an analysis of changes in the identities of leading firms, if any.

The evolution of market structure of public sector banking industry during the period 1992-2006 was examined by a research scholar (Bajaj, 2008). In the study, the focus was mainly on two aspects of market structure, first, concentration, and second, product differentiation. The study figures out pattern of dominance in the market using three variables namely assets, deposits, and advances. She found out that the share of public sector banks was slowly decreasing over the period because of entry of new private banks and foreign banks. The linear trend of concentration ratio was statistically declining, and the linear trend of product differentiation was statistically rising. Top five banks in terms of size are ranked in the study which reveals a fair amount of stability in the market structure. The identities of the five top banks remained unchanged throughout the period of analysis. The ranks of a few of them have undergone some change, but overall, no substantial churning among the top banks could be noticed in the industry over the said period. This shows that the pattern of market dominance has not changed in the industry over time. While SBI stayed dominant in absolute terms, but it may fall over time. Therefore, one also needs to examine the relative dominance of SBI with respect to its nearest rival. It is quite possible that the relative dominance of SBI has fallen in the new scenario. There is still another dimension in the story. Whatever there is the expansion of market of public sector banking industry and by individual PSBs, one does not know how the expansion of market of public sector banking industry is being shared among different PSBs.

A comparative study of public and private banking industry in India to assess the impact of banking reforms and competition on these two segments (Gupta L. , 2013) was conducted in

2013. The period of the study was 1995-96 to 2009-10. She found out that competition has emerged in Indian banking industry because of liberalization. Further, she found out that the competition has emerged in form of new banks vs. incumbents rather than in the form of public vs. private banks. Lastly, she concluded that conduct puts an impact on both structure and performance. But the study does not talk about competition within public sector banks in India.

A bank level data study was conducted to estimate the extent to which revenues earned reflects changes in input prices (Claessens & Laeven, 2004). The study used production function approach to study competition of specific banks in 50 countries banking systems. But, (Murthy & Deb, 2013) discards the use of production function approach for measurement of competition. It provides a methodology to arrive at the market form in banking industry through an analysis of all the aspects of basic conditions, structure, conduct and performance. Therefore, in the present study, production function approach will not be used.

A conceptual and theoretical framework to measure and model competition in private banking industry in India (Murthy & Deb, 2014) was given in 2014. The study used Bodenhorn's measure of competition in terms of degree of mobility. It provides the theoretical background of an alternative mechanism based on S-C-P framework, which apart from including traditional elements of S-C-P framework included entry, economies of scale, product differentiation and price cost margin, also incorporates basic conditions and strategic groups to analyze the process of market dynamics in the industry. The paper argued that competition affects basic conditions, structure, conduct and performance. The result demonstrates that variables related to basic conditions, structure, conduct and performance influence competition. The study concludes that private banking industry in India is characterized by monopolistic competition.

In all of these studies, public sector banks have been treated as homogenous lots. Mostly, the focus has been on the study of behavioural aspect of PSBs. But, in the present paper, we have examined public sector banks in terms of two strategic groups, SBI group and NB group and overall.

## **1.4 Objectives and Hypotheses**

### **1.4.1 Objectives**

The primary objectives are as follows:

1. To measure the rate of growth of structure variables in the PSBs.
2. To measure the product differentiation in the PSBs.
3. To measure the growth rate of concentration ratio in the PSBs.
4. To examine the impact of advertisement expenditure on the PSBs.
5. To examine the market dominance pattern in the PSBs.

The Secondary objectives are as follows:

1. To study the growth pattern of SBI group.
2. To study the growth pattern of NB group.
3. To examine whether there is a significant increase in product differentiation due to higher advertisement expenditure in case of SBI group.
4. To examine whether there is a significant increase in product differentiation due to higher advertisement expenditure in case of NB group.
5. To measure the concentration ratio of SBI group.
6. To measure the concentration ratio of NB group.
7. To examine whether the advertisement expenditure is going to rise in a quest to capture more market share by SBI group.
8. To examine whether the advertisement expenditure is going to rise in a quest to capture more market share by NB group.
9. To examine the dominance pattern in SBI group.
10. To examine the dominance pattern in NB group.

#### **1.4.2 Hypotheses**

Following are the primary hypotheses of the study.

- H1: There is no growth in the output of PSBs.
- H2: There is no change in the product differentiation of PSBs.
- H3: There is no growth in the concentration ratio of PSBs.
- H4: There is no change in the advertisement expenditure of PSBs.
- H5: There is no change in the dominance pattern of PSBs.

Secondary hypotheses are as follows:

- H1: There is no growth in the output of SBI group.
- H2: There is no growth in the output of NB group.
- H3: There is no change in the ratio of non-interest income to total income in case of SBI group.

H4: There is no change in the ratio of non-interest income to total income in case of NB group.

H5: There is no change in the concentration ratio of SBI group.

H6: There is no change in the concentration ratio of NB group.

H7: There is no change in the ratio of advertisement expenditure of SBI group.

H8: There is no change in the ratio of advertisement expenditure of NB group.

H9: There is no change in the dominance pattern of SBI group.

H10: There is no change in the dominance pattern of NB group.

Alternate hypotheses are opposite to the null hypotheses.

## **1.5 Methodology**

Methodology has been divided into three subsections. The first subsection 1.5.1 shows the time period and source of data used. Second subsection 1.5.2 shows variables used in the present chapter. After that tools used for the analysis are explained in subsection 1.5.3. We have used semi-log growth equation, paired t-test and t-test for equal variance. All these subsections are explained below.

### **1.5.1 Data Set and Data Source**

For the present study, annual data from 1992 to 2017 has been taken from RBI website. The Reserve Bank of India publishes the data annually. For the present study, 25 public sector banks, i.e., Nationalized Banks (9) and State Bank group (6) have been chosen. Those who have left and joined in between 1992 to 2017 have been left because in semi-log equation and paired t-test, the number of observations should be same for both time periods.

### **1.5.2 Variables**

Market structure can be studied through four elements. First element is concentration ratio which helps us to comment on the nature of the market. It compares the size of individual bank in comparison to the public sector banking industry as a whole. In the present chapter, we have used HHI index to calculate the concentration ratio. It was propounded by Hirschman Herfindahl. For this we have used the sum of deposit and advances as market size. The second variable is non-interest income. It is a proxy for product differentiation. Also it shows the monopolistic power in the market. The absolute amount of non-interest income has been taken as a structure variable. The third variable is market size which represents the sum of deposit and advances. Actually the core banking business is accepting deposits and extending loans. That is why we have taken the sum of deposit and advances as market size. This variable represents a barrier to entry that are present in the market. In other way round, it says that when there is an increase in the market share it works as a barrier to entry in the market for the potential new entrants. The fourth variable is advertisement expenditure. It is known as deferred revenue



expenditure. That means advertisement expenditure once done gives benefit over many years not in the same year when the expenditure is actually incurred. The basic purpose of advertisement expenditure is to inform the customers about the product features services so that it remains in the memory of the investors. This should not be linked with increasing sales because the advertisement expenditure is incurred to make the product stay in the limelight. But after a certain time period, the effectiveness of advertisement expenditure decreases. Here, comes the inverted u shape of advertisement expenditure which says that after a certain time period or a saturation point the effectiveness of advertisement decreases. These variables are explained below.

### **1. Market Size- Barriers to Entry**

It is sum of deposit and advances. Market size is the variable that represents core banking business which is deposits and advances. So, it is measured as sum total of deposits and advances. It is expected to affect concentration in the public sector banking industry in a positive way.

### **2. Advertisement Expenditure- A Proxy to Selling Cost**

As an absolute term, advertisement expenditure is considered as part of structure whereas when it is in proportion to Total expenditure it is considered as part of conduct. Because advertisement expenditure is a deferred revenue nature expenditure, and it brings enduring benefits. It is done with an objective to increase sales. So, it is taken as a proxy for selling cost.

### **3. Non-Interest Income - Product Differentiation**

Other income in absolute terms, it shows the amount of product differentiation in an industry. Therefore, it is a structure variable; a proxy of product differentiation.

### **4. Concentration Ratio- Nature of the Market**

It compares the size of an individual banks in relation to PS banking industry as a whole. In the present chapter, we have used HHI (Hirschman Herfindahl Index) to calculate concentration ratio in terms of deposit plus advances.

**Table 1.1: List of Market Structure Variables**

<b>Name of the variable</b>	<b>Structure variable</b>	<b>Expected sign</b>
Market size	Market share (Barriers to entry)	Positive
Non-interest income	Product differentiation (Monopolistic power)	Positive
Advertisement expenditure	Advertisement (Proxy to Selling cost)	Positive
Concentration ratio	Nature of the market	Negative

Source: Authors' own Compilation

### 1.5.3 Statistical Tools used for the Analysis

We have used Herfindahl's measure of concentration to measure competition in the public sector banking industry. In order to capture inter-bank competition and rivalry, all public sector banks are divided into two strategic groups: SBI group and NB group. Murthy's Index of Rank Dominance (IRD) is used to express a degree of dominance of an ordinal measure such as rank. The Relative Index of Rank Dominance (RIRD) is used to establish the close rivalry that existed amongst PSBs. Semi-growth log equations are used for analysing the trends in concentration ratio, market size, diversification, and advertisement expenditure.

#### 1.5.3.1 Growth Model: Semi-log

The growth rate is used for analysing trends in market structure variables of both strategic groups (SBI group and NB group). Further, it is examined through growth rates that the growth in structure variables is not homogeneous across strategic groups in PSBs. The growth rate has been calculated by using the semi-log regression function.

*A semi-log function is the best for determining growth rates.*

$$\text{Log } Y_t = a + b \cdot t \quad 1$$

$$\text{Log } Y_{(t-1)} = a + b \cdot (t-1) \quad 2$$

Equation 1 minus equation 2

$$\text{Log } t - \text{Log } (t-1) = b \quad 3$$

Or

$$\text{Log } (Y_t/Y_{(t-1)}) = b \quad 4$$

Hence,  $b$  is measure of the relative change of  $Y$  over time and it is the exponential growth rate.

#### 1.5.3.2 Herfindahl-Hirschman index (HHI) (Hirschman, 1964)

The Hirschman-Herfindahl Index (HHI) is a generalized measure of concentration which precise the information on the number and size distribution of firms into a single value. It is the sum of squares of relative sizes or market shares of the firms in the market, where the relative sizes are proportions of the total size of the market. Mathematically, it can be given as:

$$\text{HHI} = \sum_{i=1}^n (S_i)^2$$

HHI = Hirschman-Herfindahl index

$S_i$  = Percentage market share of the  $i$  th firm

$n$  = Total number of firms in the market

### 1.5.3.3 Murthy's Index of Rank Dominance (IRD) and Relative Index of Rank Dominance (RIRD)

The index of rank dominance (IRD) is an innovative measure which gives us a coefficient that expresses the degree of dominance of an ordinal measure such as rank. IRD has been further refined as a relative- Relative Index of Rank Dominance (RIRD), which measures dominance in a relative sense. This gives the proportionate weight of the rank dominance index. It will also be established through RIRD whether close rivalry exist amongst public sector banks or not.

Amongst the public sector banks, the dominant position of a bank (i.e., highest rank) for the longest period has been estimated with the help of index of rank dominance (IRD) and relative index of rank dominance (RIRD).

$$I_{rd} = \sum_{1992}^{2017} \frac{(Rank\ Score\ on\ the\ basis\ of\ market\ size)_i}{Maximum\ rank\ score}$$

where;

$I_{rd}$  = is the index of Rank Dominance. Rank Score = 25, 24, 23.... (In decreasing order of rank)

## 1.6 Findings

The objective of this paper is to look into the market structure and dominance pattern in the two strategic groups (SBI group and NB group) amongst PSBs as a result of reforms. So, findings are divided in four sub-sections, as mentioned below.

### 1.6.1 Growth Rate of Structure Variables

First of all, using semi-log growth equation has been used to caculate growth rates of structure variables. The following table shows growth rate for all these groups.

**Table 1.2: Growth Rate of Market size, Advertisement Expenditure, Product differentiation and Concentration Ratio**

<b>Banks</b> <b>Variables</b>	<b>All Banks</b>	<b>SBI group</b>	<b>NB group</b>
Market size	6.9%, Significant	6.4%, Significant	7%, significant
Advertising Expenditure	2.5%, significant	2.9%, significant	2.3%, significant
Product differentiation	0.34%, not significant	0.55%, significant	0.33%,not significant
Concentration Ratio	-0.595% Significant	-0.086% Significant	-0.178% Significant

Source: Authors' own Calculation

Table 1.2 shows growth rates for all the variables and all for both the strategic groups, namely, SBI group and NB group. First of all, in case of size, growth rate is positive and statistically significant in case of all banks, SBI group and NB group. It means that size of each group is increasing significantly. In case of advertisement expenditure, there is positive and significant growth rate in all the three cases. It shows that banks are putting more emphasis on advertisement of their products and services. It is increasing over the time period which is a good sign of the growth of banking industry. Product differentiation, income from fee-based activities, is positive and significant only in case of SBI group which means that SBI group is quite successful in achieving higher standard of fee-based income. In case of all PSBs and NB group, it is statistically not significant which means that fee-based income of these groups does not have a trend, i.e., we cannot comment on the trend of these groups. This is quite interesting. After so many years of liberalisation, still all PSBs, SBI group and NB group prefer to play safe, i.e., they are investing more funds in government securities which is a safe investment. It shows that these bank groups are risk-averse. The trend of concentration ratio is statistically significant in case of all PSBs, SBI group, and NB and it shows a decline in the concentration ratio and consequently, there is increase in the competition within each group. The decline in the concentration trend is highest in case of NB group. It means there is fairly high competition within NB group than SBI group and all PSBs.

### 1.6.2 Concentration Ratio

In order to study the nature of competition in public sector banking industry, we have used Hirschman Herfindahl Index (HHI) concentration ratio. It was expected with the entry of new private banks that it will reduce the level of concentration. And, consequently, a fall in the concentration ratio will decrease the monopoly power in the market. For analyzing the concentration, sum total of deposits and advances that constitutes its total market is being taken.

**Table 1.3: Trend of Concentration Ratio: All PSBs**

All PSB	Coefficients	Standard Error	t Stat	P-value
Intercept	9.64006947	3.3802743	2.85186012	0.00879904
time	<b>-0.0059775</b>	0.00168633	-3.544702	0.00164926

Source: Authors' own Calculation

**Table 1.4: Trend of Concentration Ratio: SBI group**

SBI group	Coefficients	Standard Error	t Stat	P-value
Intercept	1.18053766	4.00818189	0.29453196	0.77088401
time	<b>-0.0008622</b>	0.00199958	-0.4311955	0.67017463

Source: Authors' own Calculation

**Table 1.7: Concentration ratio of all PSBs, SBI group, and NB group**

All PSBs	
Years	C.Ratio

1992	0.10855939	<b>SBI group</b>		<b>NB group</b>	
1993	0.10541179	<b>Years</b>	<b>C.Ratio</b>	<b>Years</b>	<b>C.Ratio</b>
1994	0.10130867	1992	0.65474588	1992	0.074186475
1995	0.09686379	1993	0.63258189	1993	0.072038344
1996	0.10003767	1994	0.59937888	1994	0.073024629
1997	0.09887031	1995	0.57878025	1995	0.071288259
1998	0.09957228	1996	0.5825493	1996	0.071700574
1999	0.10300704	1997	0.57124031	1997	0.07219358
2000	0.10308522	1998	0.58253049	1998	0.072218218
2001	0.10730041	1999	0.59700631	1999	0.070103097
2002	0.10286664	2000	0.5943373	2000	0.068789364
2003	0.101053	2001	0.60195551	2001	0.068928734
2004	0.0960617	2002	0.58500544	2002	0.069441881
2005	0.09519245	2003	0.56914594	2003	0.069546676
2006	0.08986454	2004	0.54350957	2004	0.068830598
2007	0.08568051	2005	0.53119439	2005	0.068315625
2008	0.08548955	2006	0.50701337	2006	0.068839981
2009	0.09300879	2007	0.49447356	2007	0.068124484
2010	0.08797433	2008	0.50129757	2008	0.066729208
2011	0.08747012	2009	0.55352982	2009	0.067462885
2012	0.08583928	2010	0.54654178	2010	0.067549517
2013	0.08688326	2011	0.58233448	2011	0.068825238
2014	0.08882098	2012	0.57207536	2012	0.069481896
2015	0.09194781	2013	0.57568483	2013	0.068451918
2016	0.09730401	2014	0.60048111	2014	0.070217674
2017	0.10755478	2015	0.63071521	2015	0.071351536
Authors' own Calculation		2016	0.62013384	2016	0.070017108
		2017	0.66670469	2017	0.071642466

**Table 1.5: Trend of Concentration Ratio: NB group**

<b>NB group</b>	<b>Coefficients</b>	<b>Standard Error</b>	<b>t Stat</b>	<b>P-value</b>
Intercept	0.9265742	1.2361103	0.74958861	0.46078757
time	<b>-0.0017893</b>	0.00061666	-2.9015144	0.00783225

Source: Authors' own Calculation

**Table 1.6: Annual Compound Growth rate (Concentration Ratio)**

<b>Banks group</b>	<b>Instantaneous Growth Rate</b>	<b>Annual Compound Growth Rate</b>	
All PSBs	-0.0059775	-0.595	Lowest decline
SBI group	-0.0008622	-0.086	Moderate decline
NB group	-0.0017893	-0.178%	Highest decline

Source: Authors' own Calculation

The trend results of all PSBs, SBI group, and NB group are statistically significant. There is declining trend in the concentration ratio. This means concentration ratio is significantly declining in all PSBs, SBI group, and NB group. There is competition within each group. But it is interesting to see a highest significant declining trend in NB group.

It means they are competing rigorously within their group. There is moderate competition in SBI group. While in all PSBs, the concentration ratio trend is declining with lowest rate. But still, The concentration ratio of all PSBs, SBI group and NB group is given below.

Further, in order to examine the intensity of competition, the concentration ratio has been put in a range which is given by Woolridge and Pearson in 1993. The concentration ratio is PSB group is below 40% in all the year from 1992 to 2017 which shows that competition is fairly high in the PSB group because it falls in low category. Whereas in case of SBI group, the concentraion somewhere falls between 40-70% category and it falls in medium category which shows there is moderate comeptition in SBI group over the time period. Lastly, in case of NB group, the concentrarion ratio falls below 40% category over the time period. It fall in low category which depicts fairly high degree of competition amongst NB group banks. Since, the SBI group is in medium range, it is monopolistic in nature whereas the NB group is in low concentration range, it is competitive in nature. It is shown in the table below:

**Table 1.8: Market Concentration - Hirschman Herfindahl Index (HH Index)**

<b>Concentration Ratio</b>				
<b>Criteria for Market concentration via Hirschman Herfindahl Index (HH Index)</b>				
		<b>NB group</b>	<b>SBI group</b>	<b>PSB group</b>
0 – 40%	<b>Low</b>		<b>C.Ratio</b> (<70% but >40%)	<b>C.Ratio (&lt;8%)</b>
40 - 70%	<b>Medium</b>	<b>C.Ratio (&lt; 11%)</b>		
70 - 100%	<b>High</b>			
<b>Source: Woolridge and Pearson (1993).</b>				

Source: Authors' own Calculation

### 1.6.3 Index of Rank Dominance and Relative Index of Rank Dominance

Index of rank dominance and relative index of rank dominance helps us to comment on the structure and rivalry amongst public sector banking industry. Market size has been taken to assign ranks for all banks.

The table 1.9 shows that state bank of India has been on first place in each year. It means that state bank of India highest rank in all the years. And remaining banks are given ranks according to their market size. A bank with highest market size is given 25th rank and the second highest market size having bank is given 24th rank and so on. In other words, the rank of State bank of India has occupied first place in each year but despite that its relative index of rank dominance is 0.0769. While the relative index of rank dominance of other top four banks is very close to that of state bank of India. The top four other banks are Punjab National Bank. Canara Bank, Bank of Baroda, Union Bank of India. These have remained in top slot in almost all the years. And if we look at the remaining 20 banks, their relative index of rank dominance has no major fluctuations. It means all the banks are performing consistently and competing with each other.

**Table 1.9: Rank Dominance and Relative Index of Rank Dominance: All PSBs**



<b>Banks</b>	<b>rank dominance</b>	<b>relative index of rank dominance</b>
State Bank of India	1	0.076
Punjab National Bank	0.898	0.069
Canara Bank	0.891	0.068
Bank of Baroda	0.888	0.068
Union Bank of India	0.77	0.059
Bank of India	0.768	0.059
Oriental Bank of Commerce	0.703	0.054
Corporation Bank	0.64	0.049
Syndicate Bank	0.545	0.041
State bank of Hyderabad	0.541	0.041
Allahabad Bank	0.521	0.040
State bank of Patiala	0.503	0.038
Andhra Bank	0.495	0.038
Indian overseas Bank	0.485	0.037
Central bank of India	0.448	0.034
Indian bank	0.446	0.034
State Bank of Bikaner & Jaipur	0.376	0.028
State bank of Travancore	0.345	0.026
Dena Bank	0.315	0.024
Uco Bank	0.305	0.023
Vijaya Bank	0.275	0.021
Bank of Maharashtra	0.255	0.019
State Bank of Mysore	0.213	0.016
Punjab and Sind Bank	0.185	0.014
United Bank of India	0.176	0.013

Source: Authors' Own Calculation

**Table 1.10: Rank Dominance and Relative index of Rank Dominance: SBI group**

<b>Bank</b>	<b>Rank Dominance</b>	<b>Relative Index of Rank Dominance</b>
State Bank of India	1	0.285714286
State Bank of Hyderabad	0.80128205	0.228937729
State Bank of Patiala	0.6474359	0.184981685
State Bank of Travancore	0.51282051	0.146520147
State Bank of Jaipur	0.37179487	0.106227106
State Bank of Mysore	0.16666667	0.047619048

Source: Authors' Own Calculation

**Table 1.11: Descriptive Statistics (IRD and RIRD): SBI group**

<b>Rank Dominance</b>		<b>Relative Index of Rank Dominance</b>	
Mean	<b>0.58333333</b>	Mean	<b>0.16666667</b>
Standard Error	0.1222775	Standard Error	0.03493643
Median	0.58012821	Median	0.16575092
Mode	#N/A	Mode	#N/A
Standard Deviation	<b>0.29951747</b>	Standard Deviation	<b>0.08557642</b>
Confidence Level(95.0%)	0.31432431	Confidence Level(95.0%)	0.08980695

Source: Authors' own Calculation

This SBI strategic group result is quite interesting. The RD of these banks is not similar to that of RIRD. The individual ranks of banks are high but when these are competing with all other banks in the group, it shows somewhat a different picture. It shows that SBI group banks are competing within the group.

The descriptive statistics table shows so many interesting facts. First of all, the mean of rank dominance is 0.583 but in case of relative index of rank dominance it is just 0.1666. Secondly, the standard deviation is 0.299 in case of rank dominance, but it is 0.085 in case of relative index of rank dominance. It shows that all the banks in SBI group are competitive and consistent with little standard deviation in their relative index of rank dominance. Similarly, sample variance is also quite less in case of relative index of rank dominance. The rank dominance index and RIRD of NB group is shown below:

**Table 1.12: Rank Dominance and Relative index of Rank Dominance: NB group**

<b>Banks</b>	<b>Rank Dominance</b>	<b>Relative Index of Rank Dominance</b>
Punjab National Bank	0.937246964	0.093724696
Bank of Baroda	0.929149798	0.09291498
Bank of India	0.914979757	0.091497976
Canara Bank	0.886639676	0.088663968
Central Bank of India	0.74291498	0.074291498
Union Bank of India	0.722672065	0.072267206
Indian Overseas Bank	0.62145749	0.062145749
Syndicate Bank	0.611336032	0.061133603
Uco Bank	0.568825911	0.056882591
Indian Bank	0.481781377	0.048178138

Oriental Bank of Commerce	0.477732794	0.047773279
Allahabad Bank	0.453441296	0.04534413
Andhra Bank	0.315789474	0.031578947
Corporation Bank of India	0.307692308	0.030769231
United Bank of India	0.253036437	0.025303644
Bank of Maharashtra	0.236842105	0.023684211
Vijaya Bank	0.234817814	0.023481781
Dena Bank	0.182186235	0.018218623
Punja and Sindh Bank	0.12145749	0.012145749

Source: Authors' own Calculation

**Table 1.13: Descriptive Statistics (IRD and RIRD): NB group**

<i>Rank Dominance</i>		<i>RIRD</i>	
Mean	<b>0.52631579</b>	Mean	<b>0.05263158</b>
Standard Error	0.0626684	Standard Error	0.00626684
Median	0.48178138	Median	0.04817814
Mode	#N/A	Mode	#N/A
Standard Deviation	<b>0.2731652</b>	Standard Deviation	<b>0.02731652</b>
Confidence Level(95.0%)	0.13166141	Confidence Level(95.0%)	0.01316614

Source: Authors' own Calculation

The results of both IRD and RIRD shows there is intense competition within the NB group. The descriptive statistics table shows so many interesting facts. First of all, the mean of rank dominance is .526 (0.583 in SBI group) but in case of relative index of rank dominance it is just 0.0526 (0.1666 in SBI group). It means SBI group enjoys more market share because of a smaller number of banks in the group. That is why their RIRD is fairly high than NB group which shows that there is more competition within NB group. Secondly, the standard deviation is 0.273 (0.299 in SBI group) in case of rank dominance, but it is 0.027 (0.085 in SBI group) in case of relative index of rank dominance. But since the variation in both RD and RIRD is less in NB group which is a better indication of consistency that banks in NB group are maintaining while being competitive. This shows that NB groups banks have been successful in retaining their ranks over the time period while facing the stiff competition with the entry of private sector banks. Overall, the result shows that all the banks in SBI group and NB group are competitive and consistent with maintaining their ranks.

### **1.7 Implications for theory and practice**

This paper burst the most popular myth about public sector banks that these are inefficient and loss-making lot functioning with the support of government and RBI. It is clearly evident from the empirical results that banking market has been developing a lot since liberalization. There is stiff competition amongst all the banks both within the strategic groups and between strategic groups. The advertisement expenditure is statistically significant in case of all banks

and both strategic groups which shows the growth and use of advertising a mean to increasing sales. Similarly, market size is also statistically increasing. SBI group has been able to diversify successfully into fee-based activities as compared to NB group. The changes in ranks of top five banks shows the intense rivalry in the public sector banking industry. It is the high time now that these banks should not be treated as alike, inefficient and loss-making units.

### **1.8 Conclusion**

To investigate into market structure of public sector banks and strategic groups within public sector banks, we have applied semi-log growth equation (to examine growth rates), paired t-test (differences over the time period), Murthy's index of rank dominance and relative index of rank dominance (to study the dominance pattern), and concentration ratio (to measure and examine competition) to draw meaningful results.

The growth rate has been statistically significant and positive in case of market size and advertisement expenditure but in case of product differentiation, it is positive and significant only in case of the SBI group not in NB group and overall PSBs. It means only SBI group has been successful enough to use advertisement as a mean to offer different products to the general public. Secondly, the trend in concentration ratio has shown a significant decline over the time period in all PSBs, SBI group, and NB group. This decline clearly points out the rising competition within all PSBs, SBI group, and NB group. This declined was highest in NB group. This means that there is fairly high competition in NB group as compared to SBI group.

Another significant observation is that the dominance pattern shows that the strategic groups amongst public sector banks are rivals because they are consistently competing with each other. The Murthy's Index of Rank Dominance has given exciting results. SBI has been on first place in each year. While the relative index of rank dominance of other top four banks is very close to that of state bank of India. The RIRD shows close rivalry amongst four other banks (PNB, Bank of Baroda, Bank of India and Canara Bank).

It is encouraging to see that the overall impact of liberalization has been growing market share, healthy rivalry and competition amongst SBI and NB groups. These determinants are all market variables and not representative of government control. This means that public sector banks have adjusted to the new reality and shifted from being loss-making state-controlled units to profit-making market-oriented units and the most reliable source of self-sufficiency.

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# A Critical Review of Women Entrepreneurs Motivation and Challenges in Starting Businesses in Uttar Pradesh

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**Abstract:** *In this era, when we talk about women's empowerment and the impact of digitalization and social media awareness among women, there are still some parts of Uttar Pradesh where women are not allowed to enter into non - traditional businesses. Besides possessing creativity, innovativeness, and other entrepreneurial attributes, women entrepreneurs are facing difficulties in raising funds, managerial issues, network problems, a lack of social support, and dual responsibility. The present study highlights those challenges as well as to explore the factors motivate women to start their own businesses that need to be considered by the central and state governments, banks, and financial institutions. There are many schemes, but due to unawareness, non - availability of collateral security, lots of paperwork, and other conditions, they are hesitant to avail themselves of those available schemes. The researcher's main objective is to review the qualitative and quantitative studies have been done so far and even in 2023, Women Entrepreneurs are still facing challenges while setting up the business in Uttar Pradesh. The limitation of the study was that it considered only peer - reviewed articles published related to Uttar Pradesh. Similar research can be conducted in other states of the country to provide a more comprehensive picture. Future study may be undertaken on a wide scale and produce realistic findings to understand how women entrepreneurs maintain their continued existence and expansion in today's globalised economy by combining quantitative and qualitative approaches.*

**Keywords:** Women Entrepreneurs, Motivation, Challenges, Factors, Uttar Pradesh

## 1. Introduction

Women's responsibilities in business have changed dramatically over the ages. Women entrepreneurs (WEs) may be traced back to a variety of historical and sociological issues. During the 18<sup>th</sup> century, the Industrial Revolution opened up new opportunities for women to join in economic operations and to enter industries such as textiles, manufacturing, and retail, frequently establishing their own businesses. In the 19<sup>th</sup> and 20<sup>th</sup> centuries, the growth of feminist groups was critical to questioning old gender conventions and campaigning for women's rights, especially economic independence. Progressive social attitudes and legislative reforms have steadily expanded women's access to education, property rights, and economic prospects.

According to Schumpeter, "women entrepreneurs are those women who innovate, initiate, or adopt a business activity". As per the Government of India, "a woman entrepreneur is defined as an enterprise owned and controlled by a woman having a minimum financial interest of 51 percent of the capital and giving at least 51 percent of the employment generated in the enterprise to women."

The WEs are considered to be those who are discovering business possibilities, managing resources, making strategic decisions for business, and accepting the risks and benefits with the purpose of making it lucrative and sustainable. To segregate them from the crowd, WEs must have some attributes to be successful, like:

- WEs display a great level of tenacity and resilience, which helps them overcome difficulties and persevere in the face of adversity. WEs must have self - belief and

confidence in their talents, which helps them overcome hurdles and make daring decisions.

- Outstanding leadership abilities: Women have unique leadership traits such as good communication, teamwork, and empathy, which can improve their capacity to influence and motivate their teams. Many WEs excel at networking and cooperating with others.
- Multitasking and adaptability: Women are typically more creative, multitask more, and have the adaptability to adopt the changes introduced in the business environment. And due to their creativity, they are able to create solutions outside the box, unique ideas, and fresh methods for their businesses.
- Financial acumen: Many female entrepreneurs have strong financial management abilities and a strong grasp of forecasting, budgeting, and distributing resources, which are critical to the success as well as the viability of their businesses.
- It is crucial to highlight that these qualities are not restricted to women entrepreneurs and may be seen in entrepreneurs of all genders. However, these characteristics are frequently recognised in successful WEs.

## Development of women entrepreneurs

The advancement of digital technology has generated new prospects for entrepreneurship. These technologies are being used by women to launch enterprises in a range of areas, including e - commerce, online services, and digital marketing. Even the rise of women's networks, associations, and mentorship programmes has provided valuable assistance, counsel, inspiration for cooperation, and access to finances and resources to future female entrepreneurs.



However, research on SDGs (Sustainable Development Goals) and economic empowerment that focuses [9] on the role women in business has evidently shown importance of women's empowerment in intensifying monetary growth, sponsoring social expansion, and cultivating business accomplishment. Investing in women's empowerment helps both women and children and is essential for the health and economic growth of communities, families, and nations.

Even after breakthroughs and improvements, women continue to face gender - related barriers and hurdles in business, such as financing, societal stereotypes, and worries about work - life balance. Efforts to remove these barriers continue to promote the development and success of WEs worldwide.

#### **Current Position of Women Entrepreneurs in India**

According to the Sixth Economic Census, "women account for 13.76% of all entrepreneurs in the country and have made substantial contributions to the Indian economy. These firms employed 13.45 million people (10.24%), with 83.19% of them being self - employed. Approximately 88.8% of the workforce was working in businesses recruiting less than 10 staff. The total number of Self - Help Groups (SHGs) was 0.19 million, with all women Own Account Establishments accounting for 89% of the total, and approximately 34.3% of firms owned by women entrepreneurs were engaged in agricultural operations, with cattle leading at 31.6%. Manufacturing and retail trade were the most common non - agricultural enterprises held by women entrepreneurs accounting for 29.8% and 17.8%, respectively. The average employment per facility for women - owned businesses was shown to be 1.67". Over 48% of women entrepreneurs lack access to comprehensive business counsellors [15]. According to the Global Entrepreneurship Monitor (GEM), "women in India and the Republic of Korea tend to have the most difficulties acquiring company finance when compared to their male counterparts. Due to a lack of collateral and tangible assets, restricted pathways for proving creditworthiness, and perceptual prejudices against lending to female entrepreneurs or women - led firms, women - owned MSMEs encounter difficulties in acquiring finance. "Because the majority of women - owned enterprises are home - run, tiny, and informal in nature, they have little market exposure and marketing abilities, logistical constraints, time poverty, unpaid care duties, safety and security concerns, and a lack of digital and technological abilities".

The current situation of WEs in India indicates both progress and continuing challenges. Over the years, there has been a notable increase in the participation of women in entrepreneurship in India. Many women have founded their own businesses in fields such as technology, e - commerce, healthcare, fashion, and social enterprises. Access to money remains a big barrier. Women frequently experience problems obtaining loans or investing owing to a variety of circumstances, including a lack of collateral, a lack of knowledge about funding possibilities, and prejudices within the financial system. Efforts are being made to close this gap

by establishing specialised funds and angel investor networks dedicated to assisting women - led firms.

Women's entrepreneurship networks, incubators, and mentoring programmes have evolved to give guidance, mentorship, and support to budding female entrepreneurs. These programmes seek to foster community, create chances for skill development, and promote access to resources and networks. There is a rising appreciation in India for the accomplishments and potential of women entrepreneurs. Women - led startups have received national and worldwide prominence and recognition. Female entrepreneurs are also increasingly taking on leadership roles in major industry organisations and forums.

In spite of this, many Indian women entrepreneurs continue to struggle with combining job and family commitments, societal expectations and traditional gender norms might make it difficult to balance career and personal obligations. There is scope for more work to be done in India to overcome gender gaps in entrepreneurship. Initiatives aimed at empowering women entrepreneurs and contributing to their success and economic growth can provide equitable opportunities, access to financing, skill development, and the ability to overcome societal prejudices.

The Indian government has announced several programmes to assist WEs, which include the Stand - Up India programme, which provides monetary support and encouragement to women - owned enterprises. Other projects aim to promote skill development, provide funding, and encourage grassroots female entrepreneurship.

#### **Current Position of women entrepreneurs in Uttar Pradesh**

There is much difference in the education of urban and rural areas, which leads to less responsiveness towards the adoption of modernity. Uttar Pradesh (UP) is India's fourth - biggest state, accounting for 6.88% of the country's total land area. UP has 75 districts, and as per the National Crime Records Bureau (NCRB), "women in UP faced the most crimes in the country in 2021. National Commission for Women records show that it received the highest number of complaints of crimes against women in 2021 from UP". Women's education is still considered less important in comparison to male. There is still a male hierarchy that does not want women to go out for work in higher positions. Women are only allowed to go to farms or teaching jobs where they have to cover their heads. The literacy rate is increasing, but there is still a huge gap to be covered in comparison to urban cities.

Even women's health has not been given due importance, as can be seen from high maternal mortality rates. In that regard, government policies are supporting women to come up with new job opportunities, but women in typical rural areas are not able to take advantage of those policies. There are many factors behind this, as women's participation in family income is considered secondary income. Domestic violence, rape, and dowry cases are also some of the reasons that families don't support women in managing businesses. In case they have an urge to earn money and establish their

business, only a few options are there, like boutiques, beauty parlours, cosmetic shops, and grocery shops.

The primary goals of this study are to examine the motives for women to start businesses, to investigate the problems that women experience while starting businesses in Uttar Pradesh, and to offer strategies for women to overcome and sustain their businesses in Uttar Pradesh. This study will help make government, banks and financial institutions aware about the problems of WEs for getting financial help.

The limitation of the study is that while reviewing papers, only those that were fully accessible and from reputed journals were considered. As existing literature was only related to some popular districts of UP on which research papers are available, there are many more districts that can present more challenges for a woman while setting up a business.

The current paper has been organised in different sections, next section presents the objectives of the present study and methodology; findings and discussions; and conclusions and recommendations.

## 2. Methodology

The systematic review was conducted to review the reasons and challenges faced by WEs in UP. For the present study, only peer - reviewed articles published were considered only. It is vital to assess the factors that inspire women to create their own enterprises. [23] Entrepreneurship seemed to be motivated by the same set of push and pull variables irrespective of the gender of the entrepreneur. But due to femaleness difference, there are mainly these factors: desire for Independence, children, Economic Survival, Self - Confidence, Possessing Specific Skills [23; 20; 11; 24], poor working conditions [23]; family support [11; 24], Innovativeness [24], willing to take a business risk [20].

From the study of existing papers, it has been concluded that there are many challenges for a WEs at the time of initiating business as well as for the survival of the business. [30] Decision - making trial and evaluation laboratory (DEMATEL) approach for identifying impediments. There are some challenges, like psychological issues, gender impact on business, lack of management education, unexperienced, and non - availability of teaching opportunities; place movement and least family assistance; managerial issues; and problems acquiring financial resources. There is a link between psychological characteristics and the entrepreneurial attitude of women [20].

Major challenges have been discussed below:

### The patriarchy Issues and Gender Discrimination

Several research have been undertaken to investigate the impact of patriarchal concerns [30] on the businesses set up by women. Male members believe that sponsoring women's companies is a major risk. [25] The gender of the owner will impact the experience of small business ownership, from creation through everyday management experiences. Women are exposed to patriarchal forces [24] that underpin

their social subordination [25], and this leads them to use self - employment to fulfil the dual demands of domestic and waged labour. On the other hand, participation in the establishment of high - growth, innovation - and technology - based companies is not evenly distributed across gender lines. Female entrepreneurs have a small share in the more profitable, faster - growing sorts of entrepreneurship that this new economy is increasingly valuing [7].

### Cultural Constraints

The seamless functioning of women's businesses in society is complicated by social conventions and custom. Males, according to popular thought, are the breadwinners in households. [31], Women are largely considered for household maintenance. And if a woman expressed an interest in entrepreneurship, it was considered that she intended to take on the position of family head. According to research conducted by [7; 19], Women confront extra difficulties as a result of entrenched gender - based injustices and prejudices in culture and custom. Despite efforts by women to attain equity with the male population in areas like as employment and education, their role in the family, particularly in the fields of maintaining a home and raising children, remains largely unchanged [37; 26; 2]

### Lack of adequate finance

According to a number of studies in most cases, a lack of suitable capital [2] is the key cause for a WEs to terminate their business instead of a business disaster. [6; 12; 22; 35; 28; 10]. [10] An empirical research of 50 WEs discovered that nearly all of female entrepreneurs use an amalgamation of personal assets and other sources of finance, such as household savings, credit from banks, and mortgages by family members, to launch their own small businesses.

Financial institutions are wary about women's entrepreneurial potential. Female loonies are perceived as more dangerous by bankers than male loonies. Bankers Lending is decided by a scoring mechanism that considers factors such as security, background, credit history, official employment expertise, business networks, and the feasibility of the business proposal. The study's findings validated the difficulties that women entrepreneurs encounter in obtaining start - up finance through this technique. Unreasonable and inappropriate securities [5] to get loans for women's businesses in the majority of the regions studied. Women entrepreneurs face challenges due to a lack of financial resources [33; 3; 11] and working capital, and for those getting bank loans, it is considered an "ordeal" [10] for them. Women entrepreneurs don't have the luxury of external capital since they are unable to give actual security. There are extremely few women who hold real estate. Gender - based injustices and biases are widespread in society and culture.

### Lack of Management Education

[13; 18] The lack of managerial expertise and business skills perceived by the WEs in this survey to be a serious limitation. Women often offer less managerial knowledge [2] into their enterprises due to the so - called experience gap. While there is no statistically significant difference in formal education (women outperform men in higher degrees), women have fewer marketing, managerial, and

financial abilities. As a result, we may conclude that the business - specific educational resources [3] and vocational training [30] required to establish a firm are clearly less available for females.

#### Lack of Networking or social connectivity

[24] Developing networks can assist these entrepreneurs in purchasing from one another and developing collaboration opportunities, allowing them to achieve their goals more quickly. By using networking [2] and social support to affect the orientation of WEs [20] these entrepreneurs may also find investors and mentors [11] to help them grow their businesses. [27] quantitative study conducted with 34 WEs in southern Brazil, reveals that whenever it comes to trust inside the corporate network, women have higher expectations than men. . Knowledge of additional avenues of raw materials accessibility and good negotiation talents are essential for running a firm. The amount of profit made is determined by purchasing discounted raw materials from multiple sources. WEs business attempts are impeded by a lack of awareness regarding raw material availability [2] and inadequate negotiating and bargaining skills.

In this regard, the government should also encourage women's involvement in local, national, and worldwide trade fairs to increase their exposure, build networks, and locate prospective buyers.

#### Poor risk - taking capacity

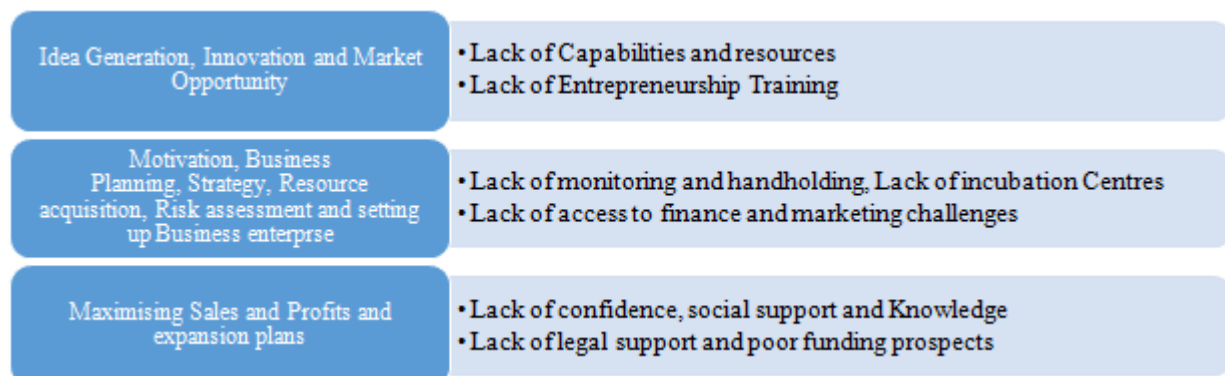
It is crucial to highlight that risk capacity is impacted by a variety of factors, including personal characteristics, experience, availability of resources, and society's

expectations. Encouraging and helping female entrepreneurs build a healthy risk appetite [2] will help them overcome these obstacles and reach their full company potential. Women with poor risk tolerance may be more cautious about developing their enterprises. They may be hesitant to incur extra debt or make big expenditures, which can limit their business' development potential. This conservative strategy may limit their capacity to scale up and compete in the market. Women entrepreneurs with a low risk tolerance may be more likely to concentrate on specialised markets or smaller consumer groups that they consider to be less dangerous. It is crucial to note that risk capacity is not entirely determined by gender but may also be impacted by other factors such as personal characteristics, experience, and education.

#### Duty towards Family

[25] Due to gendertization, there are dual demands for women to fulfil domestic and waged labour, resulting in their choosing self - employment to fulfil them, like in the beauty parlour industry, tailoring industry, retail shops, grocery shops, and food stalls/tiffin system [34] over full - time employment in the organised sector. Women, especially those with caregiving duties, frequently confront the issue of combining work and family commitments. This might limit their time and availability to focus on their firms, forcing them to make difficult decisions about their entrepreneurial endeavours.

### 3. Findings and Discussions



**Figure 4.1:** Women Entrepreneurs Activities and Challenges

Source: <https://www.niti.gov.in/>

When it comes to starting a business, women entrepreneurs encounter a variety of hurdles. While these difficulties may vary depending on aspects such as geographical location, cultural context, and industry, The lack of visible and relevant female role models in business can be demotivating for women. The lack of successful female entrepreneurs in positions of leadership, as well as the media, might contribute to a lack of self - belief and discourage women from following their entrepreneurial dreams.

Access to excellent "business education and training" is essential for developing skills and evidence required to thrive as an entrepreneur. However, due to financial restrictions, restricted availability, or cultural expectations, women entrepreneurs may encounter difficulties attending

such programmes. Women entrepreneurs may suffer from impostor syndrome and self - doubt, feeling as though they don't belong or aren't as talented as their male competitors. It is critical for women to build confidence and overcome internal limitations in order to fully realise their business potential.

Addressing these difficulties would necessitate a multidimensional strategy that includes equitable access to finance, the development of supporting ecosystems, the promotion of gender diversity and inclusion, the provision of tailored training and mentorship programmes, and the challenge of gender preconceptions and prejudices. By addressing these issues, society may help women



entrepreneurs reach their full potential and create more economic development and creativity.

Women's business is mainly motivated by need, with little potential for innovation. The Entrepreneurs Cells data clearly show a decline in women's long - term entrepreneurship and a spike in women - owned companies without hired workers, demonstrating an elevated level of informal economic activity and unstable firms [32]. Entrepreneurs' self - efficacy and risk - taking ability were discovered to be potential success factors [19]. Those who are knowledgeable and substantial - minded might work with local government officials to launch projects and campaigns that teach people about the value of women's entrepreneurship and the benefits it would bring to the community [30]. [1] investigates the factors - personal (work - life balance, experiences, and entrepreneurship education and training), social (social identity, family, friends, and role models), environmental (government, NGOs, financial institutions, and culture), and EL (action, experience, social, and vicarious learning) for the creation of a comprehensive conceptual framework of skills (entrepreneurial, personal, social, and managerial) to support the long - term growth of women social entrepreneurs.

The central and state governments are trying to introduce and implement policies to increase women's participation in the workforce through education, promoting gender equality, and awareness campaigns on health, but there are still many challenges for women to set up their businesses in UP cities. Because they are the primary breadwinners in their families, most women in UP create their own modest companies. According to the government, there have been around 8713 total authorised start - ups up to March 2023, of which 4305 were led by women. This shows that more than 50% of women have registered start - ups, but this includes involvement of WEs in agro - products and dairy farming as well. With a view to enhancing and motivating the WEs, In 2015, the Government of India launched "Pradhan Mantri Mudra Yojana (PMMY) " to promote women entrepreneurs through financial help in the form of "Mudra Loans" and in 2021, the UP government introduced a portal named "Mission Shakti - Nirbhaya ek Pahal, " launched on September 29 with the purpose of providing a safe environment to women and empowering them with a series of awareness and capacity building workshops, and recently introduced a helpline for them "Vikas Utsav".

#### 4. Conclusion and Recommendations

Furthermore, it is critical to encourage the growth of entrepreneurship among women, particularly women from disadvantaged backgrounds. Women's entrepreneurial activities must be strengthened in light of diminishing female workforce participation and commitment to achieving the 5<sup>th</sup> SDG on gender equality. It is undeniable that women's entrepreneurship may significantly improve women's engagement in the economy, in that way increasing GDP to an even greater extent.

To motivate and enhance the number of women entrepreneurs in India, several initiatives were implemented in 2022, like NITI Aayog, which has developed its own

"Women Entrepreneurship Platform (WEP) 3.0 online page with the purpose of assisting Indian women entrepreneurs and has an aim to onboard 2.5 lakh women entrepreneurs, engage with 500 partners, and host over 200 capacity - building online and offline events" [15].

Family, community, and nation are all important. A plan like this would end up resulting in long - term societal gains. In the future, further comparative studies can be conducted on both male and female challenges and opportunities while setting up business in UP. There are a few recommendations that can be incorporated to promote women's adoption of entrepreneurship in UP, as follows:

- Administrative barriers should be eased, particularly for rural women's businesses.
- Raising awareness among rural Indian women entrepreneurs about government rules and regulations governing commerce and industry.
- Shifting beyond farm to other services in women's business ventures [32] creates a variety of perhaps innovative and expanding entrepreneurial enterprises that must be reinforced via appropriate training in skills and imaginative thinking, as well as to simple availability of capital.
- Through conducting financial literacy programmes, WEs could understand various available financial instruments and be able to manage their finances effectively.
- WEs should also make efforts on their own to access credit for government schemes and finances effectively.
- WEs should also explore and connect with networking groups through social media, as it would help them connect with potential customers, partners, and suppliers.
- WEs should invest their time and money in learning how to leverage technology to enhance their businesses, processes, and reach.

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## श्रीमद्भगवद् गीता में 'कर्म' की अवधारणा

डॉ. सुमन रानी

असिस्टेंट प्रोफेसर, संस्कृत विभाग  
भारती महाविद्यालय, दिल्ली विश्वविद्यालय, दिल्ली

सम्पूर्ण चराचर जगत् में सर्वश्रेष्ठ, कर्मठ, बुद्धिमान प्राणी मानव नित नवीन आयामों पर विश्व में अपनी कर्मठता का लोहा मनवा रहा है, परन्तु आज मानव अनेकों आधुनिक सुविधाओं से सम्पन्न होते हुए भी अशान्त व दुःखी रहता है। वह कर्म करते हुए अनेकों संसाधनों की प्राप्ति के बाद भी शान्त सुखारी जीवन जीने में अपने को असमर्थ पाता है। इसका कारण मानव की कर्महीनता नहीं है अपितु कर्मों के साथ भावशून्यता, लोभ, अपेक्षा, असंयम, समभावहीनता, दयाशून्यता इत्यादि अनेकों नैतिक गुणों के अभाव या अज्ञान के कारण है। आधुनिक समय में मानवता को धर्म अर्थात् कर्तव्यनिष्ठता, संयम से दृढ़ सुख-दुःख में समभाव विश्व कल्याण भाव तथा अनासक्त कर्म की शिक्षा 'श्रीमद्भगवद्गीता' से ही प्राप्त हो सकती है। वस्तुतः भारतीय समाज के मानस पटल पर ऐसा ग्रन्थ जो वैश्विक स्तर पर अत्यन्त लोकप्रिय रहा हो और जिसमें धर्म, संस्कृति, जीवन दर्शन, आचार-विचार, कर्तव्य-अकर्तव्य, ऐहिक-पारलौकिक जीवन को उत्कृष्ट प्रकार से जीने तथा सामाजिक उन्नति के केन्द्र मानवीय विकास और सृजन के उन गूढ़ रहस्यात्मक प्रश्नों पर सूक्ष्म, हृदयग्राही एवं मानवीय संवेदनाओं को झकझोर देने वाले समस्याओं का समाधान सरल एवं स्पष्ट भाषा में प्रस्तुत किया है। श्रीमद्भगवद्गीता में श्रीकृष्ण ने सभी प्रकार के कर्म रहस्यों के उद्घाटन के बाद 'यथोच्छसि तथा कुरु' कहकर मानवीय समक्षताओं की अपार सम्भावनाओं की विशालतम स्वरूप की ओर ध्यान इंगित करते हुए कर्मों पर वैयक्तिक गुणों एवं भिन्नताओं के प्रभाव को भी स्पष्ट परिलक्षित किया है। गीता का ज्ञान किसी वर्ग-विशेष या समूह, सम्प्रदाय के लिए न होकर सृष्टि के कण-कण के समायोजन, विकास, स्थिति-परिस्थिति का एक प्रायोगिक ग्रन्थ है। वस्तुतः गीता में सभी शास्त्रों के सारभूत तत्त्व निहित हैं। कहा भी गया है - 'सर्वशास्त्रमयी सा' यद्यपि गीता की रचना किसी स्वतन्त्र ग्रन्थ के रूप में नहीं हुई है, महर्षि व्यास द्वारा उपदिष्ट महाभारत के भीष्मपर्व के 25वें अध्याय से लेकर 42वें अध्याय तक 700 श्लोक रूप में निबद्ध है। गीता का कोई विशिष्ट नाम या दर्शन का प्रतिपादन न होते हुए भी यह ग्रन्थ समस्त दर्शन एवं उपनिषदों के साररूप में उपस्थित है। यही कारण है कि श्रीमद्भगवद्गीता का महत्त्व बहुत अधिक बढ़ जाता है। गीता का महत्त्व प्रतिपादित करते हुए उचित ही कहा गया है -

सर्वोपनिषदो गावो दोग्धा गोपालनन्दनः ।

पार्थो वत्सः सुधीर्भोक्ता दुग्धं गीतामृतं महत् ॥

जीवन में कर्मों की निरन्तरता जीवनपर्यन्त रहती है। मनुष्य एक क्षण भी कर्म किये बिना नहीं रह सकता है जब दृष्ट भाव में मानव कोई कार्य नहीं करता है, तत् क्षण भी वह श्वसन इत्यादि क्रिया कर रहा होता है - 'करोतीति क्रियते वा तत् इति कर्म' कर्म शब्द का अर्थ कार्य, प्रवृत्ति या क्रिया है। कर्म करने की सामर्थ्य शक्ति समाप्त होने पर जीव को मृत मान लिया जाता है। यह सम्पूर्ण सृष्टि प्रकृति के गुणों के अनुरूप कर्म करने पर विवश है। स्वयं श्रीकृष्ण भी कर्म की सार्वभौमिकता एवं सत्यता को बतलाते हुए इस प्रकार कहते हैं -

न हि कश्चित् क्षणमपि जातु तिष्ठत्यकर्मकृतः ।

कार्यते हावशः कर्म सर्वः प्रकृतिजैर्गुणैः ॥ (श्रीमद्भगवद्गीता 3/5)

कर्म जीवन की अनिवार्यता है। कर्मों की सार्थकता देश, काल, समाज, परिस्थिति पर निर्भर करती है। इसीलिए कहा गया है -

नियतं कुरु कर्म त्वं कर्म ज्यायो ह्यकर्मणः ।

शरीरयात्रापि च ते न प्रसिद्ध्येदकर्मणः ॥ (श्रीमद्भगवद्गीता 3/8)

जब तक आत्मा की उपस्थिति होती है, जीव सदैव सक्रिय रहता है। माया के संसर्ग में आकर आत्मा भौतिक गुणों को प्राप्त कर लेता है। इसीलिए आत्मा की शुद्धि हेतु जीव को सदैव शास्त्रसम्मत कर्मों के संलग्न होना चाहिये। यदि जीवात्मा कृष्णभावनामृत के अपने स्वाभाविक कर्म के रहते हुए जिस भी कार्य को करता है, वह सर्वदा कल्याणप्रद ही होता है। श्रीमद्भगवद् द्वारा इसकी पुष्टि की गयी है -

त्यक्त्वा स्वधर्मं चरणाम्बुजं हरेभजन्नपक्वोऽथ पतेत्ततो यदि ।

यत्र क्व वाभद्रमभूदयमुण्य किं को वार्थ आसोभजतां स्वधर्मताः ॥

सांसारिक पदार्थों के लिप्त होने का कारण त्रिविध गुण अर्थात् सत्त्व, रजस् और तमस् इन गुणों के कारण ही मनुष्य क्रियाशील रहता है। कर्मों की सिद्धि में स्थान, कर्ता, अनेक प्रकार के सहायक साधन, कर्ता के कार्य-सम्बन्धित चेष्टाएँ और भाग्य ये पाँच कारण होते हैं -

अधिष्ठानं तथा कर्ता करणं च पृथग्विधम् ।

विविधाश्च पृथक्केष्टा दैवं चैवात्र पञ्चम् ॥ (श्रीमद्भगवद्गीता 18/14)

कार्य की सम्पन्नता का प्रमुख और अन्तिम कारण 'दैव' अथवा भाग्य है। वस्तुतः यहाँ इन पूर्वोक्त उक्त चार कारण भाग्य या दैव पर ही आधारित है। मनुष्य के शुभाशुभ कर्मों के पूर्व संस्कारों को ही %दैव% शब्द से अभिहित किया है -

'पूर्वजन्मकृतं कर्म तदैवमिति कथ्यते।' (हितोपदेश मित्रलाभ 33)

प्रत्येक कर्म की सिद्धि में दैव अथवा भाग्य के साथ अन्य सभी

# Teaching International Relations in Indian Universities: Issues and Challenges

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## Introduction

Globally, it is in the recent past that the concerns for pedagogy in international relations (IR) have gained a new momentum despite the study of the discipline being more than a century old. Teaching–learning IR in India is also in an urgent need of one. Recently, much attention is drawn towards the necessity of greater theoretical rigour in Indian scholarship on IR to match global standards and her increasing visibility as an emerging power on the global scene (Paul, 2017).

While the appeal of IR as a discipline is increasing among students at the undergraduate, post-graduate and research levels, evolving a robust pedagogy that encapsulates the relevance of the discipline to students from the vantage point of this part of the world is a challenge that teachers imparting knowledge about IR in India constantly struggle with. For long, the syllabi at the undergraduate level in various universities across the country did not touch upon the theoretical aspects at all (Bajpai & Mallavarappu, 2005), confining the focus to Cold War history and foreign policy. Introduction to theories and theoretical engagement with problems and issues in IR only took place at the post-graduate level in universities such as Jawaharlal Nehru University (JNU), University of Delhi (DU)<sup>3</sup>, Jadavpur University and in South Asian University (SAU) in the recent past.

While JNU has an entire school dedicated to the study of IR (including programmes on area studies, international economy and trade), DU offered only a couple of papers in the master's programme as subdiscipline of political science. The SAU also has a department dedicated to IR. With successive syllabus revision exercises in DU, the IR courses have been invested with rich theoretical content, and also the number of papers associated with relevant themes in IR has been significantly increased. However, the pedagogical concerns still loom large. How to navigate through the challenge of not making the discipline look like something which makes more sense from a Western lens only, where concerns that affect the post-colonial/global south/developing countries/non-Western countries, either

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<sup>3</sup> DU has also introduced sections on IR theories in the undergraduate level Political Science courses after 2009.

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does not figure or appears only marginally, say in one of the last or penultimate subunits. Challenges to teaching–learning IR in a relevant manner are multifold, ranging from curriculum design to the availability of material across the country in languages other than English, workshops on how to broach topics from non-Western perspective and newer pedagogical tools that encourage methodological rigour at the research levels.

## Challenges

With the rise of an interconnected world and India becoming a crucial player in international affairs, it has become all the more pertinent to think of the challenges being faced by the world from fresh conceptual, theoretical and methodological standpoints. The South Asian region being a hub of international conflicts also makes the discipline relevant subject to understand the empirical realities of the contemporary world. Though there are few centres in India which focus exclusively on IR teaching at the master's level, only few courses are taught at the undergraduate level to expose students to this subject. Largely, the study of IR continues to remain a subfield of the main discipline of political science. Within political science, the teaching and learning of IR are primarily done through two major ways.

At the undergraduate level, the focus is more on the world history and foreign policy of India. At the masters' level, the focus of teaching is the traditionally dominant theories such as realism and neo-realism or liberalism. Besides, Indian foreign policy is also an issue which is taught at both the levels. However, the focus of foreign policy courses is more on state-directed issues such as diplomacy, bilateral relations and regional issues. It is the state-centric lens of policy that defines the core of these issues, leaving aside possibilities of any critical engagement with the issues. How people-centric approaches can provide alternative explanations is rarely the subject matter. The centrality of the nation state and territory in IR flows from the Anglo-American-dominated knowledge structure of the Cold War era in which the territorial security of states, especially the protection of the borders, was considered as the primary objective of state policy (Wæver, 1998).

The training of students in IR is more oriented towards writing events, conflicts or country-centric commentaries. Bilateral ties or international organizations or any form of collective security organizations are some of the popular areas of research and intellectual engagement. Philosophical, ontological and theoretical questions are rarely the focus of IR scholars in India. A major reason for this is either lack of or weak engagement with methodological research, especially in the fields of philosophy, history and conceptual development.

In one of the speeches, Shiv Shankar Menon had argued how IR in India continues to face a disconnect between IR theory and practice.<sup>4</sup> Deepa Shahi has argued how IR studies have expanded rapidly in the past few decades across India as there are many new institutions that offer courses on IR.<sup>5</sup> However, on the issues of thematic expansion, she argues how the concerns of IR teaching in India are guided by the powerful players in world politics and nature of Indian state's engagement with these powerful players.

The discipline of IR in India has been trying to define itself as a separate discipline instead of producing research, cutting across various disciplinary boundaries. Multidisciplinary approaches are

<sup>4</sup> Text of the lecture is available on <https://www.brookings.edu/blog/up-front/2019/02/11/studying-international-relations-in-india/> (accessed on 5 June 2022).

<sup>5</sup> The article is available on <https://www.e-ir.info/2016/10/29/teaching-international-relations-in-india-from-pedagogy-to-andragogy/> (accessed on 8 November 2022).

missing from the curriculum across universities, though in the early decades after independence, there were efforts to bring scholars from multiple disciplines together to understand IR. However, such scholarship rarely got any acknowledgement in the Indian knowledge traditions. This gradually paved the way for a narrow scholarship, focusing on themes that are policy centric in nature. IR teaching in India till date does not equip the student with how to balance the two concerns. Multidisciplinary focus, philosophy and empirical studies are not to be seen as three different compartments. Rather it is possible for a scholar to make a final balance between the three. It is necessary to inculcate such research practices in IR teaching and learning in India today.

Another major issue that concerns the teaching and learning of IR in India is the pedagogical tools. IR teaching in India is considered to be quite similar to the teaching of any other subject of social sciences. Innovative teaching methods, including movie screening, documentaries, usage of maps, simulation techniques and survey methods, have hardly made their way into teaching in IR. Though the study of areas was an innovative idea in view of independent India's growing engagement with the world, gradually it has become confined to understanding history, politics or economy of other regions through the secondary sources produced by Western scholars. Hence, Indian scholars' world view is formed not by the original research based on innovative methods but what comes from the perspective of scholars based in the west European or north American universities.

## **An Alternative**

In view of these emerging changes at the global level, it is appropriate to think of reinventing the teaching and learning process in IR in India. There is a need to have a learner-centric approach, interlinking it with the everydayness of Indian society or the South Asian region rather than considering the European or foreign policy lens as 'the paradigm' of understanding IR. A more participatory and interactive approach to discipline that brings together teaching as well as research in the subject is necessary to reimagine the discipline. Some of the recent concerns like cybersecurity, wartime violence, gender issues, migration and its impact on people's lives, climate change and environmental degradation, poverty and urbanization are some of the concerns which continue to remain ignored in the IR teaching not only in India but also at the global level.

In fact, quite like the traditional binary of IR distinguishing between domestic and foreign, these issues are considered for scholars who work on domestic issues, Indian economy or Indian politics. Research and teaching in IR, on the other hand, is considered an outward-looking subject while defining the foreign and 'the other' outside the territorial boundaries of the state. It ignores the very fact that some of these concerns are specific to India or South Asia, and they may not be seen as pressing issues by the scholars located in the American or British universities.

Despite the fact that in the past three decades the nature of events impacting the external as well as internal policies of the states have undergone a significant transformation, teaching and learning in IR in India has been struggling to catch up with these changing realities of time and space. New concepts and theories in the form of debates have hardly made their way into political science or IR syllabi in Indian universities (Behera, 2007).

There is a need to engage with some of the recent theories such as feminism, constructivism, security studies in the IR teaching and learning in most Indian universities. Similarly, there is hardly any focus on training students in the research methods which can be helpful in innovative research. IR is generally understood as a field useful for understanding a state's world view and its external relations. It is the foreign policy analysis that forms the core of intellectual imagination in the teaching and learning of IR



in India. Some of the relevant contemporary questions such as migration, refugees, urbanization and city development, security and securitization, ontological theories, social constructivism, historical analysis, can be few additions to the IR.

The pandemic has shown how the contemporary nature of security threats is not confined to the physical borders of the states. The concept of human security that tried to focus on multiple meanings and concerns of security than the physical security of the state is yet not a framework of analysis in most of the university- and college-level teaching of IR in India. The Westphalian treaty and the rise of modern nation state cannot be *the reference point* of studying world history and IR as is the case in most of the political science syllabi. As Amtiav Acharya (2014) has argued for IR scholarship at the global level advocating a 'Global IR', the Indian IR scholars also need to engage with other alternative theoretical contributions coming from China, Japan, Turkey and Russia rather than living with a narrow world view defined from an Anglo-American knowledge-centric world order. Even within Europe, there have been multiple debates on alternative forms of conceptual and methodological interventions when it comes to the question of pedagogy. For a more vibrant, dynamic and pluralistic IR, it is inevitable for Indian scholars to go beyond the traditional concepts such as sovereignty, bilateral conflicts or bilateral issues of the South Asian region.

Another field that has also not been given due attention in the post-graduate programmes in IR teaching is the courses on peace and conflict studies. As a subdiscipline of IR, peace and conflict studies has evolved as a very popular subject worldwide. However, in India this subject is being taught at a few universities only.

With the rise of pandemic, multiple conflicts emerging at India's borders, including the return of Taliban in Afghanistan, political instability in Pakistan, economic and political turmoil in Sri Lanka and refugee crisis on India–Myanmar border, the study of region within IR requires fresh, critical and creative engagements with the issues instead of remaining hostage to the developments in the bilateral meetings or multilateral regional official meetings. In view of this, there is a need to update the pedagogy, topics of analysis and methodologies in the discipline in order to provide rigorous research and better explanations of the problems that the world is encountering today.

It is only in the recent past that scholars have started engaging with some of the philosophical questions in IR in view of the ideas in the traditional religious texts, focusing on *dharma* (Shani & Behera, 2021). Linking contemporary concerns with innovative conceptual categories or methods is still missing from such endeavours. Globally, when IR scholarship is diversifying itself while engaging with a variety of methods, including ethnography, anthropology and political psychology, India's post-modern methodological 'ethnographic turn in Indian IR' is yet to come (Suthar, 2016).

It has not always been the case. Indian IR had a vibrant history of engagement with conceptual categories or philosophical concerns. Kanti Bajpai and Sidharth Mallawarappu (2005) had argued how IR research in India did have a strong philosophical foundation. However, this trend gradually shifted in the form of restricting the subject to concerns of state policy, especially foreign policy. Other major emerging concerns that form the core of teaching and learning in some of the new universities are globalization, global governance, global trade, etc.

For pedagogical enrichment, there is a need to go beyond classroom- and lecture-based teaching methods. Classroom-oriented teaching–learning has confined the debates and discussions amongst students to the reading-based practices (Ishiyama et al., 2015). Group-based teaching methods or research training are not part of syllabi or training in IR in Indian universities or colleges. Such a method can help student develop diverse perspectives on the subject while fostering independent quest for knowledge (Scott et al., 2021). Furthermore, moving beyond the South Asian region is also required. Other parts of the world, such as Eastern Europe or Africa, rarely make any entry into the IR classroom unless they are

engaged in a conflict situation. IR subject matter in other words is defined either by common cultural/geographical linkages or conflict. Such incorporation would further open up possibilities of large-scale theoretical generalizations about state behaviour or achieving institutional effectiveness at the global level. So far, there has been a clear gap between scholarship in comparative politics and IR. Though JNU's Area Study programme promotes such engagement, there is hardly any interaction between the area studies subject matter and IR theories. Both are seen as two air-tight, compartmentalized branches of studies with an implicit sense of academic hierarchy. Such disciplinary boundaries inhibit possibilities of wide-ranging concepts and theories.

Apart from the aforementioned issues of pedagogy and philosophical issues of IR teaching and learning, there are also practical issues involved that cannot be overlooked. Language being the most important factors in this, non-availability of texts, readings focusing on original research or conceptual debates are two such impediments. Most of the writings, not only of the Western scholars but also of the Indian scholars are available in English. No such writings are available in regional languages or in Hindi. Consequently, intellectual imagination of a larger mass of students who have interest in studying IR remains confined to the ideas of foreign policy or bilateral or multilateral issues. The only source of such information is the newspaper articles or commentaries published on and off. In other words, a majority of students who come from a non-English background have newspaper writings as the only source of information. This also results into production of journalistic writings in the provincial universities on the subjects related to IR rather than constructive and creative engagement.

Additionally, even in English there are not good-quality textbooks or reference books available on the subject. Most of the books are produced keeping in mind either the requirement of competitive exams or a university-specific syllabi. Generally, only those handbooks are referred that are written keeping in mind the European or American university systems. India-specific handbooks dealing with pedagogical, philosophical or empirical realities of Indian society and state are simply not available. It is only in the recent past that handbooks dealing with Indian politics have come in the market, but for the purpose of IR teachers and students no such handbook is available till date. At the institutional level, there are no organized efforts to promote such writings that can facilitate research and learning in Indian students.

The recent political developments in India have further changed the character of the discipline, narrowing down the focus of the discipline on issues of national security and foreign policy. Question of philosophical relevance or of conceptual debates is considered as an abstract subject. Within bilateral relations, only a group of countries and research dealing with India's policy towards these countries are the focus. Even these calculations are either based upon trade relevance or traditional cultural ties. Research on any country that does not have relevance from these two perspectives remains at the margins of IR. The theoretical debate during the early years of the twenty-first century in India had emphasized upon the need to bring IR theory out of clutches of nation-state-centric politics, including the Indian state. However, there seems to be reverse that is happening now. The discipline of IR is gradually becoming more and more state-centric in nature, instead of promoting ideas and engagement beyond the territorial or cultural boundaries of a state. There is a need to have more organized debates and discussions on the IR teaching-learning in India.

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# Well-posedness of generalized vector variational inequality problem via topological approach

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## Abstract

In this paper, we discuss well-posedness for a generalized vector variational inequality problem (GVVIP, in short) in the framework of topological vector spaces. Unlike in the available literature, we have adopted a topological approach using admissibility and convergence of nets, instead of monotonicity and convexity etc of the function involved. We provide necessary and sufficient conditions for a GVVIP to be well-posed in generalized sense. We give a characterization for GVVIP to be well-posed in generalized sense in terms of the upper semi-continuity of the approximate solution set map. Also, we provide some necessary conditions for a GVVIP to be well-posed in generalized sense in terms of Painlevé–Kuratowski convergence.

**Keywords** Generalized vector variational inequality · Well-posedness · Topological vector space · Compactness

**Mathematics Subject Classification** 49J40 · 49K40 · 54H99

## 1 Introduction

The classical notion of variational inequalities (introduced by Stampacchia [26]) was extended by Gianessi [12] to vector variational inequalities (VVI, in short) in the framework of finite dimensional Euclidean spaces. Thereafter, several variants of VVI have been introduced and are used to solve vector optimization problem extensively [1, 25, 28, 30]. Ruiz-Garzon et al. [24] have provided some relations between VVI problems and optimization problems by using the condition of pseudo-invexity. Recently, in [13, 19, 20] researchers have provided the existence results for the solutions of several variants of vector variational inequality problem in the setting of topological vector spaces by using topological approach.

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The concept of well-posedness, which is closely related to stability theory, was initially introduced by Tykhonov [27] for scalar minimization problem. Due to close relationship of variational inequality problems and mathematical programming problems, the notion of well-posedness has also been generalized to variational inequalities [4, 21, 29] and further to many other problems such as fixed point problems [10], equilibrium problems [8], optimization problems with variational inequality, mixed quasi variational-like inequality and equilibrium constraints [8, 21, 22].

Crespi et al. [7] proposed the concept of well-posedness for vector optimization problem and for a VVI of the differential type and also set up a relationship between well-posedness of these two problems in the setting of Euclidean space  $\mathbb{R}^n$ . In [9], Fang and Huang introduced some notions of parametric well-posedness for Stampacchia and Minty type vector variational inequalities. They also, established equivalence between well-posedness of a Stampacchia VVI and parametric well-posedness of a vector optimization problem under some suitable conditions. At the subsequent time, in [15], researchers introduced various types of generalized Levitin-Polyak well-posedness for generalized variational inequality problems with functional constraints in the framework of topological spaces, equipped with norm topology. In [5], Cheng et al. discussed the well-posedness of a generalized mixed vector variational type inequality and a constrained optimization problem and proposed metric characterization of well-posedness in terms of an approximate solution set.

In [18], researchers studied the concept of parametric well-posedness for vector equilibrium problem and the concept of generalized well-posedness for an equilibrium problem with equilibrium constraints in the setting of topological vector spaces. Jayswal and Jha [16] discussed well-posedness for generalized mixed vector variational-like inequality problem and optimization problem in the framework of Banach space. Very recently, Jha et al. [17] have also discussed well-posedness for multi-time variational inequality using generalized monotonicity.

However, all the above studies have used some type of monotonicity and convexity of the function involved. In this paper, we provide an alternative method for well-posedness for the generalized vector variational inequality problem without using any such monotonicity and convexity. We use topological concepts such as closedness, compactness, upper semi-continuity, admissibility of function space topology etc to achieve the results. We have found so far that the concept of admissibility has not been much used in the existing literature to obtain such results.

In the following we recall a set valued map.

A mapping  $F : X \rightrightarrows Y$  is a *set-valued* map from  $X$  to  $Y$  if for each  $x \in X$ ,  $F(x)$  is a set in  $Y$ .

The generalized vector variational inequality problem proposed by Chen and Craven [6] can be presented as follows:

*Generalized vector variational inequality problem:* Let  $X$  and  $Y$  be two real topological vector spaces and let  $K$  be a nonempty convex subset of  $X$ . Let  $T : K \rightrightarrows \mathcal{C}(X, Y)$  be a set valued map, where  $\mathcal{C}(X, Y)$  denotes the space of all continuous linear mappings from the space  $X$  to the space  $Y$ . Further, let  $C$  be a closed convex pointed cone in  $Y$  with  $\text{int}C \neq \emptyset$ , where  $\text{int}C$  denotes the interior of  $C$ . Then the generalized vector variational inequality problem (GVVIP) is to find  $x_0 \in K$  such that, there exists  $t_{x_0} \in T(x_0)$  with

$$t_{x_0}(x - x_0) \notin -\text{int}C \quad \forall x \in K.$$

We consider here GVVIP in a more general framework by taking  $X, Y$  as topological vector spaces instead of real topological vector spaces:

Throughout the paper, the set of all solutions to the GVVIP is denoted by  $S_{GVVIP}$ .

Rest part of the paper is arranged as follows: In Sect. 2, we provide some basic definitions and results, which will be used in the paper. In Sect. 3, we discuss well-posedness and generalized well-posedness of a GVVIP. It is shown that GVVIP is well-posed in generalized sense if and only if the solution set of GVVIP is nonempty. We also give a characterization for the GVVIP to be well-posed in generalized sense in terms of upper semi-continuity of the approximate solution set-valued map  $Q(\cdot)$ . Along with, we provide an example to illustrate our result.

## 2 Preliminaries

In this section, we recall some definitions and basic results which will be used later to obtain the main results.

**Definition 2.1** [23] Let  $(X, \mu)$  be a topological space. Then

- (i) A set  $D$  called a *directed set* with a partial order  $\preceq$  such that for every pair  $\alpha, \beta$  in  $D$ , there exists an element  $\gamma$  in  $D$  such that  $\alpha \preceq \gamma$  and  $\beta \preceq \gamma$ .
- (ii) A function  $\xi$  from a directed set  $D$  into  $X$ , is called a *net* in  $X$ ;  
We usually denote  $\xi(\alpha)$  by  $x_\alpha$  and the net  $\xi$  itself is represented by  $\{x_\alpha\}_{\alpha \in D}$ .
- (iii) A net  $\{x_\alpha\}$  is said to *converge* to the point  $x \in X$  if for each neighbourhood  $U$  of  $x$ , there exists some  $\alpha \in D$  such that for  $\alpha \preceq \beta$ , we have  $x_\beta \in U$ .

**Definition 2.2** [3] If  $X$  and  $Y$  are two topological spaces and  $F : X \rightrightarrows Y$  is a set-valued mapping. Then  $F$  is called

- (i) *Upper semi-continuous* at  $\bar{x} \in X$  if for each open set  $V$  in  $Y$  containing  $F(\bar{x})$ , there is an open set  $U$  in  $X$  containing  $\bar{x}$  such that  $F(x) \subseteq V$ , for every  $x \in U$ ;
- (ii) *Lower semi-continuous* at  $\bar{x} \in X$  if for each open set  $V$  in  $Y$  with  $F(\bar{x}) \cap V \neq \emptyset$ , there is an open set  $U$  in  $X$  such that  $F(x) \cap V \neq \emptyset$ , for every  $x \in U$ ;
- (iii) *Upper semi-continuous* (respectively, *lower semi-continuous*) on  $X$  if it is upper semi-continuous (respectively, *lower semi-continuous*) at every point  $x \in X$ .

**Lemma 2.3** [3] Let  $X$  and  $Y$  be two topological spaces. Let  $F : X \rightrightarrows Y$  be a set-valued mapping such that  $F(x)$  is nonempty and compact for each  $x \in X$ . Then  $F$  is upper semi-continuous at  $\bar{x}$  if and only if for any net  $\{x_n\}$  in  $X$ , converging to  $\bar{x}$  and  $y_n \in F(x_n)$ , there exists a subnet  $\{y_{n_k}\}$  of  $\{y_n\}$  such that  $\{y_{n_k}\}$  converges to  $\bar{y}$  for some  $\bar{y} \in F(\bar{x})$ .

**Lemma 2.4** [3] Let  $X$  and  $Y$  be two topological spaces and let  $F : X \rightrightarrows Y$  be a set-valued map. Then  $F$  is lower semi-continuous at  $\bar{x}$  if and only if for any net  $\{x_n\}$  in  $X$ , converging to  $\bar{x}$  and for any  $\bar{y} \in F(\bar{x})$ , there exists a net  $\{y_n\} \subseteq F(x_n)$  converging to  $\bar{y}$ .

We now recall the notion of Painlevé–Kuratowski convergence [11]. For a net of sets  $\{U_\alpha\}_{\alpha \in D}$  in  $X$ , we have

$$\text{Li } U_\alpha = \{x \in X : x_\alpha \rightarrow x, x_\alpha \in U_\alpha, \alpha \in D\}$$

$$\text{Ls } U_\alpha = \{x \in X : x_\beta \rightarrow x, x_\beta \in U_\beta, \beta \in D_1, D_1 \text{ is a directed subset of } D\}$$

The net  $\{U_\alpha\}$  converges to  $U$  in the sense of Painlevé–Kuratowski if

$$\text{Ls } U_\alpha \subseteq U \subseteq \text{Li } U_\alpha.$$

The relation  $\text{Ls } U_\alpha \subseteq U$  is known as the *upper part of the convergence* and the relation  $U \subseteq \text{Li } U_\alpha$  is known as the *lower part of the convergence*.



**Definition 2.5** [2, 14] Let  $(Y, \mu_1)$  and  $(Z, \mu_2)$  be two topological spaces. Let  $\mathcal{C}(Y, Z)$  be the space of all continuous mappings from  $Y$  to  $Z$ . A topology  $\tau$  on  $\mathcal{C}(Y, Z)$  is called *admissible*, if the *evaluation map*  $e : \mathcal{C}(Y, Z) \times Y \rightarrow Z$ , defined by  $e(f, y) = f(y)$ , is continuous.

**Lemma 2.6** [14] A function space topology on  $\mathcal{C}(X, Y)$ , the collection of continuous mappings from the space  $X$  to the space  $Y$ , is admissible if and only if for any net  $\{f_n\}_{n \in D_1}$  in  $\mathcal{C}(X, Y)$ , convergence of  $\{f_n\}_{n \in D_1}$  to  $f$  implies continuous convergence of  $\{f_n\}_{n \in D_1}$  to  $f$ . That is, if  $\{f_n\}_{n \in D_1}$  converges to  $f$  in  $\mathcal{C}(X, Y)$  and  $\{x_m\}_{m \in D_2}$  is any net in  $X$  converging to  $x \in X$ , then  $\{f_n(x_m)\}_{(n,m) \in D_1 \times D_2}$  converges to  $f(x)$  in  $Y$ .

The above characterization of admissibility remains valid for the family of continuous linear mappings from  $X$  to  $Y$ , where  $X$  and  $Y$  are topological vector spaces.

Throughout the paper  $0_X$  and  $0_Y$  denote the zero vectors in the space  $X$  and in the space  $Y$  respectively. All topological vector spaces considered in the paper are taken to be  $T_1$  and hence they all are Hausdorff.

### 3 Well-posedness

Authors have found so far that in literature, researchers have used convexity, monotonicity, hemi-continuity etc. to discuss the well-posedness and generalized well-posedness of a variational inequality problem [16, 18] but here we adopt topological approach to discuss the generalized well-posedness of a GVVIP in the setting of topological vector spaces.

Motivated by [16, 18], below we define approximating net for GVVIP described in Sect. 1, in the framework of topological vector spaces, in the following way:

**Definition 3.1** (i) A net  $\{x_n\} \subseteq K$  is said to be an *approximating net* for a GVVIP if there exist a net  $\{\varepsilon_n\} \subseteq \text{int}C$  converging to  $0_Y$  and  $t_{x_n} \in T(x_n)$  such that

$$t_{x_n}(y - x_n) + \varepsilon_n \notin -\text{int}C \quad \forall y \in K.$$

- (ii) A GVVIP is said to be *well-posed* if there exists a unique solution  $\bar{x}$  of GVVIP and every approximating net converges to  $\bar{x}$ .
- (iii) A GVVIP is said to be *well-posed in generalized sense* if the solution set  $S_{GVVIP}$  of the GVVIP is nonempty and every approximating net has a subnet, which converges to some point in  $S_{GVVIP}$ .

We define a set-valued map  $Q : \text{int}C \cup \{0_Y\} \rightrightarrows K$  such that

$$Q(\varepsilon) = \{x \in K, t_x \in T(x) : t_x(y - x) + \varepsilon \notin -\text{int}C \quad \forall y \in K\}.$$

Clearly, if the net  $\{\varepsilon_n\} \subseteq \text{int}C$  converges to  $0_Y$  and  $x_n \in Q(\varepsilon_n)$  for each  $n$ , then  $\{x_n\}$  is an approximating net.

Following proposition provides some properties of the map  $Q$ .

**Proposition 3.2** Let  $Q : \text{int}C \cup \{0_Y\} \rightrightarrows X$  be a set-valued map defined by

$$Q(\varepsilon) = \{x \in K, t_x \in T(x) : t_x(y - x) + \varepsilon \notin -\text{int}C \quad \forall y \in K\}.$$

Then

- (i)  $S_{GVVIP} \subseteq Q(\varepsilon) \quad \forall \varepsilon \in \text{int}C \cup \{0_Y\}$ ;
- (ii)  $Q(0_Y) = S_{GVVIP}$ .

- Proof** (i) Let  $\bar{x} \in S_{GVVIP}$ , then there exists  $t_{\bar{x}} \in T(\bar{x})$  such that  $t_{\bar{x}}(y - \bar{x}) \notin -\text{int}C$ , for every  $y \in K$ , which implies  $t_{\bar{x}}(y - \bar{x}) + \varepsilon \notin -\text{int}C$ , that is  $\bar{x} \in Q(\varepsilon)$ .
- (ii) From (i),  $S_{GVVIP} \subseteq Q(0_Y)$ . Let  $\hat{x} \in Q(0_Y)$ , then  $t_{\hat{x}} \in T(\hat{x})$  with  $t_{\hat{x}}(y - \hat{x}) + 0_Y \notin -\text{int}C$ , for every  $y \in K$ , which implies  $t_{\hat{x}}(y - \hat{x}) \notin -\text{int}C$ , for every  $y \in K$ , that is,  $\hat{x} \in S_{GVVIP}$ . Hence  $Q(0_Y) \subseteq S_{GVVIP}$ .  $\square$

Following theorem provides necessary and sufficient conditions for a GVVIP to be well-posed in generalized sense.

**Theorem 3.3** *Let  $X$  and  $Y$  be two topological vector spaces and let  $\mathcal{C}(X, Y)$  be the space of all continuous linear mappings from  $X$  to  $Y$ , equipped with an admissible topology. Let  $K$  be a nonempty closed convex compact subset of  $X$  and  $C$  be a closed convex pointed cone in  $Y$  with  $\text{int}C \neq \emptyset$ . Further, let  $T : K \rightrightarrows \mathcal{C}(X, Y)$  be an upper semi-continuous set valued map such that for each  $x \in K$ ,  $T(x)$  is compact. Then the GVVIP is well-posed in generalized sense if and only if the solution set  $S_{GVVIP}$ , of GVVIP is nonempty.*

**Proof** First suppose GVVIP is well-posed in generalized sense, then the solution set  $S_{GVVIP}$  of GVVIP is nonempty.

Conversely, suppose the solution set  $S_{GVVIP}$  is nonempty. We have to show GVVIP is well-posed in generalized sense. Let  $\{x_n\} \subseteq K$  be an approximating net, then there exists a net  $\{\varepsilon_n\} \subseteq \text{int}C$ , converging to  $0_Y$  and  $t_{x_n} \in T(x_n)$  such that

$$t_{x_n}(y - x_n) + \varepsilon_n \notin -\text{int}C \quad \forall y \in K. \quad (1)$$

As  $K$  is compact,  $\{x_n\}$  has a subnet  $\{x_{n_k}\}$  converging to some  $\bar{x} \in K$  and for the subnet  $\{x_{n_k}\}$ , (1) reduces to

$$t_{x_{n_k}}(y - x_{n_k}) + \varepsilon_{n_k} \notin -\text{int}C \quad \forall y \in K, \quad (2)$$

where  $\{\varepsilon_{n_k}\}$  is a subnet of  $\{\varepsilon_n\}$ . Since  $T$  is upper semi-continuous, then for  $x_{n_k} \rightarrow \bar{x}$  and  $t_{x_{n_k}} \in T(x_{n_k})$  there exists a subnet  $\{t_{x_{n_{k_l}}}\}$  of  $\{t_{x_{n_k}}\}$ , converging to  $t_{\bar{x}} \in T(\bar{x})$ . For  $\{t_{x_{n_{k_l}}}\}$ , (1) reduces to

$$t_{x_{n_{k_l}}}(y - x_{n_{k_l}}) + \varepsilon_{n_{k_l}} \notin -\text{int}C \quad \forall y \in K, \quad (3)$$

where  $\{\varepsilon_{n_{k_l}}\}$  is a subnet of  $\{\varepsilon_{n_k}\}$ . Since  $x_{n_{k_l}} \rightarrow \bar{x}$ ,  $y - x_{n_{k_l}} \rightarrow y - \bar{x}$  and  $t_{x_{n_{k_l}}} \rightarrow t_{\bar{x}}$ , therefore by using the virtue of admissibility of function space  $\mathcal{C}(X, Y)$ , we have  $\{t_{x_{n_{k_l}}}(y - x_{n_{k_l}})\}$  converges to  $t_{\bar{x}}(y - \bar{x})$ . Thus,  $\{t_{x_{n_{k_l}}}(y - x_{n_{k_l}}) + \varepsilon_{n_{k_l}}\}$  converges to  $t_{\bar{x}}(y - \bar{x}) + 0_Y = t_{\bar{x}}(y - \bar{x})$ . If  $t_{\bar{x}}(y - \bar{x}) \in -\text{int}C$ , for some  $y \in K$ , then  $t_{x_{n_{k_l}}}(y - x_{n_{k_l}}) + \varepsilon_{n_{k_l}} \in -\text{int}C$  eventually, which contradicts (3). Hence,  $t_{\bar{x}}(y - \bar{x}) \notin -\text{int}C$ , for any  $y \in K$ , that is,  $\bar{x}$  is a solution of the GVVIP.  $\square$

The following example illustrates the above result.

**Example 3.4** Consider  $X = Y = \mathbb{R}$ ,  $K = [0, 2]$ . Clearly,  $K$  is closed convex and compact. Let  $C = \mathbb{R}^+ \cup \{0\}$ , then  $C$  is a closed convex pointed cone with  $\text{int}C \neq \emptyset$ , and  $-\text{int}C = (-\infty, 0)$ . Further, let  $T : K \rightrightarrows \mathcal{C}(X, Y)$  be a set valued map defined by  $T(x) = \{t'_x, t''_x\}$ , where  $t'_x(u) = \langle x, u \rangle$  and  $t''_x(u) = -\langle x, u \rangle$  for  $x \in K$  and  $u \in X$ . That the induced topology of  $\mathcal{C}(X, Y)$  is admissible can be verified by the fact that if  $\{x_m\}$  converges to  $x$  in  $X$  and  $\{\xi_n\}$

converges to  $\xi$  in  $\mathcal{C}(X, Y)$ , then we have

$$\begin{aligned}\|\xi_n(x_m) - \xi(x)\| &= \|\xi_n(x_m) - \xi_n(x) + \xi_n(x) - \xi(x)\| \\ &\leq \|\xi_n(x_m) - \xi_n(x)\| + \|\xi_n(x) - \xi(x)\| \\ &\leq \|\xi_n\| \|x_m - x\| + \|\xi_n(x) - \xi(x)\|.\end{aligned}$$

Hence,  $\xi_n(x_m) \rightarrow \xi(x)$ .

We take  $x_0 = 0$ . Then for any  $y$  in  $K$ , we have  $t''_{x_0}(y - x_0) = -\langle x_0, y - x_0 \rangle = 0$ . So,  $t''_{x_0}(y - x_0) \notin -\text{int}C$  and so  $x_0$  is a solution for the GVVIP. Similarly,  $x_0 = 2$  is also a solution for the GVVIP. Thus  $\mathcal{S}_{GVVIP} \neq \emptyset$ .

Now we show that the GVVIP is well-posed in generalized sense, that is, every approximating net has a convergent subnet, which converges to some point in  $\mathcal{S}_{GVVIP}$ . Let  $\{x_n\}$  be an approximating net in  $[0, 2]$ . Then there exists a net  $\{\varepsilon_n\}$  in  $\text{int}C = (0, \infty)$  where  $\varepsilon_n \rightarrow 0$  and  $t''_{x_n}(y - x_n) + \varepsilon_n = -\langle x_n, y - x_n \rangle + \varepsilon_n = -x_n(y - x_n) + \varepsilon_n = x_n^2 - x_n y + \varepsilon_n \notin (-\infty, 0)$ , for all  $y \in [0, 2]$ . Since  $[0, 2]$  is compact, therefore  $\{x_n\}$  has a subnet  $\{x_{n_k}\}$ , which converges to some  $\hat{x} \in [0, 2]$ . Also,

$$t''_{n_k}(y - x_{n_k}) + \varepsilon_{n_k} \rightarrow \hat{x}^2 - \hat{x}y.$$

Clearly, the inequality  $x_0^2 - x_0 y \geq 0 \quad \forall y \in [0, 2]$ , is satisfied by  $x_0 = 0$ . If  $\hat{x} \neq 0$ , then we have  $\hat{x} - y \geq 0 \quad \forall y \in [0, 2]$ . This implies  $\hat{x} = 2$ . It is already shown above that  $2 \in \mathcal{S}_{GVVIP}$ . Thus,  $\{x_n\}$  has a convergent subnet which converges to some point in  $\mathcal{S}_{GVVIP}$ . Hence the GVVIP is well-posed in generalized sense.

Next theorem gives necessary and sufficient condition for a GVVIP to be well-posed in generalized sense in terms of upper semi-continuity of the map  $Q(\cdot)$ .

**Theorem 3.5** *GVVIP is well-posed in generalized sense if and only if the map  $Q(\cdot)$  is upper semicontinuous at  $0_Y$  and  $\mathcal{S}_{GVVIP}$  is compact.*

**Proof** Suppose  $Q : \text{int}C \cup \{0_Y\} \rightrightarrows X$  is not upper semicontinuous at  $\varepsilon = 0_Y$ , then there exists an open set  $W$  containing  $Q(0_Y)$  such that for every neighbourhood  $V$  of  $0_Y$  in  $\text{int}C \cup \{0_Y\}$ , there exists  $\varepsilon_V \in V$  such that  $Q(\varepsilon_V) \not\subseteq W$ . Clearly,  $\varepsilon_V \in \text{int}C$ . Let  $\mathcal{U}$  denote the family of neighbourhoods of  $0_Y$  in the subspace  $\text{int}C \cup \{0_Y\}$ . Then it can be shown that  $(\mathcal{U}, \geq)$  is a directed set, where " $\geq$ " denotes the inverse set inclusion. Hence  $\{\varepsilon_V : V \in \mathcal{U}\}$  is a net. For the sake of simplicity, we denote  $\{\varepsilon_V\}_{V \in \mathcal{U}}$  by  $\{\varepsilon_n\}_{n \in D}$ , where  $D = \mathcal{U}$ . It can be shown that  $\{\varepsilon_n\}$  converges to  $0_Y$ .

As  $Q(\varepsilon_n) \not\subseteq W$ , there exists  $x_n \in Q(\varepsilon_n)$  for each  $n \in D$  such that  $x_n \notin W$ . Clearly,  $\{x_n\}$  is an approximating net. Since the GVVIP is well-posed in generalized sense, there exists a subnet  $\{x_{n_k}\}$  of  $\{x_n\}$ , converging to some  $\bar{x} \in \mathcal{S}_{GVVIP}$ . Now,  $\mathcal{S}_{GVVIP} = Q(0_Y)$  by Proposition 3.2 and  $Q(0_Y) \subseteq W$ . Thus,  $\bar{x} \in W$  and hence  $\{x_n\}$  is eventually contained in  $W$ . This contradicts the fact that  $x_{n_k} \in Q(\varepsilon_{n_k}) \not\subseteq W$ . Hence, our assumption is wrong and hence  $Q(\cdot)$  is upper semicontinuous at  $\varepsilon = 0_Y$ .

We now show that  $\mathcal{S}_{GVVIP}$  is compact. Let  $\{u_n\}$  be a net in  $\mathcal{S}_{GVVIP} = Q(0_Y)$ , then there exist  $t_{u_n} \in T(u_n)$  such that

$$t_{u_n}(y - u_n) + 0_Y \notin -\text{int}C \quad \forall y \in K,$$

which gives

$$t_{u_n}(y - u_n) + \varepsilon_n \notin -\text{int}C \quad \forall y \in K,$$

which implies  $\{u_n\}$  is an approximating net. Since the GVVIP is well-posed in generalized sense, therefore there exists a subnet  $\{u_{n_k}\}$  of  $\{u_n\}$ , converging to some  $\bar{u} \in S_{GVVIP}$ .

Conversely, let  $\{x_n\}$  be an approximating net, then there exists a net  $\{\varepsilon_n\} \subseteq \text{int}C$  converging to  $0_Y$  such that  $x_n \in Q(\varepsilon_n)$  for every  $n$ . Since  $Q(\cdot)$  is upper semi-continuous at  $0_Y$  and  $Q(0_Y) = S_{GVVIP}$  is compact, then by Lemma 2.3, for every net  $\{\varepsilon_n\} \subseteq \text{int}C$ , converging to  $0_Y$  and  $\{x_n\} \subseteq Q(\varepsilon_n)$ , there exists a subnet  $\{x_{n_k}\}$  of  $\{x_n\}$ ,  $x_{n_k} \in Q(\varepsilon_{n_k})$  such that  $\{x_{n_k}\}$  converges to some  $\bar{x} \in Q(0_Y) = S_{GVVIP}$ . Hence, GVVIP is well-posed in generalized sense.  $\square$

In the next result, we give necessary condition for a GVVIP to be well-posed in terms of lower semi-continuity of the map  $Q(\cdot)$ .

**Theorem 3.6** *If GVVIP is well-posed, then the map  $Q(\cdot)$  is lower semi-continuous at  $0_Y$ .*

**Proof** Let  $\bar{x}$  be the unique solution of GVVIP, that is,  $S_{GVVIP} = \{\bar{x}\}$  such that every approximating net converges to  $\bar{x}$ . We shall show that the map  $Q(\cdot)$  is lower semi-continuous at  $0_Y$ . Let  $\{\varepsilon_n\} \subseteq \text{int}C$  be a net which converges to  $0_Y$ . Let  $y_0 \in Q(0_Y) = \{x \in K, t_x \in T(x) : t_x(y - x) + 0_Y \notin -\text{int}C, \forall y \in K\} = S_{GVVIP} = \{\bar{x}\}$ . Thus  $y_0 = \bar{x}$ . Let  $\{y_n\}$  be a net such that  $y_n \in Q(\varepsilon_n)$ , for each  $n$ , then  $\{y_n\}$  is an approximating net. Since GVVIP is well-posed,  $\{y_n\}$  converges to  $\bar{x} = y_0$ . Hence  $Q(\cdot)$  is lower semi-continuous at  $0_Y$ .  $\square$

From Theorem 3.5 and 3.6, we can conclude the following:

**Corollary 3.7** *If the GVVIP is well-posed then the map  $Q(\cdot)$  is continuous at  $0_Y$ .*

In next couple of theorems we provide necessary conditions for a GVVIP to be well-posed in generalized sense in terms of convergence.

**Theorem 3.8** *If a GVVIP is well-posed in generalized sense and  $\{\varepsilon_n\}$  is a net in  $\text{int}C$  such that  $\{\varepsilon_n\}$  converges to  $0_Y$ . Then*

$$Ls Q(\varepsilon_n) \subseteq Q(0_Y).$$

**Proof** Let  $\{x_n\}$  be a net in  $K$  with  $x_n \in Q(\varepsilon_n)$ . Let  $x \in Ls Q(\varepsilon_n)$ , then there exists a subnet  $\{x_{n_k}\}$  of  $\{x_n\}$  such that  $x_{n_k} \in Q(\varepsilon_{n_k})$  and  $\{x_{n_k}\}$  converges to  $x$ , where  $\{\varepsilon_{n_k}\}$  is a subnet of  $\{\varepsilon_n\}$ . Clearly,  $\{x_{n_k}\}$  is an approximating net for the GVVIP. Since the GVVIP is well-posed in generalized sense, therefore  $\{x_{n_k}\}$  has a subnet that converges to some point in  $S_{GVVIP}$ . As  $\{x_{n_k}\}$  converges to  $x$ , every subnet of  $\{x_{n_k}\}$  converges to  $x$ . Hence,  $x \in S_{GVVIP} = Q(0_Y)$ . Painlevé–Kuratowski  $\square$

**Theorem 3.9** *Suppose  $K$  is compact, the GVVIP is well-posed in generalized sense,  $Q(0_Y)$  is singleton and  $\{\varepsilon_n\}$  is a net in  $\text{int}C$  such that  $\{\varepsilon_n\}$  converges to  $0_Y$ . Then*

$$Q(0_Y) \subseteq Li Q(\varepsilon_n).$$

**Proof** Let  $Q(0_Y) = \{\bar{x}\}$ . Let  $\{\varepsilon_n\} \subseteq \text{int}C$  be a net, which converges to  $0_Y$  and let  $\{x_n\}$  be a net in  $K$  such that  $x_n \in Q(\varepsilon_n)$ , then there exist  $t_{x_n} \in T(x_n)$  with

$$t_{x_n}(y - x_n) + \varepsilon_n \notin -\text{int}C \quad \forall y \in K.$$

Since  $K$  is compact, therefore  $\{x_n\}$  has a convergent subnet  $\{x_{n_k}\}$  converging to some member of  $K$ . Then  $\{x_{n_k}\}$  is an approximating net as  $x_{n_k} \in Q(\varepsilon_{n_k})$ , where  $\{\varepsilon_{n_k}\}$  is a subnet of  $\{\varepsilon_n\}$ , converging to  $0_Y$ . As the GVVIP is well-posed in generalized sense,  $\{x_{n_k}\}$  has a convergent subnet  $\{x_{n_{k_l}}\}$  converging to some  $\hat{x} \in S_{GVVIP}$ . Since  $S_{GVVIP} = Q(0_Y)$ , by Proposition 3.2 and  $Q(0_Y)$  is singleton, therefore  $\hat{x} = \bar{x}$ . Hence  $\{x_{n_{k_l}}\}$  converges to  $\bar{x}$ . Thus, there exists a net  $\{x_{n_{k_l}}\}$  in  $Q(\varepsilon_n)$  converging to  $\bar{x}$ . Therefore  $\bar{x} \in Li Q(\varepsilon_n)$ .  $\square$

From Theorem 3.8 and 3.9 one can conclude the following result:

**Theorem 3.10** *Let  $K$  be compact and the GVVIP be well-posed in generalized sense. Let  $Q(0_Y)$  be singleton, then whenever the net  $\{\varepsilon_n\} \subseteq \text{int}C \cup 0_Y$  converges to  $0_Y$ , the image net  $\{Q(\varepsilon_n)\}$  converges to  $Q(0_Y)$  in Painlevé–Kuratowski sense.*

## 4 Conclusion

In this paper, well-posedness is discussed for a GVVIP. We have obtained the results following a new technique, adopting a topological approach. No convexity and monotonicity conditions are used unlike in the available literature. Topological concepts including admissibility of the function space topology, convergence of nets etc are used to obtain our results. Further investigation is required to check whether this approach can also work for studying other aspects of variational inequality problem.

## Declarations

**Conflict of interest** The authors have no conflict of interest to declare.

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# Social Media and Digital Marketing of Women Entrepreneurs in NCR

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**ABSTRACT:** In the present Era, Digital marketing and Social media has become an important tool to spread awareness, promotion of products & services and to connect the customers and to stimulate new business. This platform is creating opportunities to the existing as well as upcoming business venture. Social media is the way to connect the customers directly by identifying their needs and it also helps in customizing the product & services as per the requirement of customers. It is cheapest way of communication regarding the promotion of product and services. There are many types of social media platforms which serves as a podium to prospective entrepreneurs to set up their business and job creation and skill development.

Whether women working or homemaker are all contributor in the development of social system. Social media is playing an important role in change of the women's personality, carriage abs their passion. There are many women entrepreneur who belongs to the small cities but building big businesses and living their dreams. There are many examples like Ms Akansha founder of Celebrity Club in 2017 with less amount to invest, Kids Clothing brand listed on "Meesho" and other E-commerce platforms. She had turnover of Rs 5 crore in 2018 itself. She is also connected through WhatsApp and Instagram which helps her reaching to the customers directly and getting feedback immediately.

According to the sixth economic census, Ministry of Statistics and Program Implementation, women comprise around 14% of the total number of entrepreneurs based in India. As per World Bank Report 2018, India has been ranked on 120th position among 131 countries in terms of female labour force participation. The Indian government has announced many schemes for women owned businesses like Bhartiya Mahila Bank Commercial Loan Scheme, Dena Shakti Scheme, Udyogini Scheme, Mahila Udyam Nidhi Scheme and Stree Shakti Scheme.

With the assistance of social media, the business has no geographical boundaries for costumers. The target of this paper is to spot the adherence and dependency of women entrepreneurs on the social media platform through Primary knowledge assortment. This paper focuses on how social media is used sagely to empower ladies during a conservative culture like India.

**KEYWORDS:** Social Media, Digital Marketing, Women, NCR, Entrepreneurs

## 1. INTRODUCTION

In earlier period women were deprived from doing work outside. But with the increase in the urge of independency and sometimes due to some other factors, they are coming out of the house to work outside. Sometimes they start the business with full enthusiasm

but due to family factors, they had to discontinue the business.

During this current period, it has been observed that women are more oriented towards social media to earn as well as get recognition in the society. They are using this platform for the Digital marketing also which has changed the methods of establishment of their business,

doing promotion of the business Product, and promotion of new schemes. Digital marketing provides the information to the prospective customers. Digital marketing consists of both online and offline promotion strategies. It consists of Canvas, Google Analytics, Google Ads, Mail Chimp, Trello, Slack, Yoast SEO, Survey, Ahrefs, Semrush. These tools help in reaching the target customer and make the visual content which helps the business to attract the attention of the customers. Social media is one of the component of digital marketing.

Digital marketing provides the opportunity for the customers to get customized marketing channels as per their budget, target customer, to make customers aware about their brand and to add up the value in sale. Digital marketers keep changing the channels of advertisement as per the brand requirement. Digital Marketing provides attractive pamphlets and templates and audio-visual content. In this lead, Social media is considered fast and cheap mode of advertisement of the product.

In the present study, we focused only on social media. It has become a popular tool for mouth publicity which works very fast. Mostly businesses are using this tool to reach the customer globally. With help of social media, they can start their business with very less investment and can make it online advertise without spending more money. Now a day it has become a culture to promote the business online and to connect with their customers directly. It really gives them motivation to work upon their product in respect of quality as well as price. Customers are also getting regular updates regarding the launch of new products, drop in price of product or sale period without going anywhere. Social media is kind of window through which prospective customers can attract to the desired products and innovative products without roaming here and there. Through this platform, women entrepreneurs are engaging themselves in businesses as well as creating job opportunities for others also. This social media platform is giving the opportunity to them to do the business without considering any geographical boundaries. In this digital era, they are open to promote their products worldwide and getting orders.

With the help of digital marketing, they are creating innovative content to promote their products. Even through Facebook live, you tube live, Instagram and other live modes they are directly showcase their products to their idle customers and they can resolve the queries of their customers on the spot. This has totally changed the culture of doing business. They need only a device and active internet connection to connect with their customers. This is not only helping in connection of the Business to customer(B2C) but also connecting to the Business to Business(B2B) in case of wholesale and retail products. Even once videos are made, they get stored on that platform and desired customer can access those video for the products whenever they required.

## 2. SIGNIFICANCE OF THE STUDY

The purpose of the study is to find out those factors which motivates the women to have their own start-ups. As we know Digital marketing providing global exposure to new start-ups and gives a boost to business. It does not motivate gender biasness as it creates online unseen layer of the seller identity. As there is no opening and closing time for the business, it is 24\*7.

This study will help the Government to consider the importance of digital marketing concept should be introduced at school level itself.

The purpose of the study is to make Government and Non-Government agencies realize that how young women entrepreneurs are using social media as one of the tools of Digital Marketing to promote their business. More Digital marketing-oriented courses should be launched for women at free of cost or nominal charges

## 3. Objectives of the Study

- To find out the adoption level of digital marketing and social media among women entrepreneurs
- To study the factors which impact the awareness among women entrepreneurs regarding Digital marketing tools
- To examine the impact of digital marketing and social media on the business owned by women entrepreneur
- To study the impact of digital marketing and social media in Covid-19 pandemic period on the business owned by women entrepreneur

## 4. Hypothesis

Ho: There is no significant difference in the adoption level of digital marketing and social media among women entrepreneurs

Ho: There is no significant difference due to the factors which impact the awareness among women entrepreneurs regarding Digital Marketing tools

Ho: There is no significant difference in the impact of digital marketing and social media on the business owned by women entrepreneur

Ho: There is no significant difference in the impact of digital marketing and social media in Covid-19 pandemic period on the business owned by women entrepreneur

## 5. Review of literature

Anusuah (2018) Social Media has motivated women to start new business ventures with less amount as capital to invest. These social networking societies are playing very important role in the women empowerment in such Indian stereotype society. These are also encouraging civic participation among women in India.

During Covid-19, many entrepreneurs were facing financial challenges but social media provided a platform for the existing businesses to sustain as well as to set up new innovative business ventures. With the

help of social media instruments women entrepreneurs were able to connect their customers and aggressive brand promotion through facebook live, Instagram for pictures and whatsapp to get personally connect with the customers. (Rahayu, Ninik Sri 2021)

Social media has given platform to beat problems and challenges of women through blogs, chats, on-line campaign, on-line discussion forums and on-line communities which is generally not disseminated or propagated by thought media. (Kumari, Madhu 2020)

As a result of the development of social media as part of contemporary technological advancements, businesspeople are now able to conduct their operations successfully online. An increasing number of female business owners are transitioning their enterprises from the traditional brick and mortar business model to the online environment. (Queen Chioma Nworgu 2020).

Sometimes women pursue entrepreneurship because they want to start their own company or because they want to learn and grow their business knowledge and abilities. Alternatively, they may have wanted to start their own business in order to provide for their family by working at their own pace and for a consistent income, particularly during periods of unemployment or fear of unemployment. (Nworgu, Achinewhu-Nworgu & Natrajan, 2019)

Jonsson (2015), Through their network support, particularly online financial assistance, social media specifically helps companies function better. Nevertheless, several earlier studies have only briefly examined various forms of assistance or sources, regardless of how female entrepreneurs respond to and utilise social media in their regular company operations. Are doing This calls into question how well women company owners understand and utilise social media to assist their operations. Entrepreneurship is an initiative, innovation, and decision-making skills with respect to capital and responsibility (Cadaru & Badulescu, 2015).

According to Achinewhu-Nworgu (2014), more individuals have the chance to further their education, build successful careers for themselves, and enjoy family and personal life. These possibilities must be investigated and used in some way. However, there are difficulties associated with any possibility that is offered. The urge to run our own business can present both problems and rewards. It might be more difficult to start a business as a woman, especially if you're young and have no business expertise.

Online networking provides a real-time asset in terms of information, buyer requirements and market trends. These materials can be used by businesses to make changes and build unique focused on features for future products and promote messages. Businesses may assess if their brands are truly adapted to customers' needs and can figure out which features of their items make them stand out or exceptional in the buyer's view. Organizations can benefit from web-based social

networking and allow customers to participate in the creation of new brands (Cox, 2010).

Women who engage in entrepreneurial activities and take risks by creatively combining resources provide them the opportunity to take advantage of opportunities in their community by producing goods and services. (Mordi, C., Simpson, R., Singh, S., & Okafor, C. (2010).

Based on demographic characteristics (Lall, Madhurima, and SahaiShikha, 2008) established psychographic variables such as degree of commitment, entrepreneurial hurdles, and future growth plans. The study identified firm owner characteristics including self-perception, self-esteem, entrepreneurial enthusiasm, and operational difficulties as being important for future development and expansion ambitions. Despite the fact that the number of women opting to work in family companies has significantly increased, the poll indicated that they still have a lower status and face more operational difficulties. To begin with, businesses may gather an unlimited amount of feedback on their products and brands by monitoring customer internet chats, allowing them to spot trends endeavor to improve future brand performance (Madupu, 2006).

The customer's behavioural intents, perspective, perception of the system's utility and simplicity, and perceived usefulness of the structure all have an impact on how one uses an advancement system either indirectly or directly. According to the Technology Advancement Model, external influences should have an impact on intention and certifiable usage through mediated outcomes for perceived utility and ease of use (Venkatesh & Davis, 2000).

## 6. RESEARCH METHODOLOGY

In this study we focused on the women entrepreneurs in National Capital Region. For this study, a self-structured questionnaire was sent to sample size of 600 women who have established their business in NCR. The main objective of the study is to study the factor analysis of social media and Digital marketing which use by women entrepreneurs, to study the impact of digital and social media marketing on women entrepreneurs and to study the impact of digital and social media marketing in COVID-19 pandemic period. The study was administered to a sample of 553 women entrepreneurs because of non-response from the other women entrepreneurs. The convenient random sampling technique has been used by the researchers. The responses have been collected using a self-prepared questionnaire survey.

## 7. Results and Findings

The study was conducted on a sample size of 553 female entrepreneurs in NCR. Among the respondents 50.8% lies in the age group of below 25 years old and 29.3% belongs to the age group of 25-35-year-old and 14.5% falls between 35-45 years of age. When we study the

educational qualification 56.8% respondents are graduate while 22.1% are post-graduate. When we look into the marital status of the respondents, 61.3% are unmarried while 36.3% are married only. When we study source of initial capital for the establishment of the business, 40.3% invested from personal savings and 27.5% got it from spouse and family while 15.4% from financial institutions and 16.8% from others. When we study experience using social media for business, 34.7% respondents are using from more than 1 year but less than 3 years, 25.1% are using more than 3 but less than 5 years, 19.2% more than 5 years and 21% less than 1 year. For digital marketing, 41.2% women entrepreneurs are using Mobile phone only while 30.2% are using mobile phone and laptop both. When we study the region respondents belongs to, 72.8% belongs to Delhi, 13.3% Gurugram and 10.7% Noida and remaining to Faridabad. When we study Nature of business, it is found that 34.5% in Retail Business, 44.7% in Professional service and 20.8% Miscellaneous firm. When we study the year of establishment of business, 38.2% during 2010-2020 while 36.3% after 2020. It shows how women entrepreneur owned start-ups and small level scale businesses are growing up because social media and Digital marketing has given them a platform to connect with their customers even they can showcase their product live to their customers through Livestreaming.

**Table 7.1 Descriptive Statistics**

	N	Minimum	Maximum	Mean	Std. Deviation
Age(in Years)	553	1	4	1.75	.898
education	553	1	4	2.19	.762
Marital Status	553	1	4	1.67	.558
Annual Income	553	1	4	1.82	.937
Nature of Activity	553	1	3	1.86	.732
Year of Establishment	553	1	4	3.04	.911
Type of ownership	553	1	2	1.23	.419
ources of initial capital	553	1	4	2.09	1.106
Experience in social media	553	1	4	2.42	1.024
Intensity of usage	553	1	4	2.01	.690
Internal Motivational factors	553	1.00	5.00	3.3119	.88086
External Motivational Factors	553	1.00	5.00	3.2399	.96534
Impact of Covid-19	552	1.00	5.00	2.9565	.75338
Valid N (listwise)	552				

Table 7.1 represents the descriptive statistics for demographic variables (age, educational qualification, marital status, annual income, nature of activity, year of establishment of business, type of ownership & sources of initial capital) of the respondents. This table also represents the descriptive statistics of main characteristics variables (Intensity of usage of social media, Internal motivational factors, External motivational factors and impact of covid-19) used to measure the impact of these on adoption of social media and digital marketing by women entrepreneur to enhance and develop their business in NCR region. The mean value of variable is given in this table.

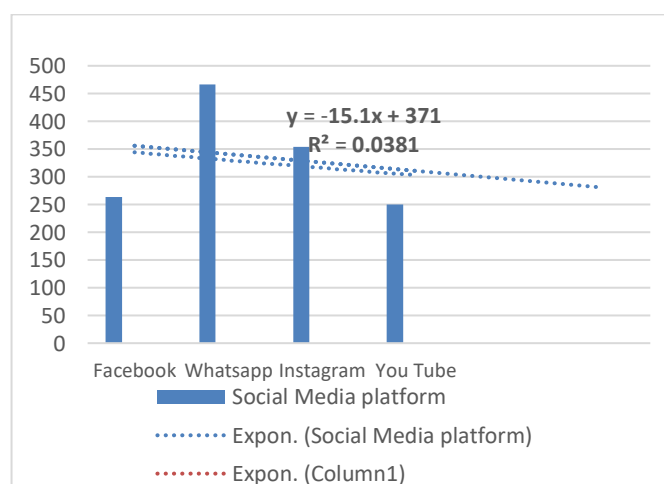
The success of any primary data based research depends on the reliability and validity of the instruments/variable scale used in the questionnaire to get the required response from the sample respondents, so in order to test the reliability of variable scales, used in the questionnaire, Cronbach's alpha statistics (Cronbach, 1971) is calculated and shown in the Table:7.2

**Table 7.2 Cronboach's Alpha**

Variable	Number of Items	Cronbach's Alpha
Internal Motivational Factors	17	0.950
External Motivational Factors	3	0.759
Covid-19 Factors	7	0.803

The values for Internal and External Motivational factors & Covid-19 factors are 0.950, 0.759 and 0.803 are more than 0.7 which is acceptable.

In order to study the impact of usage of social media applications and digital marketing, R<sup>2</sup> was calculated (Graph-1). But, in the study researcher have been find out very low significance of social media and digital marketing of women entrepreneurs. May be due to less awareness of women entrepreneurs and they don't know how to use of apps for the marketing purposes.

**Graph-7.1**

Impact of motivational factors on the adoption of social media and digital marketing by women entrepreneur



Year of establishment of business clearly depicts that the more motivation women entrepreneurs are getting through adoption of social media and digital marketing. For this purpose, motivational factors have been categorized into two categories i.e., Internal factors and External factors. The One-Way ANOVA test statistics conducted which compares the means of one or more groups based on one independent variable (or factor).

The most important assumption of One-Way ANOVA is that the variances amongst the groups must be similar. The table -7.3 shows the Levene's test of homogeneity of variances, which tests the hypothesis of similar variances. The Levene's test statistics is not significant since the p-value is less than 5% level of significance value of 0.05. Therefore, the assumption of homogeneity of variance is not met (except covid-19). So to further analyse equal variance assumption of one-way Anova, the robust tests of equality of means is reported in Table-7.5

		Levene Statistic	df1	df2	Sig.
Internal_MF	Mean	5.716	3	549	<.001
	Median	3.926	3	549	.009
	Median and with adjusted df	3.926	3	532	.009
	Trimmed mean	5.411	3	549	.001
External_MF	Mean	2.728	3	549	.043
	Median	2.297	3	549	.077
	Median and with adjusted df	2.297	3	544	.077
	Trimmed mean	2.649	3	549	.048
Covid_19	Mean	1.102	3	548	.348
	Median	.844	3	548	.470
	Median and with adjusted df	.844	3	544	.470
	Trimmed mean	1.085	3	548	.355

Table-7.4 represents the output of Anova analysis and whether there is a statistically difference between the group means. For Internal Motivational the significance level is <0.001(p-value=<.001) which is below 0.05. Therefore, there is a statistically difference in the mean internal motivational factors between women entrepreneurs with different year of establishment of business. Similarly, impact of covid-19 on the adoption of social media and digital marketing is statistically different between the two categories. But external motivational factor is not statistically different between the two categories. We can see that the significance value of the external factors (p-value=0.056) is higher than 0.05. Therefore, there is no statistically significant difference in the external motivational factors on growing number of business establishments.

		Sum of Squares	df	Mean Square	F	Sig.
Internal Motivational Factors	Between Groups	14.228	3	4.743	6.288	<.001
	Within Groups	414.079	549	.754		
	Total	428.306	552			
External Motivational Factors	Between Groups	7.038	3	2.346	2.539	.056
	Within Groups	507.357	549	.924		
	Total	514.395	552			
Covid_19	Between Groups	5.357	3	1.786	3.183	.024
	Within Groups	307.380	548	.561		
	Total	312.736	551			

As per discussion in previous paragraph, there is a violation of the assumption of homogeneity of variances while determining the effect of internal & external motivation factors and impact of Covid -19 on the growing number of establishment of the businesses. This can be determining whether there were significant differences between the groups by using Welch test (see Table-7.5). Like the ANOVA Test, the significance value(p-value) is less than than 0.05 (except external motivational factors, p-value=0.056) thus are statistically significant differences between groups.

		Statistic	df1	df2	Sig.
Internal Motivational Factors	Welch	5.753	3	147.830	<.001
external Motivational Factors	Welch	2.580	3	149.168	.056
Impact of Covid-19	Welch	2.954	3	148.008	.035

a. Asymptotically F distributed.

## 8. CONCLUSION

In this study, it was find out that internal motivational factors play very important role in the increasing number of business establishments by women entrepreneurs. While External motivational factors like-are government schemes helpful for getting funds, importance of government support in learning digital marketing strategies and role of government in conducting awareness programmes regarding government schemes, respondents found that these factors don't make any difference in the adoption level of social media and digital marketing.

The study reveals that the impact of Covid-19 on women owned business that it definitely leads to decline in the sale but for very short period of time and it gave them an opportunity to adopt social media and digital marketing

to give a boost to their business. It was found out that social media helped them to connect with their customers directly and get feedback immediately regarding their products and services. But again there is negative relationship between role of government in supporting of their business during Covid-19.

The study found that there are so many government schemes for women Entrepreneur but due to lack of awareness they are not able to avail them. Government is also considering the contribution made by women entrepreneurs in the socio-economic of the country. For this to encourage women entrepreneurs, NITI AAYOG launched 'Women Entrepreneurial and Innovation Cell', Mudra Micro loan scheme and mentorship to women entrepreneurs. But still there is lack of awareness regarding these schemes. In order to this, government should conduct awareness programmes regarding schemes in schools and educational institutes. So that upcoming women entrepreneur could be aware of these schemes and could be motivated to have their own start-ups.

Due to global reach and flexibility in digital marketing leads to women entrepreneur to manage their business entirely on internet. It is also known as cost effective strategy because there is no involvement of any middle agent and this leads to direct contact between buyer and seller as well as low cost of the product which motivates buyer to shop online. Through whatsapp, Instagram and facebook etc, customer can easily connect with seller and seller can get immediate feedback of the product. This leads to make business communication more easy. It provides fastest means of executing financial transactions under digital marketing. Customers can make online payments effortlessly.

## 9. LIMITATIONS OF THE STUDY

This study is limited to only Delhi & N.C.R i.e., Noida, Faridabad and Gurugram and Sample Size also limited. Digital Marketing has so many tools. But this study has mainly limited to the one of the digital marketing strategies i.e Social Media. In order to have a more comprehensive study with a greater impact, the study may be further expanded to the other Metropolitan cities around the nation.

## 10. SUGGESTIONS

- Government should provide a platform for women entrepreneurs who owned micro and small businesses can get expert assistance for digital marketing strategies. Even leadership qualities and other features to become an entrepreneur should be inculcated in the curriculum itself at the very beginning stage. All kinds of necessary information regarding how to start their own ventures should be made available on single portal
- Government should conduct awareness programmes on regular basis to make women entrepreneur regarding the existing schemes

especially available for them. So that they can make full utilization of those existing schemes.

- Government should provide the aid to the women entrepreneurs networking groups so that those groups can conduct networking sessions on regular basis. It will give opportunity to small business owned women entrepreneurs to connect with networking groups and can do business in the targeted groups.
- Government should recognize the women entrepreneurs work on regular basis, it will give motivation to the women to have their own start-ups and business.
- So that a greater number of women entrepreneurs may actively participate in entrepreneurial activities and become entrepreneurs, even entrance and exit primarily SME's should be loosened and made simple for women entrepreneurs.

In the present scenario, there is a need of adoption of digital marketing tools to boost comprehensive business since it may result in business across all religions, castes, geographical locations, genders, etc. This will definitely help in growing in the number of new ventures which is the ultimate purpose of our government to promote "Make In India".

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## Visibilisation of Womens' Unpaid Work: Aspiring Towards Recognition

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### Abstract

*The existing institutional structures, power relations, societal norms prevent women from accessing basic services indispensable to a dignified life. Over the last few decades, the gendered roles of men and women and the power hierarchy they breed are often contested. At the heart of gender inequality is the unequal division of unpaid care work and sharing of domestic responsibility between men and women. Besides contributing to the growth of the economy, unpaid care work is imperative to the well-being first and foremost of the family, society, and a developed nation. Social customs deep rooted in patriarchal structure, define unpaid work as female birth right. Irrespective of women belonging to different socio-economic strata, cultures or their place of residence, spend their time and energy in investing in social reproduction which is often unpaid. The gendered bias towards domestic responsibilities is an encroachment of women's rights (UN, 2013) and an impediment on their economic empowerment. In India too, the burden of unpaid work falls disproportionately on women as social norms view men as the provider of the family and by default women as the caregiver, subordinate to men. Women due to biological reproduction are assigned the responsibility of sustaining the care work which is unpaid and thus entrenches women's unequal status (OECD, 2014). Covid-19 pandemic has further embedded women's critical role of care both as frontline health care workers and care providers in the family. Against this backdrop, the paper analyses gendered unpaid care work, the impact of Covid 19 on the crucial role of care, and the systematic sharing of responsibilities. The redressal of issues concerning care by the policymakers has important implications towards ungendered 'care work'.*

Keywords: unpaid work, care, gender, recognition, empowerment

## AWARENESS AMONG ADOLESCENTS REGARDING POCSO ACT

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### Abstract

Child sexual abuse is a serious threat to a Nation's children. Child sexual abuse refers to an act between a child and an adult, where the child is unable to give any informed consent or is not developmentally prepared for such a violation. Due to increasing number of Child sexual abuse cases in our country, POCSO Act was enacted in 2012. This act relates to protection of children from sexual offences. This act is considered to be a landmark legislation to protect Indian children against crimes of sexual nature. In view of the importance of the act, the current research paper focused on the awareness regarding POCSO Act among adolescents in the age group of 14-18 years. The study was carried out using an online survey to understand the awareness levels of the adolescents. The sample of the study includes 165 adolescents. The study concluded Adolescent living in a nuclear families showed higher awareness; male respondents of the study were more aware than the female respondents and income level of the family had varied impact in awareness.

Many respondents felt 'lack of awareness of law' as the main reason for the perpetrators not being punished. Majority of them revealed middle school years as an appropriate period to discuss about sexual concerns. It can be concluded that there was poor level of awareness among the adolescents about the POCSO Act 2012 with regard to punishment given, recording of statement and so on.

**Keywords:** Adolescent, Awareness level, POCSO Act, Child Sexual Abuse.

### I.1. Introduction

"Child sexual abuse is the involvement of a child in sexual activity that he or she does not fully comprehend, is unable to give informed consent to, or for which the child is not developmentally prepared and cannot give consent, or that violates the laws or social taboos of society. Child sexual abuse is evidenced by this activity between a child and an adult or another child who by age or development is in a relationship of responsibility, trust or power, the activity being intended to gratify or satisfy the needs of the other person. (WHO, 1999)

### Child Sexual Abuse (CSA) in Indian context

Child sexual abuse is a worldwide phenomenon. According to a data, about 15 million adolescent girls experience forced sex worldwide (UN Women, 2020). Statistics show that in India, every 155 minutes, a child under 16 years of age is raped. This shows that in India the situation is worser. CSA has a devastating effect on the development of a child. It retards the social and emotional development of the effected child.

The father of the nation, Mohandas Karamchand Gandhi, once said: "India will be free when the women feel safe to walk in the streets of India at midnight". But achieving it is yet a dream come true. It is very disheartening to state the fact that in a land where young girls are worshipped, they are not safe. From 2009 to 2014, the number of registered child rape cases rose to 151% (Patil, 2021).

These figures are of reported cases which is very less as compared to actual numbers. As per UNICEF also "The actual figure is difficult to estimate because large numbers of cases go unreported (UNICEF, 2020)" People do not report basically for the fear of defamation. This fear of defamation is only because adolescents are not aware about POCSO Act in which an action can be taken against the perpetrator secretly.

# A Urysohn lemma for regular spaces

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## ABSTRACT

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Using the concept of  $m$ -open sets,  $M$ -regularity and  $M$ -normality are introduced and investigated. Both these notions are closed under arbitrary product.  $M$ -normal spaces are found to satisfy a result similar to Urysohn lemma. It is shown that closed sets can be separated by  $m$ -continuous functions in a regular space.

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KEYWORDS: regularity; normality;  $M$ -normality;  $M$ -regularity; Urysohn lemma.

## 1. INTRODUCTION

Nowadays topological approaches are being investigated in various diverse field of science and technology such as computer graphics, evolutionary theory, robotics[4, 9, 10] etc. to name a few. In a finite topological space, the intersection of all open neighbourhoods of a point  $p$  is again an open neighbourhood of  $p$ , which is the smallest one. It is called the *minimal neighbourhood* of  $p$ . However, in general framework, we define the minimal open sets or  $m$ -open sets as the ones obtained by taking the arbitrary intersections of the open sets. They have been studied in the recent past by several researchers [2, 6]. In this paper, we further use them for construction of new notions in topology, namely  $M$ -regularity and  $M$ -normality. These two notions are distinct from the already existing notions of regularity and normality, and are found to have

several interesting properties. Both of them are closed under arbitrary product.  $M$ -normal spaces are found to exhibit Urysohn lemma type property. Finally it is shown that even in regular spaces, disjoint pair of closed sets can be separated by mappings, the so called  $m$ -continuous mappings. In that sense, the last result of the paper may be treated as Urysohn lemma for regular spaces. Here it may be mentioned that the classical Urysohn lemma is unprovable in  $\text{ZF}[1, 5]$ . The usual proof of Urysohn lemma in Kelley [8] uses the axioms of dependent choice to successfully select open sets separating previously chosen sets [1]. Similar choices have been made in our proof also, making it valid only in  $\text{ZFC}$ .

## 2. PRELIMINARIES

**Definition 2.1** ([6]). Let  $(X, \tau)$  be a topological space. A set  $A \subseteq X$  is called  $m$ -open if  $A$  can be expressed as intersection of a subfamily of open sets.

The complement of an  $m$ -open set is called an  $m$ -closed set. The collection of  $m$ -open sets of a topological space  $(X, \tau)$  is denoted by  $\mathcal{M}$ .

Clearly, every open set is  $m$ -open. In a finite space, open sets are the only  $m$ -open sets.

The following example gives an idea about the abundance of  $m$ -open sets.

**Example 2.2.** Let  $X = \mathbb{N}$  be the set of natural numbers, equipped with the co-finite topology. Then every subset of  $X$  is  $m$ -open.

**Proposition 2.3** ([6]). For a topological space  $(X, \tau)$ , we have the following results:

- (i)  $\emptyset, X \in \mathcal{M}$ ;
- (ii)  $\mathcal{M}$  is closed under arbitrary union;
- (iii)  $\mathcal{M}$  is closed under arbitrary intersection.

**Definition 2.4.** [6] Let  $(X, \tau)$  and  $(Y, \mu)$  be two topological spaces. Then a function  $f: X \rightarrow Y$  is said to be  $m$ -continuous at a point  $x \in X$  if for every open neighbourhood  $V$  of  $f(x)$  there exists an  $m$ -open set  $U$  containing  $x$  in  $X$  such that  $f(U) \subseteq V$ .

A function  $f: X \rightarrow Y$  is said to be  $m$ -continuous [6] if it is  $m$ -continuous at each point  $x$  of  $X$ .

Since every open set is  $m$ -open. Therefore every continuous function is  $m$ -continuous.

But the converse need not be true.

**Example 2.5.** Let  $X = \mathbb{N}$  be the set of natural numbers equipped with the co-finite topology and  $Y = \{a, b, c\}$  with the topology  $\mu = \{\emptyset, \{a\}, \{b, c\}, Y\}$ . Then consider a function  $f: X \rightarrow Y$  defined as:

$$f(x) = \begin{cases} a & \text{if } x < 10, \\ b & \text{if } 10 \leq x < 100, \\ c & \text{otherwise.} \end{cases}$$



Since every subset  $A \subseteq \mathbb{N}$  is  $m$ -open under the co-finite topology, function  $f$  is  $m$ -continuous. But  $f$  is not a continuous function as  $f^{-1}(\{a\}) = \{x \in \mathbb{N} \mid x < 10\}$  is not an open set in  $\mathbb{N}$  under the co-finite topology.

**Theorem 2.6.** *Let  $(X, \tau)$  and  $(Y, \mu)$  be two topological spaces. Then for a function  $f: (X, \tau) \rightarrow (Y, \mu)$ , the following are equivalent:*

- (i)  $f$  is  $m$ -continuous;
- (ii) inverse image of every open subset of  $Y$  is  $m$ -open;
- (iii) inverse image of every closed subset of  $Y$  is  $m$ -closed.

*Proof.* (i)  $\Rightarrow$  (ii): Let  $U$  be any open subset of  $Y$  and let  $x \in f^{-1}(U)$ . Then  $f(x) \in U$ . Therefore there exists an  $m$ -open subset  $V$  in  $X$  such that  $x \in V$  and  $f(V) \subseteq U$ . Thus  $x \in V \subseteq f^{-1}(U)$ , therefore  $f^{-1}(U)$  is an  $m$ -open neighbourhood of  $x$ . Hence  $f^{-1}(U)$  is  $m$ -open.

(ii)  $\Rightarrow$  (iii): Let  $A$  be any closed subset of  $Y$ . Then  $Y \setminus A$  is open and therefore  $f^{-1}(Y \setminus A)$  is  $m$ -open, that is,  $X \setminus f^{-1}(A)$  is  $m$ -open. Hence  $f^{-1}(A)$  is  $m$ -closed.

(iii)  $\Rightarrow$  (i): Let  $M$  be an open neighbourhood of  $f(x)$ , therefore  $Y \setminus M$  is closed, and consequently  $f^{-1}(Y \setminus M)$  is  $m$ -closed. Thus  $f^{-1}(M)$  is  $m$ -open and hence  $x \in f^{-1}(M) = N$  (say). Then, we have  $N$  is an  $m$ -open neighbourhood of  $x$  such that  $f(N) \subseteq M$ .  $\square$

In next result, we prove that arbitrary product of  $m$ -open sets is again  $m$ -open under the product topology. Here we use the fact that “An open set  $V$  of a product topology can be realized in the form  $V = \prod_{i \in \Lambda} V_i$ , where  $V_i \in \tau_i$  and  $V_i = X_i$  except for finitely many  $i$ 's.” This can be verified using the concept of basic open sets and the fact that

$$\left( \bigcup_{i \in I} A_i \right) \times \left( \bigcup_{j \in J} B_j \right) \times \dots = \bigcup_{(i,j,\dots) \in I \times J \times \dots} (A_i \times B_j \times \dots).$$

We also provide below the following results, which will be used in our paper.

**Lemma 2.7** ([3, p. 28]). *Let  $\{A_{\alpha,\beta}\}$  be an arbitrary family of non-empty sets. Then we have*

$$\bigcap_{\beta} \left( \prod_{\alpha} A_{\alpha,\beta} \right) = \prod_{\alpha} \left( \bigcap_{\beta} A_{\alpha,\beta} \right)$$

**Lemma 2.8** ([7, p. 34]). *Let  $\{(X_{\alpha}, \tau_{\alpha}) \mid \alpha \in \mathcal{A}\}$  be an arbitrary family of topological spaces and let  $A_{\alpha} \subseteq X_{\alpha}$  for each  $\alpha \in \mathcal{A}$ . Then we have*

$$cl \left( \prod_{\alpha} V_{\alpha} \right) = \prod_{\alpha} (cl(V_{\alpha})).$$

**Theorem 2.9.** *Let  $(X_{\alpha}, \tau_{\alpha})$  be topological spaces and  $U_{\alpha}$  be an  $m$ -open set in  $(X_{\alpha}, \tau_{\alpha})$ . Then the product of  $U_{\alpha}$ 's is an  $m$ -open set in the product topology  $\prod_{\alpha} \tau_{\alpha}$  of  $X = \prod_{\alpha} X_{\alpha}$ .*



*Proof.* Let  $\{(X_\alpha, \tau_\alpha)\}_\alpha$  be a family of topological spaces and  $A$  be an  $m$ -open set in the product topology  $X = \prod_\alpha X_\alpha$ . Then there exists open sets  $U_i$  in  $X$  such that  $A = \bigcap_i U_i$ . Since  $U_i$  is an open set in the product topology of  $X$ , therefore there exists open set  $U_{\alpha,i} \in \tau_\alpha$  with  $U_{\alpha,i} = X_\alpha$  for all but finitely many  $\alpha$ 's such that  $U_i = \prod_\alpha U_{\alpha,i}$ . Hence  $A = \bigcap_i \left( \prod_\alpha U_{\alpha,i} \right)$ . Using the fact that  $\bigcap_\beta \left( \prod_\alpha A_{\alpha,\beta} \right) = \prod_\alpha \left( \bigcap_\beta A_{\alpha,\beta} \right)$ , in view of Lemma 2.7, we have  $A = \bigcap_i \left( \prod_\alpha U_{\alpha,i} \right) = \prod_\alpha \left( \bigcap_i U_{\alpha,i} \right)$ . Hence the proof.  $\square$

Now, we will show that every subset of a  $T_1$ -topological space  $(X, \tau)$  is  $m$ -open.

**Theorem 2.10.** *Every subset of a  $T_1$ -space is  $m$ -open.*

*Proof.* Let  $(X, \tau)$  be a topological space, which is  $T_1$ . Let  $A$  be a non-empty subset of  $X$ . Then every singleton  $\{x\} \subseteq X$  is a closed set. Therefore, consider  $A = \bigcap_{x \in X \setminus A} X \setminus \{x\}$ . Since every singleton is closed therefore  $X \setminus \{x\}$  is an open set in  $X$ . Hence the arbitrary intersection of open sets is  $m$ -open, thus  $A$  is  $m$ -open.  $\square$

### 3. $M$ -REGULAR SPACES

**Definition 3.1.** A topological space  $(X, \tau)$  is said to be  $M$ -regular if for each pair consisting of a point  $x$  and an  $m$ -closed set  $B$  not containing  $x$ , there exists a disjoint pair of an  $m$ -open set  $U$  and an open set  $V$  containing  $x$  and  $B$  respectively. In other words,

For every pair,  $x$  and  $B$  with  $x \notin B$ , where  $B$  is an  $m$ -closed set, there exist an  $m$ -open set  $U$  and an open set  $V$  such that  $x \in U$ ,  $B \subseteq V$  and  $U \cap V = \emptyset$ .

Now, we provide a characterization for  $M$ -regularity.

**Theorem 3.2.** *Let  $(X, \tau)$  be a topological space. Then  $X$  is  $M$ -regular if and only if for a given point  $x \in X$  and an  $m$ -open neighbourhood  $U$  of  $x$ , there exists an  $m$ -open neighbourhood  $V$  of  $x$  such that  $x \in V \subseteq cl(V) \subseteq U$ .*

*Proof.* Suppose that  $X$  is  $M$ -regular. Let  $x \in X$  and  $U \subseteq X$ , an  $m$ -open neighbourhood of  $x$ , be given. Then  $B = X \setminus U$  is an  $m$ -closed set disjoint from  $x$ . By the given hypothesis, there exists a disjoint pair of an  $m$ -open set  $V$  and an open set  $W$  containing  $x$  and  $B$  respectively. Thus we have,  $x \in V$  and  $X \setminus U = B \subseteq W$ , that is,  $x \in V \subseteq X \setminus W \subseteq U$ . Hence we have,  $x \in V \subseteq cl(V) \subseteq cl(X \setminus W) = X \setminus W \subseteq U$ . Therefore we have,  $x \in V \subseteq cl(V) \subseteq U$ .

Conversely, suppose that a point  $x \in X$  and an  $m$ -closed set  $B$  not containing  $x$  are given. Then  $U = X \setminus B$  is an  $m$ -open set containing  $x$ . Then, by the hypothesis, there exists an  $m$ -open neighbourhood  $V$  of  $x$  such that  $x \in V \subseteq cl(V) \subseteq U$ . Thus we have, a disjoint pair of  $m$ -open set  $V$  and an open set  $X \setminus cl(V)$  which contains  $x$  and  $B$  respectively. Therefore  $(X, \tau)$  is  $M$ -regular.  $\square$

With the help of following example, we show that an  $M$ -regular space need not be regular.

**Example 3.3.** Let  $X = \mathbb{N}$  be the set of natural numbers, equipped with the co-finite topology. Then every subset  $A$  of  $X$  is  $m$ -open. Therefore  $X$  is a  $M$ -regular space but not a regular space.

But, every regular topological space is  $M$ -regular. For this, we have the following result:

**Theorem 3.4.** *Every regular space is  $M$ -regular.*

*Proof.* Let  $(X, \tau)$  be a topological space which is regular. We have to show that  $X$  is  $M$ -regular. For this, let  $V$  be any  $m$ -open subset of  $X$  and let  $x \in V$ . Then, we have  $V = \bigcap_{j \in J} V_j$ , where  $V_j$ 's are open sets in  $X$ . Therefore,

as  $x \in V = \bigcap_{j \in J} V_j$ , we have  $x \in V_j$  for all  $j \in J$ . Since the space  $X$  is given

to be regular, thus there exists open set  $W_j$  such that  $x \in W_j \subseteq cl(W_j) \subseteq V_j$ , for all  $j \in J$ . Now, consider  $W = \bigcap_{j \in J} W_j$  an  $m$ -open set in  $X$ , we have

$x \in W \subseteq \bigcap_{j \in J} cl(W_j) \subseteq \bigcap_{j \in J} V_j = V$ . Thus we have,  $x \in W \subseteq cl(W) \subseteq V$ , where

$W$  is an  $m$ -open subset of  $X$ . Hence  $X$  is  $M$ -regular.  $\square$

From the Theorem 2.10, one can conclude that every  $T_1$ -space is  $m$ -regular.

But the converse of the above statement is not true. That is, an  $M$ -regular space need not be  $T_1$ . For this, we have the following example:

**Example 3.5.** Let  $X = \{a, b, c, d\}$  be a non-empty set equipped with a topology  $\tau = \{\emptyset, \{a, b\}, \{c, d\}, X\}$ . Then  $(X, \tau)$  is an  $M$ -regular space but it is not a  $T_1$ -space.

Next we will provide the decomposition of  $T_1$ -space with the help of  $M$ -regularity.

**Theorem 3.6.** *Every  $M$ -regular  $T_0$ -space is  $T_1$ .*

*Proof.* Let  $(X, \tau)$  be a topological space. Let  $x, y \in X$  be a pair of distinct points of an  $M$ -regular  $T_0$ -space  $X$ . Let there exists an open set  $V$  in  $X$  such that  $x \in V$  but  $y \notin V$ . Since every open set is  $m$ -open and the space  $X$  is given to be  $M$ -regular, therefore there exists an  $m$ -open set  $U$  in  $X$  such that

$x \in U \subseteq cl(U) \subseteq V$ . Then consider,  $W = X \setminus cl(U)$  is open in  $X$  such that  $x \notin W$  and  $y \in W$ . Thus  $X$  is  $T_1$ .  $\square$

From the Theorem 3.6, one can state the following:

**Theorem 3.7.** *Every  $T_0$ -space is  $M$ -regular if and only if it is  $T_1$ .*

However a  $T_0$ -space need not be  $M$ -regular.

**Example 3.8.** Let  $X$  be a Sierpiński space, that is,  $X = \{a, b\}$  with topology  $\tau = \{\emptyset, \{a\}, X\}$ . Then  $(X, \tau)$  is a  $T_0$ -space but not  $M$ -regular.

In our next result, we show that Hausdorffness is a sufficient condition for  $M$ -regularity.

**Theorem 3.9.** *Every Hausdorff space is  $M$ -regular.*

*Proof.* Let  $(X, \tau)$  be a Hausdorff space. Let  $x$  and  $B$  be a pair of a point and an  $m$ -closed set such that  $x \notin B$ . Then for every  $y \in B$ , we have  $x \neq y$ . Therefore by the given hypothesis, there exists a disjoint pair of open sets  $U_y$  and  $V_y$  such that  $x \in U_y$  and  $y \in V_y$ . Then consider  $V = \bigcup_y \{V_y \mid y \in B\}$ , an open cover of  $B$  and  $U = \bigcap_y \{U_y \mid y \in B\}$  is an  $m$ -open set containing  $x$ . Thus we have a disjoint pair consisting an open set  $V$  and an  $m$ -open set  $U$  containing  $B$  and  $x$  respectively. Therefore  $X$  is  $M$ -regular.  $\square$

The converse, however need not be true.

**Example 3.10.** Let  $X = \{a, b, c, d\}$  be a non-empty set equipped with a topology  $\tau = \{\emptyset, \{a, b\}, \{c, d\}, X\}$ . Then  $(X, \tau)$  is an  $M$ -regular space but it is not a Hausdorff space.

Our next result is on the product of  $M$ -regular spaces.

**Theorem 3.11.** *Any arbitrary product of  $M$ -regular spaces is again  $M$ -regular.*

*Proof.* Let  $\{(X_\alpha, \tau_\alpha)\}_\alpha$  be a family of  $M$ -regular spaces and  $X = \prod_\alpha X_\alpha$ . Let  $x = (x_\alpha) \in X$  be a point and  $U$  be an  $m$ -open neighbourhood of  $x \in X$ . Since  $U$  is an  $m$ -open set in  $X$ , therefore  $U = \bigcap_i U_i$ , where  $U_i$  is an open set in  $X$  under the product topology. Therefore, we have  $U_i = \prod_\alpha U_{\alpha,i}$ , where  $U_{\alpha,i} \in \tau_\alpha$ . Hence, we have  $U = \bigcap_i \left( \prod_\alpha U_{\alpha,i} \right)$ . We use the fact that

$$\bigcap_\beta \left( \prod_\alpha A_{\alpha,\beta} \right) = \prod_\alpha \left( \bigcap_\beta A_{\alpha,\beta} \right) \text{ in view of Lemma 2.7. Therefore, we have}$$

$$U = \bigcap_i \left( \prod_\alpha U_{\alpha,i} \right) = \prod_\alpha \left( \bigcap_i U_{\alpha,i} \right) \text{ and } x \in U. \text{ Hence we have } x_\alpha \in \bigcap_i U_{\alpha,i},$$

where  $\bigcap_i U_{\alpha,i} = W_\alpha$  (say) is an  $m$ -open set in  $(X_\alpha, \tau_\alpha)$ . Since  $(X_\alpha, \tau_\alpha)$  is  $M$ -regular, therefore there exists an  $m$ -open set  $V_\alpha$  of  $(X_\alpha, \tau_\alpha)$  such that  $x_\alpha \in V_\alpha \subseteq cl_\alpha(V_\alpha) \subseteq W_\alpha$ . Now,  $V = \prod_\alpha V_\alpha$  is an  $m$ -open set in  $X$  in view of

Theorem 2.9. Again  $cl(V) = cl\left(\prod_\alpha V_\alpha\right) = \prod_\alpha cl_\alpha(V_\alpha)$ , in view of Lemma 2.8.

Thus, we have an  $m$ -open set  $V$  in  $X$  such that  $x \in V \subseteq cl(V) \subseteq \prod_\alpha W_\alpha \subseteq U$ .

Hence  $X$  is  $M$ -regular.  $\square$

#### 4. $M$ -NORMAL SPACES

**Definition 4.1.** A topological space  $(X, \tau)$  is said to be  $M$ -normal if for each disjoint pair consisting of a closed set  $A$  and an  $m$ -closed set  $B$ , there exists a disjoint pair consisting of an  $m$ -open set  $U$  and an open set  $V$  in  $X$  containing  $A$  and  $B$  respectively.

*Remark 4.2.* An  $M$ -normal space need not be  $M$ -regular.

For this, consider the Sierpiński space mentioned in the Example 3.8. The space  $(X, \tau)$  is  $M$ -normal but not  $M$ -regular.

In our next result, we provide a characterization for  $M$ -normality.

**Theorem 4.3.** Let  $(X, \tau)$  be a topological space. Then  $(X, \tau)$  is  $M$ -normal if and only if for a given closed set  $C$  and an  $m$ -open set  $D$  such that  $C \subseteq D$ , there is an  $m$ -open set  $G$  such that  $C \subseteq G \subseteq cl(G) \subseteq D$ .

*Proof.* Let  $C$  and  $D$  be the closed and  $m$ -open sets respectively such that  $C \subseteq D$ . Then  $X \setminus D$  is an  $m$ -closed set such that  $C \cap (X \setminus D) = \emptyset$ . Then, from the  $M$ -normality, there exist an  $m$ -open set  $G$  and an open set  $V$  such that  $C \subseteq G$ ,  $X \setminus D \subseteq V$  and  $G \cap V = \emptyset$ . Therefore  $X \setminus V \subseteq D$  and hence  $C \subseteq G \subseteq X \setminus V \subseteq D$ , where  $X \setminus V$  is a closed set. Hence  $C \subseteq G \subseteq cl(G) \subseteq cl(X \setminus V) = X \setminus V \subseteq D$ . Conversely, consider  $D$  and  $C$  as closed and  $m$ -closed sets respectively such that  $C \cap D = \emptyset$ . Then  $X \setminus C$  is  $m$ -open set containing  $D$ . Then by the given hypothesis, there exist an  $m$ -open set  $G$  such that  $D \subseteq G \subseteq cl(G) \subseteq X \setminus C$ . Thus, we have  $D \subseteq G$ ,  $C \subseteq V$  and  $G \cap V = \emptyset$ , where  $V = X \setminus cl(G)$ , an open set. Hence  $X$  is  $M$ -normal.  $\square$

From the Example 3.3, one can easily verify that  $M$ -normality doesn't imply Normality. Here the space  $X$  is  $M$ -normal but it is not normal.

In the following result, we show that every normal space is  $M$ -normal.

**Theorem 4.4.** Every normal space is  $M$ -normal.

*Proof.* Let  $(X, \tau)$  be a topological space which is normal. We have to show that  $X$  is  $M$ -normal. For this, let  $A$  be any closed subset of  $X$  and let  $V$  be an  $m$ -open subset of  $X$  such that  $A \subseteq V$ . Then, we have  $V = \bigcap_{j \in J} V_j$ , where  $V_j$ 's

are open sets in  $X$ . Therefore, we have  $A \subseteq V = \bigcap_{j \in J} V_j$ , that is,  $A \subseteq V_j$  for all  $j \in J$ . Since the space  $X$  is given to be normal, thus there exists open set  $W_j$  such that  $A \subseteq W_j \subseteq cl(W_j) \subseteq V_j$ , for all  $j \in J$ . Now, consider  $W = \bigcap_{j \in J} W_j$ , an  $m$ -open set in  $X$ , we have  $A \subseteq W \subseteq \bigcap_{j \in J} cl(W_j) \subseteq \bigcap_{j \in J} V_j = V$ . Thus we have,  $A \subseteq W \subseteq cl(W) \subseteq V$ , where  $W$  is an  $m$ -open subset of  $X$ . Hence  $X$  is  $M$ -normal.  $\square$

One specialty of  $M$ -normality is that it is preserved under arbitrary product.

**Theorem 4.5.** *Any arbitrary product of  $M$ -normal spaces is again  $M$ -normal.*

*Proof.* Let  $\{(X_\alpha, \tau_\alpha)\}_\alpha$  be a family of  $M$ -normal spaces and  $X = \prod_\alpha X_\alpha$ . Let  $A \subseteq X$  be a closed set and  $U$  be an  $m$ -open set such that  $A \subseteq U$ . Since  $U$  is an  $m$ -open set in  $X$ , therefore  $U = \bigcap_i U_i$ , where  $U_i$  is an open set in  $X$  under the product topology. Thus, we have  $U_i = \prod_\alpha U_{\alpha,i}$ , where  $U_{\alpha,i} \in \tau_\alpha$  and  $U_{\alpha,i} = X_\alpha$  for all but finitely many  $\alpha$ 's, as explained before Theorem 2.9. Hence, we have  $U = \bigcap_i \left( \prod_\alpha U_{\alpha,i} \right)$ . We use the fact that  $\bigcap_\beta \left( \prod_\alpha A_{\alpha,\beta} \right) = \prod_\alpha \left( \bigcap_\beta A_{\alpha,\beta} \right)$  following Lemma 2.7. Thus we have  $U = \bigcap_i \left( \prod_\alpha U_{\alpha,i} \right) = \prod_\alpha \left( \bigcap_i U_{\alpha,i} \right)$ . Similarly, we have  $A = \prod_\alpha A_\alpha$ , where  $A_\alpha$  is a closed set in  $X_\alpha$ . Since  $A \subseteq U$ , thus we have  $A_\alpha \subseteq \bigcap_i U_{\alpha,i}$ . Let  $\bigcap_i U_{\alpha,i} = W_\alpha$ , an  $m$ -open set in  $X_\alpha$ . We have  $A_\alpha \subseteq W_\alpha$  and since  $X_\alpha$  is an  $M$ -normal space, therefore, there exists an  $m$ -open set  $V_\alpha$  such that  $A_\alpha \subseteq V_\alpha \subseteq cl(V_\alpha) \subseteq W_\alpha$ . Thus we have,  $\prod_\alpha A_\alpha \subseteq \prod_\alpha V_\alpha \subseteq \prod_\alpha cl(V_\alpha) \subseteq \prod_\alpha W_\alpha$ . Now,  $\prod_\alpha V_\alpha$  is  $m$ -open in view of Theorem 2.9. Also,  $cl \left( \prod_\alpha V_\alpha \right) = \prod_\alpha (cl(V_\alpha))$ , in view of Lemma 2.8. Hence we have  $V = \prod_\alpha V_\alpha$ , an  $m$ -open set in  $X$  such that  $A \subseteq V \subseteq cl(V) = \prod_\alpha (cl(V_\alpha)) = cl \left( \prod_\alpha V_\alpha \right)$ . It follows that  $A \subseteq V \subseteq cl(V) \subseteq \prod_\alpha W_\alpha \subseteq U$ . Hence  $X$  is  $M$ -normal.  $\square$

Following result for  $M$ -normal spaces is analogous to the well known Urysohn lemma for normal spaces.

**Theorem 4.6.** *Let  $(X, \tau)$  be a topological space. Then for each pair of disjoint subsets  $A$  and  $B$  of  $X$ , one of which is closed and the other is  $M$ -closed, there exists an  $m$ -continuous function  $f$  on  $X$  to  $[0, 1]$  (resp.  $[a, b]$  for any real number  $a, b$ ,  $a < b$ ), such that  $f(A) = \{0\}$  and  $f(B) = \{1\}$  (resp.  $f(A) = \{a\}$ , and  $f(B) = \{b\}$ ) provided  $X$  is  $M$ -normal.*

*Proof.* Let  $(X, \tau)$  be an  $M$ -normal space. Let  $C_0$  and  $C_1$  be two disjoint sets, where  $C_0$  is closed and  $C_1$  is  $m$ -closed in  $X$ . Since  $C_0 \cap C_1 = \emptyset$ , therefore  $C_0 \subseteq X \setminus C_1$ . Let  $P$  be the set of all dyadic rational numbers in  $[0, 1]$ . We shall define for each  $p$  in  $P$ , an  $m$ -open set  $U_p$  of  $X$ , in such a way that whenever  $p < q$ , we have  $cl(U_p) \subseteq U_q$ .

First we define  $U_1 = X \setminus C_1$ , an  $m$ -open set such that  $C_0 \subseteq U_1$ . Since  $X$  is  $M$ -normal space, by Theorem 4.3, there exists an  $m$ -open set  $U_{1/2}$  such that  $C_0 \subseteq U_{1/2} \subseteq cl(U_{1/2}) \subseteq U_1$ . Similarly, there also exist another  $m$ -open sets  $U_{1/4}$  and  $U_{3/4}$  such that  $C_0 \subseteq U_{1/4} \subseteq cl(U_{1/4}) \subseteq U_{1/2} \subseteq cl(U_{1/2}) \subseteq U_{3/4} \subseteq cl(U_{3/4}) \subseteq U_1$ , because  $cl(U_{1/4})$  is again a closed set. Continuing the process, we define  $U_r$ , for each  $r \in P$  such that  $C_0 \subseteq U_r \subseteq cl(U_r) \subseteq U_1$  and  $cl(U_r) \subseteq U_s$  whenever  $r < s$ , for  $r, s \in P$ .

Let us define  $\mathbf{Q}(x)$  to be the set of those dyadic rational numbers  $p$  such that the corresponding  $m$ -open sets  $U_p$  contains  $x$ :

$$\mathbf{Q}(x) = \{p \mid x \in U_p\}$$

Now we define a function  $f: X \rightarrow [0, 1]$  as

$$f(x) = \inf \mathbf{Q}(x) = \inf \{p \mid x \in U_p\}$$

Clearly,  $f(C_0) = \{0\}$  and  $f(C_1) = \{1\}$ . Then we show that  $f$  is the desired  $m$ -continuous function. For a given point  $x_0 \in X$  and an open interval  $(c, d)$  in  $[0, 1]$  containing the point  $f(x_0)$ . We wish to find an  $m$ -open neighbourhood  $U$  of  $x_0$  such that  $f(U) \subseteq (c, d)$ .

Let us choose rational numbers  $p$  and  $q$  such that  $c < p < f(x_0) < q < d$ . Then  $U = U_q \setminus cl(U_p) = U_q \cap (X \setminus cl(U_p))$  is the desired  $m$ -open neighbourhood of  $x_0$ .

Here, we will show that  $x_0 \notin cl(U_p)$ . If  $x_0 \in cl(U_p)$ , then for  $s > p$ , we have  $x_0 \in cl(U_p) \subseteq U_s$ . Thus  $x_0 \in U_s$  for all  $s > p$ . This implies that  $f(x_0) \leq p$ , as  $f(x_0) = \inf \{s \mid x_0 \in U_s\}$ . This contradicts the fact that  $f(x_0) > p$ . Similarly, as  $f(x_0) < q$ , therefore  $x_0 \in U_q$  and hence  $U = U_q \setminus cl(U_p)$  is the desired neighbourhood of  $x_0$ .

Hence  $f$  is an  $m$ -continuous function on  $X$  to  $[0, 1]$  with  $f(C_0) = \{0\}$  and  $f(C_1) = \{1\}$ . This completes the proof.  $\square$

Since every closed set is  $m$ -closed, we get the following result:

**Corollary 4.7.** *Let  $(X, \tau)$  be an  $M$ -normal topological space. Then for each pair of disjoint closed subsets  $A$  and  $B$  of  $X$ , there exists an  $m$ -continuous function  $f$  on  $X$  to  $[0, 1]$  (resp.  $[a, b]$  for any real number  $a, b$ ,  $a < b$ ), such that  $f(A) = \{0\}$  and  $f(B) = \{1\}$  (resp.  $f(A) = \{a\}$ , and  $f(B) = \{b\}$ ).*



*Remark 4.8.* From the proof of Theorem 4.6, it is clear that the proof is in line of the usual proof of Urysohn lemma in Kelley[8], wherein the choice function plays its role. Hence the proof is valid for ZFC. Again, it has been pointed out in [1] that the axiom of multiple choice also implies Urysohn lemma, since one can use the intersection of the finitely many separating open sets provided by MC. Essentially the same argument shows that DMC implies Urysohn lemma.

Since similar working is followed in our Theorem 4.6, hence the variant of Urysohn lemma in our paper is also valid for ZF with DMC.

Our next theorem provides the relation between regularity and  $M$ -normality.

**Theorem 4.9.** *Every regular space is  $M$ -normal.*

*Proof.* Let  $A$  and  $B$  be two disjoint sets such that  $A$  is closed and  $B$  is  $m$ -closed. Since  $A \cap B = \emptyset$ , therefore  $B \subseteq X \setminus A$ , where  $X \setminus A$  is an open set containing the  $m$ -closed set  $B$ . Then, by the given hypothesis, for each  $b \in B \subseteq X \setminus A$ , there exists an open set  $U_b$  such that  $b \in U_b \subseteq cl(U_b) \subseteq X \setminus A$ . Thus, we have a collection  $\mathcal{D} = \{U_b \mid b \in B\}$  which covers  $B$ . Further, if  $D \in \mathcal{D}$ , then  $cl(D)$  is disjoint from  $A$  because  $cl(D) \subseteq X \setminus A$ .

Consider  $V = \bigcup \{D \mid D \in \mathcal{D}\}$ . Then  $V$  is an open set in  $X$  which contains  $B$ , an  $m$ -closed set. Since  $D$  lies in some  $U_b$  whose closure is disjoint from  $A$ , therefore  $W = \bigcup \{cl(D) \mid D \in \mathcal{D}\}$  is disjoint from  $A$ . Therefore,  $V = \bigcup \{D \mid D \in \mathcal{D}\}$  and  $X \setminus W$  are two disjoint subsets of  $X$ . Now  $W$ , being union of closed sets, is  $m$ -closed. Thus we have one open set and one  $m$ -open set containing the sets  $B$  and  $A$  respectively. Hence  $X$  is  $M$ -normal.  $\square$

In view of Theorem 4.6 and 4.9, one can observe the following:

**Theorem 4.10.** *Let  $(X, \tau)$  be a regular space. Then for every disjoint pair of sets consisting of a closed set  $A$  and an  $m$ -closed set  $B$ , there always exists an  $m$ -continuous mapping  $f$  from  $X$  to  $[a, b]$  such that  $f(A) = \{a\}$  and  $f(B) = \{b\}$ .*

The last and the final result of this section is a simple corollary of Theorem 4.10. However its importance lies in revealing the fact that even in regular spaces, closed sets can be separated by mappings, the so-called  $m$ -continuous mappings. In that sense, this result may be treated as Urysohn lemma for regular spaces.

**Theorem 4.11.** *Let  $(X, \tau)$  be a regular space. Then for every disjoint pair of closed sets  $A$  and  $B$ , there always exists an  $m$ -continuous mapping  $f$  from  $X$  to  $[a, b]$  such that  $f(A) = \{a\}$  and  $f(B) = \{b\}$ .*

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## ਬਾਲ ਸਾਹਿਤ : ਸਮੱਸਿਆ ਅਤੇ ਸੰਭਾਵਨਾਵਾਂ

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ਅੱਜ ਵਿਗਿਆਨ ਅਤੇ ਤਕਨੀਕ ਦਾ ਯੁੱਗ ਹੈ। ਇਸ ਯੁੱਗ ਦੇ ਬੱਚੇ ਪੁਰਾਣੇ ਪੀੜ੍ਹੀ ਤੋਂ ਜ਼ਿਆਦਾ ਤਰਕਸ਼ੀਲ ਅਤੇ ਵਿਗਿਆਨਕ ਸੋਚ ਵਾਲੇ ਹਨ। ਉਹ ਸਮਾਂ ਹੁਣ ਬੀਤ ਗਿਆ ਜਦੋਂ ਬਾਲ ਸਾਹਿਤ ਬੱਚਿਆਂ ਨੂੰ ਸਿਖਾਉਣ ਅਤੇ ਉਪਦੇਸ਼ ਦੇਣ ਦਾ ਸਾਧਨ ਮੰਨਿਆ ਜਾਂਦਾ ਸੀ। 'ਪੰਚਤੰਤਰ ਦੀਆਂ ਕਹਾਣੀਆਂ', 'ਜਾਤਕ ਕਥਾਵਾਂ', 'ਲੋਕ ਕਥਾਵਾਂ' ਹੁਣ ਤੱਕ ਇਸ ਕਥਨ ਦੀ ਪੁਸ਼ਟੀ ਹੀ ਕਰਦੇ ਆਏ ਹਨ। ਦਰਅਸਲ ਸਾਡੇ ਬਜ਼ੁਰਗਾਂ ਦੀ ਇਹ ਧਾਰਨਾ ਰਹੀ ਹੈ ਕਿ ਬੱਚਾ ਇਕ ਕੋਰੀ ਸਲੇਟ ਦੀ ਤਰ੍ਹਾਂ ਹੁੰਦਾ ਹੈ। ਉਸਦੀ ਆਪਣੀ ਕੋਈ ਸ਼ਖ਼ਸੀਅਤ ਨਹੀਂ ਹੁੰਦੀ ਅਤੇ ਵੱਡਿਆਂ ਨੇ ਉਸ ਸਲੇਟ 'ਤੇ ਆਪਣੀ ਮਰਜ਼ੀ ਅਨੁਸਾਰ ਫੁੱਲ ਪੱਤੀਆਂ ਬਣਾ ਕੇ ਸੰਵਾਰਨਾ ਹੁੰਦਾ ਹੈ। ਇਸ ਤਰ੍ਹਾਂ ਵੱਡਿਆਂ ਤੋਂ ਬੱਚਿਆਂ ਨੂੰ ਸਿੱਖਿਆ ਮਿਲਣਾ ਇਕ ਅਟੱਲ ਸੱਚਾਈ ਹੈ। ਪਰ ਨਵੇਂ ਦੌਰ ਨੇ ਇਸ ਸੱਚ ਨੂੰ ਗਲਤ ਸਾਬਿਤ ਕਰ ਦਿੱਤਾ ਹੈ। ਮਨੋਵਿਗਿਆਨ ਦੀ ਨਵੀਂ ਖੋਜ ਨੇ ਇਹ ਸਾਬਿਤ ਕਰ ਦਿੱਤਾ ਹੈ ਕਿ ਬੱਚਾ ਖੁਦ ਵਿਕਾਸ ਕਰਨ ਦੇ ਲਈ ਉਤਸ਼ਾਹਿਤ ਹੁੰਦਾ ਹੈ। ਇਸ ਪ੍ਰਕਿਰਿਆ ਦੌਰਾਨ ਉਹਨੂੰ ਪੜ੍ਹਨ ਦੇ ਲਈ ਅਜਿਹੇ ਸਾਹਿਤ ਦੀ ਜ਼ਰੂਰਤ ਹੁੰਦੀ ਹੈ, ਜੋ ਉਸਦੀ ਜਿਗਿਆਸਾ ਨੂੰ ਸ਼ਾਂਤ ਕਰੇ ਅਤੇ ਉਸ ਨੂੰ ਉਪਦੇਸ਼ਾਤਮਕ ਸਿੱਖਿਆ ਤੋਂ ਮੁਕਤ ਕਰੇ। ਬੱਚੇ ਹੁਣ ਜ਼ਿਆਦਾ ਤਰਕਸ਼ੀਲ ਅਤੇ ਵਿਵਹਾਰਿਕ ਹੋ ਗਏ ਹਨ। ਇਸ ਲਈ ਰਚਨਾਤਮਕ ਸਾਹਿਤ ਹੀ ਉਨ੍ਹਾਂ ਦੀ ਸ਼ਖ਼ਸੀਅਤ ਨੂੰ ਨਿਖਾਰ ਸਕਦਾ ਹੈ। ਉਪਦੇਸ਼ਾਤਮਕ ਜ਼ਰੂਰਤਾਂ ਸਕੂਲ ਦੀ ਪਾਠ ਪੁਸਤਕ ਪੂਰਾ ਕਰ ਹੀ ਦਿੰਦੀਆਂ ਹਨ। ਤਦ ਹੀ ਬੱਚੇ ਪਾਠ ਪੁਸਤਕ ਦੇ ਇਲਾਵਾ ਕੁਝ ਨਵਾਂ ਰੋਚਕ ਪੜ੍ਹਨ ਦੇ ਲਈ ਲੱਭਦੇ ਹਨ। ਹੁਣ ਸਿੱਖਿਆ ਅੰਕਾਂ ਦਾ ਖੇਲ ਬਣ ਗਈ ਹੈ। ਪਾਠ ਪੁਸਤਕਾਂ ਨੂੰ ਰਟ ਰਟ ਕੇ ਬੱਚਾ ਇਨ੍ਹਾਂ ਪੁਸਤਕਾਂ ਤੋਂ ਨਫ਼ਰਤ ਕਰਨ ਲੱਗ ਜਾਂਦਾ ਹੈ। ਉਹ ਪੁਸਤਕਾਂ ਤੋਂ ਦੂਰੀ ਬਣਾਉਣ ਲੱਗਦਾ ਹੈ। ਇਸ ਲਈ ਉੱਤਮ ਅਤੇ ਵਧੀਆ ਬਾਲ ਸਾਹਿਤ ਹੀ ਬੱਚਿਆਂ ਦੀ ਸ਼ਖ਼ਸੀਅਤ ਨੂੰ ਨਿਖਾਰ ਸਕਦਾ ਹੈ।

ਵਧੀਆ ਬਾਲ ਸਾਹਿਤਕਾਰ ਨੂੰ ਬੱਚਿਆਂ ਦੇ ਮਨ ਦੇ ਮੁਤਾਬਿਕ ਚੱਲਣਾ ਪੈਂਦਾ ਹੈ। ਬੱਚਿਆਂ ਨੂੰ ਜੋ ਵੀ ਸਿਖਾਇਆ ਜਾਂ ਦੱਸਿਆ ਜਾਵੇ, ਉਹ ਰੋਚਕ ਹੋਣਾ ਚਾਹੀਦਾ ਹੈ। ਭਾਵੇਂ ਹੀ ਇਹ ਕਹਿਣ ਨੂੰ ਸੌਖਾ ਹੈ ਪਰ ਬੱਚਿਆਂ ਦੇ ਮਾਨਸਿਕ ਪੱਧਰ 'ਤੇ ਪਹੁੰਚ ਕੇ ਲਿਖਣਾ ਬਹੁਤ ਮੁਸ਼ਕਿਲ ਹੈ। ਬਾਲ ਸਾਹਿਤਕਾਰਾਂ ਦੇ ਲਈ ਸਭ ਤੋਂ ਵੱਡੀ ਮੁਸ਼ਕਿਲ

ਕੰਮ ਹੁੰਦਾ ਹੈ ਸ਼ਬਦਾਂ ਦੀ ਚੋਣ। ਸ਼ਬਦਾਂ ਦੇ ਦੋ ਅਰਥ, ਲੇਖਕ ਦੇ ਮਨ ਵਿਚ ਹੁੰਦੇ ਹਨ ਪਰ ਕੀ ਬੱਚਾ ਉਨ੍ਹਾਂ ਦੇ ਅਰਥਾਂ ਨੂੰ ਸਮਝ ਪਾ ਰਿਹਾ ਹੈ? ਜੇਕਰ ਨਹੀਂ ਤਾਂ ਉਹ ਲੇਖਕ, ਬਾਲ ਲੇਖਕ ਨਹੀਂ ਹੋ ਸਕਦਾ। ਕਦੇ ਮਾਤਾਵਾਂ ਨੂੰ ਬੱਚਿਆਂ ਦੀ ਭਾਸ਼ਾ ਸਮਝਦੇ ਦੇਖਣਾ ਬੜਾ ਦਿਲਚਸਪ ਹੁੰਦਾ ਹੈ। ਗੋਦ ਵਿਚ ਉਠਾਏ ਅਮੁੱਕ ਅਬੋਧ ਬਾਲ ਦੇ ਲਈ ਮਾਂ ਦੀ ਭਾਸ਼ਾ ਹੋਰ ਹੁੰਦੀ ਹੈ। ਇਹੀ ਮਾਤਾ ਤੋਤਲੇ ਸ਼ਬਦਾਂ ਵਾਲੇ ਸਿੱਖਦੇ ਹੋਏ ਬੱਚੇ ਦੇ ਨਾਲ ਅਲੱਗ ਭਾਸ਼ਾ ਵਿਚ ਗੱਲ ਕਰਦੀ ਹੈ। ਉਸਦੀ ਗੁੱਸੇ ਜਾਂ ਪਿਆਰ ਦੀ ਭਾਸ਼ਾ ਦਾ ਅੰਤਰ ਸਮਝਣ ਵਿਚ ਬੱਚੇ ਨੂੰ ਦੇਰ ਨਹੀਂ ਲੱਗਦੀ। ਸਾਹਿਤਕਾਰ ਨੇ ਬੱਚੇ ਦੀ ਮਾਂ ਵਾਲਾ ਰੂਪ ਲੈ ਕੇ; ਉਸਦੇ ਸਾਥ ਦੀ ਭਾਸ਼ਾ ਦੀ ਤਲਾਸ਼ ਕਰਨੀ ਹੁੰਦੀ ਹੈ। ਲੇਖਕ ਨੇ ਦੇਖਣਾ ਹੁੰਦਾ ਹੈ ਕਿ ਉਸਦੇ ਪਾਠਕ ਦੀ ਉਮਰ ਕਿੰਨੀ ਹੈ; ਉਸਦੀ ਉਪ ਭਾਸ਼ਾ ਕਿਹੜੀ ਹੈ?

ਉਹ ਕਿਸ ਤਰ੍ਹਾਂ ਦੇ ਸਮਾਜ ਵਿਚ ਰਹਿ ਰਿਹਾ ਹੈ? ਕਿਉਂਕਿ ਸ਼ਹਿਰੀ ਅਤੇ ਗ੍ਰਾਮੀਣ ਬੱਚੇ ਲਈ ਸਾਹਿਤ ਦੀ ਭਾਸ਼ਾ ਅਲੱਗ ਅਲੱਗ ਹੋਏਗੀ। ਤਸਵੀਰਾਂ, ਪ੍ਰਤੀਕ, ਬਿੰਬ ਅਲੱਗ ਅਲੱਗ ਹੋਣਗੇ। ਜੇਕਰ ਬਾਲ ਸਾਹਿਤਕਾਰ, ਬੱਚਿਆਂ ਦੀ ਸੰਗਤ ਵਿਚ ਨਹੀਂ ਰਹਿੰਦਾ ਤਾਂ ਉਸਦੀ ਸੋਚ, ਅਨੁਭਵ ਗੌਰਵਸ਼ਾਲੀ ਨਹੀਂ ਹੋ ਸਕਦਾ। ਉਸਨੇ ਜਿਨ੍ਹਾਂ ਪਾਠਕਾਂ ਨੂੰ ਸਾਹਮਣੇ ਰੱਖ ਕੇ ਲਿਖਣਾ ਹੈ, ਜੇਕਰ ਉਨ੍ਹਾਂ ਦੀ ਸੰਗਤ ਵਿਚ ਕੁਝ ਸਮਾਂ ਗੁਜ਼ਾਰਿਆ ਜਾਵੇ ਤਾਂ ਉਹ ਬਾਲ ਵੀ ਉਸ ਲੇਖਕ ਦੀ ਭਾਸ਼ਾ ਦਾ ਘੇਰਾ ਨਿਸ਼ਚਿਤ ਕਰ ਦੇਣਗੇ।

ਜੇਕਰ ਭਾਸ਼ਾ ਬਾਲ ਪਾਠਕਾਂ ਦੀ ਉਮਰ ਅਤੇ ਸ਼ਬਦ ਗਿਆਨ ਦੇ ਅਨੁਸਾਰ ਹੋਣ ਤਾਂ ਸਵਾਲ ਇਹ ਉੱਠਦਾ ਹੈ ਕਿ ਬਾਲ ਮਨ ਨੂੰ ਪਰੋਸਿਆ ਕੀ ਜਾਏ? ਵਿਸ਼ਿਆਂ ਦੇ ਲਈ ਬਾਲਕਾਂ ਦੀ ਭੁੱਖ ਅਸੀਮਿਤ ਹੈ। ਜਿਸ ਤਰ੍ਹਾਂ ਬੱਚਾ ਅਬੋਧ ਉਮਰ ਵਿਚ ਕੰਮ ਕਾਜ (ਕਿਰਿਆਵਾਂ) ਸਿੱਖਦਾ ਹੈ, ਉਸੇ ਤਰ੍ਹਾਂ ਬਾਲ ਲੇਖਕ ਵੀ ਰਚਨਾ ਕਰਦੇ ਸਮੇਂ ਉਸ ਪ੍ਰਕਿਰਿਆ ਵਿਚੋਂ ਨਿਕਲਦਾ ਹੈ। ਉਦਾਹਰਣ ਦੇ ਲਈ ਬੱਚੇ ਜਦੋਂ ਚਮਚ ਨਾਲ ਖਾਣਾ ਸਿੱਖਦੇ ਹਨ ਤਾਂ ਉਹ ਪਲੇਟ ਤੋਂ ਬਾਹਰ ਖਿਲਾਰਦੇ ਹਨ ਜਾਂ ਚਮਚ ਮੂੰਹ ਵਿਚ ਪਾਉਣ ਦੇ ਲਈ ਸੰਘਰਸ਼ ਕਰਦੇ ਹਨ। ਹੌਲੀ ਹੌਲੀ ਸਿੱਖ ਜਾਂਦੇ ਹਨ। ਇਸ ਤਰ੍ਹਾਂ ਲੇਖਕ ਬਾਲਕਾਂ ਦੇ ਲਈ ਲਿਖਦਾ ਹੈ, ਕੱਟਦਾ ਹੈ ਅਤੇ ਇਹ ਪ੍ਰਕਿਰਿਆ ਉਦੋਂ ਤੱਕ ਚੱਲਦੀ ਰਹਿੰਦੀ ਹੈ; ਜਦੋਂ ਤੱਕ ਸੰਤੁਸ਼ਟੀ ਨਹੀਂ ਹੋ ਜਾਂਦੀ। ਜਦੋਂ ਤੱਕ ਸ਼ਬਦ ਵਾਕਾਂ ਵਿਚ ਤਰਤੀਬ ਅਨੁਸਾਰ ਚੱਲ ਨਹੀਂ ਜਾਂਦੇ। ਵਾਕਾਂ ਵਿਚ ਜਾਨ ਨਹੀਂ ਪੈ ਜਾਂਦੀ। ਬੱਚਿਆਂ ਦੇ ਲਈ ਲਿਖਦੇ ਸਮੇਂ ਬਾਲ ਸਾਹਿਤਕਾਰ ਦੇ ਲਈ ਇਹ ਜ਼ਰੂਰੀ ਹੁੰਦਾ ਹੈ ਕਿ ਉਹ ਘੰਟਿਆਂ ਬੱਧੀ ਵਿਚ ਹੋਰ ਸੰਦਰਭ ਵਿਚ ਲਿਖੇ। ਸੰਦਰਭ ਦੇ ਬਿਨਾਂ ਬੱਚਾ ਰਚਨਾ ਨਾਲ ਨਹੀਂ ਜੁੜੇਗਾ। ਜੇਕਰ ਗਲਪ ਵਿਚ ਹੋਵੇ ਤਾਂ ਬਿਰਤਾਂਤ ਨਿਰੰਤਰ ਨਹੀਂ ਹੋਣਾ ਚਾਹੀਦਾ। ਗੱਲ ਦੀ ਤਰਫ਼ ਟੁੱਟ ਟੁੱਟ ਕੇ ਜੁੜੇ ਤਾਂ ਬਾਲ ਪਾਠਕ ਮਹਿਸੂਸ ਕਰੇਗਾ ਕਿ

ਕਦਮ ਕਦਮ 'ਤੇ ਨਵੀਂ ਗੱਲ ਹੋ ਰਹੀ ਹੈ। ਇਸ ਤਰ੍ਹਾਂ ਉਸਦੀ ਸੋਚ ਤੇਜ਼ ਹੋਵੇਗੀ ਅਤੇ ਉਸਦਾ ਭਾਸ਼ਾ ਗਿਆਨ ਮਜ਼ਬੂਤ ਹੁੰਦਾ ਹੈ।

ਬਾਲ ਸਾਹਿਤ ਦੇ ਲਈ ਰਚਨਾ ਦਾ ਆਕਾਰ ਛੋਟਾ ਹੋਣਾ ਚਾਹੀਦਾ ਹੈ। ਲੰਬੀ ਰਚਨਾ ਜਿੰਨੀ ਚਾਹੇ ਰੋਚਕ ਹੋਵੇ ਪਰ ਬਾਲ, ਬੋਰ ਹੋ ਕੇ ਸੌਂ ਜਾਵੇਗਾ।

ਤੀਸਰਾ, ਰਚਨਾ ਵਿਚ ਨਾਟਕੀ ਅੰਸ਼ ਹੋਵੇ ਤਾਂ ਰਚਨਾ ਜ਼ਿਆਦਾ ਸਾਰਥਕ ਹੋਵੇਗੀ। ਐਕਸ਼ਨ ਭਰਪੂਰ ਰਚਨਾ ਵਿਚ ਬੱਚਾ, ਰਚਨਾ ਦਾ ਪਾਤਰ ਬਣਨਾ ਚਾਹੁੰਦਾ ਹੈ। ਇਸ ਤੋਂ ਬੱਚੇ ਦੇ ਅੰਦਰ ਹਰ ਕੰਮ ਨੂੰ ਖੇਲ ਵਿਚ ਬਦਲਣ ਦੀ ਪ੍ਰਕਿਰਤੀ ਜਾਗਰਿਤ ਹੁੰਦੀ ਹੈ। ਇਸ ਦਾ ਪ੍ਰਮਾਣ ਕਾਰਟੂਨ ਚੈਨਲਾਂ 'ਤੇ ਚੱਲਦੇ ਪ੍ਰੋਗਰਾਮ ਹਨ। ਤੁਸੀਂ ਬੱਚਿਆਂ ਨੂੰ ਇਹ ਪ੍ਰੋਗਰਾਮ ਦੇਖਦੇ ਹੋਏ ਇਨ੍ਹਾਂ ਦੇ ਨਾਲ ਘੁਲਦੇ ਮਿਲਦੇ ਦੇਖਦੇ ਹੋ। ਹਰ ਬੱਚਾ ਮੋਟੂ ਪਤਲੂ, ਛੋਟਾ ਭੀਮ ਵੀ ਬਣਨਾ ਚਾਹੁੰਦਾ ਹੀ ਨਹੀਂ, ਬਲਕਿ ਬਣਿਆ ਹੋਇਆ ਮਹਿਸੂਸ ਕਰਦਾ ਹੈ। ਇਸ ਪ੍ਰਕਾਰ ਜੇਕਰ ਕਿਸੇ ਸਾਹਿਤਕ ਰਚਨਾ ਵਿਚ ਬੱਚਾ ਅਭੇਦ ਹੋਇਆ ਮਹਿਸੂਸ ਕਰਦਾ ਹੈ ਤਾਂ ਇਹ ਰਚਨਾ ਯਕੀਨਨ ਸਫਲ ਮੰਨੀ ਜਾਵੇਗੀ।

ਬਾਲ ਸਾਹਿਤ ਦੀ ਪੁਸਤਕਾਂ ਦੀ ਪ੍ਰੋਡਕਸ਼ਨ ਅਰਥਾਤ ਪ੍ਰਕਾਸ਼ਨ ਦੀ ਤਰਫ਼ ਵੀ ਧਿਆਨ ਦੇਣਾ ਜ਼ਰੂਰੀ ਹੈ। ਜਿਸ ਤਰ੍ਹਾਂ ਅਸੀਂ ਉੱਪਰ ਜ਼ਿਕਰ ਕੀਤਾ ਹੈ ਕਿ ਬੱਚਿਆਂ ਲਈ ਕੀਤੀ ਗਈ ਰਚਨਾ ਐਕਸ਼ਨ ਭਰਪੂਰ ਹੋਣੀ ਚਾਹੀਦੀ ਹੈ, ਇਸੇ ਪ੍ਰਕਾਰ ਪ੍ਰਕਾਸ਼ਿਤ ਪੁਸਤਕਾਂ ਚਿੱਤਰ ਸਹਿਤ ਤੇ ਰੰਗਦਾਰ ਹੋਣੀ ਚਾਹੀਦੀ ਹੈ ਤਾਂ ਕਿ ਬੱਚੇ ਜ਼ਿਆਦਾ ਆਕਰਸ਼ਿਤ ਹੋਣ। ਆਕਰਸ਼ਿਤ ਕਰਕੇ ਹੀ ਉਨ੍ਹਾਂ ਨੂੰ ਸ਼ਬਦ ਗਿਆਨ ਨਾਲ ਜੋੜਿਆ ਜਾ ਸਕਦਾ ਹੈ। ਪੁਸਤਕ ਦਾ ਸਿਰਲੇਖ ਆਕਰਸ਼ਿਤ ਨਹੀਂ ਹੋਵੇਗਾ ਤਾਂ ਬੱਚਾ ਪਹਿਲਾਂ ਹੀ ਉਸ ਤੋਂ ਮੂੰਹ ਮੋੜ ਲਏਗਾ।

ਪੰਜਾਬੀ ਵਿਚ ਬਾਲ ਸਾਹਿਤ ਦੀ ਦਸ਼ਾ ਅਤੇ ਦਿਸ਼ਾ ਬਾਰੇ ਵਰਣਨ ਦੇ ਬਿਨਾਂ ਮੇਰੀ ਗੱਲ ਅਧੂਰੀ ਰਹੇਗੀ। ਪੰਜਾਬੀ ਵਿਚ ਬਾਲ ਸਾਹਿਤ ਦੀ ਪਰੰਪਰਾ ਬਹੁਤ ਪੁਰਾਣੀ ਨਹੀਂ ਹੈ। ਆਧੁਨਿਕ ਪੰਜਾਬੀ ਸਾਹਿਤ ਦੇ ਰਚਨਾਕਾਰ, ਬੜੇ ਸਾਹਿਤਕਾਰ, ਬਾਲ ਸਾਹਿਤ ਦੀ ਤਰਫ਼ ਤੋਂ ਉਦਾਸੀਗੀਣ ਹੀ ਰਹੇ ਹਨ। ਰਬਿੰਦਰ ਨਾਥ ਠਾਕੁਰ ਨੇ ਬੰਗਾਲੀ ਵਿਚ ਬੱਚਿਆਂ ਲਈ ਢੇਰ ਸਾਰੇ ਸਾਹਿਤ ਦੀ ਰਚਨਾ ਕੀਤੀ ਹੈ। ਪਰ ਉਨ੍ਹਾਂ ਦੇ ਸਮਕਾਲੀ ਪੰਜਾਬੀ ਸਾਹਿਤਕਾਰ ਭਾਈ ਵੀਰ ਸਿੰਘ, ਧਨੀ ਰਾਮ ਚਾੜ੍ਹਕ, ਪ੍ਰੋ. ਪੂਰਨ ਸਿੰਘ, ਗੁਰਬਖਸ਼ ਸਿੰਘ ਪ੍ਰੀਤਲੜੀ, ਨਾਨਕ ਸਿੰਘ ਆਦਿ ਨੇ ਬਾਲ ਸਾਹਿਤ ਦੀ ਕੋਈ ਰਚਨਾ ਨਹੀਂ ਕੀਤੀ। ਜਿਥੋਂ ਤੱਕ ਮੇਰੀ ਸਮਝ ਹੈ 1941-42 ਵਿਚ ਗੁਰਬਖਸ਼ ਸਿੰਘ ਪ੍ਰੀਤਲੜੀ ਨੇ 'ਬਾਲ ਸੰਦੇਸ਼' ਨਾਂ ਦਾ ਮੈਗਜ਼ੀਨ ਸ਼ੁਰੂ ਕੀਤਾ ਸੀ ਜੋ ਉਨ੍ਹਾਂ ਦੇ ਸਪੁੱਤਰ ਹਿਰਦੇਪਾਲ ਸਿੰਘ ਹੁਣ ਵੀ ਚਲਾ ਰਹੇ ਹਨ। 1971 ਵਿਚ ਪੰਜਾਬ ਸਕੂਲ ਸਿੱਖਿਆ ਬੋਰਡ ਨੇ ਬੱਚਿਆਂ ਲਈ 'ਪੰਖੜੀਆਂ' ਮੈਗਜ਼ੀਨ ਸ਼ੁਰੂ ਕੀਤਾ ਜਿਸ ਵਿਚ ਛੋਟੇ ਛੋਟੇ

ਲੇਖਕਾਂ ਦੀਆਂ ਰਚਨਾਵਾਂ ਛਪਦੀਆਂ ਰਹੀਆਂ ਅਤੇ ਅੱਜ ਵੀ ਛਪ ਰਹੀਆਂ ਹਨ। ਪੰਜਾਬੀ ਦੇ ਨਾਟਕਾਂ ਦੀ ਰਚਨਾ ਸਾਰੇ ਸਾਹਿਤ ਰਚਨਾਕਾਰਾਂ ਦੇ ਬਾਅਦ ਸ਼ੁਰੂ ਹੋਈ ਅਰਥਾਤ 1913 ਵਿਚ ਆਈ. ਸੀ. ਨੰਦਾ ਨੇ ਪਹਿਲੇ ਪੰਜਾਬੀ ਨਾਟਕ 'ਕੁਲਹਨ' ਦੀ ਰਚਨਾ ਕੀਤੀ ਸੀ। ਸਨੇਹ ਲਤਾ ਸਾਨਿਆਲ ਨੇ ਨਾਟਕ ਵਿਚ 'ਬਾਂਦਰ ਦਾ ਵਿਆਹ' ਪੁਸਤਕ ਲਿਖੀ। ਪੰਜਾਬੀ ਵਿਚ ਬਾਲ ਨਾਟਕ ਖੇਲਣ ਅਤੇ ਦੇਖਣ ਦੀ ਲੰਮੀ ਪਰੰਪਰਾ ਰਹੀ ਹੈ। ਇਸ ਵਿਚ ਲਗਭਗ ਸਾਰੇ ਬੜੇ ਨਾਟਕਕਾਰਾਂ ਨੇ ਆਪਣਾ ਯੋਗਦਾਨ ਦਿੱਤਾ ਹੈ। ਇਸ ਸਮੇਂ ਹਰ ਸਾਹਿਤ ਦੇ ਰੂਪ ਵਿਚ ਬੱਚਿਆਂ ਦੇ ਲਈ ਰਚਨਾਵਾਂ ਹੋ ਰਹੀਆਂ ਹਨ। ਨੋਬਲ ਕਹਾਣੀ ਦੇ (ਇਲਾਵਾ) ਸਫ਼ਰਨਾਮਾ ਆਦਿ ਵੀ ਲਿਖੇ ਜਾ ਰਹੇ ਹਨ। ਇਸ ਦਾ ਕਾਰਨ ਇਹ ਹੈ ਕਿ ਵੱਡੀ ਗਿਣਤੀ ਵਿਚ ਪੰਜਾਬੀ ਸਾਹਿਤਕਾਰਾਂ ਨੇ ਬੱਚਿਆਂ ਦੀਆਂ ਜ਼ਰੂਰਤਾਂ ਨੂੰ ਪਹਿਚਾਣਿਆ ਹੈ ਅਤੇ ਉਨ੍ਹਾਂ ਲਈ ਰਚਨਾਵਾਂ ਲਿਖਣ ਦੀ ਤਰਫ਼ ਧਿਆਨ ਦੇਣਾ ਸ਼ੁਰੂ ਕੀਤਾ ਹੈ। ਇਨ੍ਹਾਂ ਲੇਖਕਾਂ ਵਿਚ ਜਸਬੀਰ ਸਿੰਘ ਭੁੱਲਰ, ਮਨਮੋਹਨ ਸਿੰਘ ਦਾਊਂ, ਦਰਸ਼ਨ ਸਿੰਘ ਆਸ਼ਟ, ਕੇਵਲ ਧਾਲੀਵਾਲ, ਸਰਬਜੀਤ ਸਿੰਘ ਬੇਦੀ, ਬਚਿੰਤ ਕੌਰ, ਆਤਮਾ ਸਿੰਘ, ਜਗਦੀਸ਼ ਕੌਸ਼ਲ, ਤਾਰਾ ਸਿੰਘ ਅਨਜਾਣ ਆਦਿ ਅਨੇਕਾਂ ਨਾਮ ਜ਼ਿਕਰਯੋਗ ਹੈ।

ਪੰਜਾਬੀ ਦੇ ਇਕ ਹੋਰ ਲੇਖਕ ਕਮਲਜੀਤ ਨੀਲੋ ਦਾ ਇਸ ਖੇਤਰ ਵਿਚ ਕੰਮ ਵਿਸ਼ੇਸ਼ ਯੋਗਤਾ ਦਾ ਧਾਰਨੀ ਹੈ। ਨੀਲੋ, ਰਮਾ ਰਤਨ ਅਤੇ ਹੋਰ ਸਾਥੀ ਮਿਲ ਕੇ ਹਰ ਸਾਲ ਬੱਚਿਆਂ ਦੀ ਵਰਕਸ਼ਾਪ ਕਰਦੇ ਹਨ। ਬੱਚਿਆਂ ਦੀਆਂ ਕਵਿਤਾਵਾਂ, ਕਹਾਣੀਆਂ, ਨਾਟਕ ਆਦਿ ਦੀ ਪ੍ਰਫੋਰਮੈਂਸ ਕਰਕੇ ਉਨ੍ਹਾਂ ਦੇ ਅੰਦਰ ਨੈਤਿਕ ਮੁੱਲ, ਜੀਵਨ ਦੇ ਲਈ ਸੰਘਰਸ਼ ਅਤੇ ਸਭਿਆਚਾਰਕ ਮੁੱਲ ਨੂੰ ਭਰਨ ਦੀ ਕੋਸ਼ਿਸ਼ ਕਰਦੇ ਹਨ। ਕੁਝ ਸੰਸਥਾਵਾਂ ਨੇ ਵੀ ਬਾਲ ਸਾਹਿਤ ਦੀ ਤਰਫ਼ ਧਿਆਨ ਦਿੱਤਾ ਹੈ। ਭਾਸ਼ਾ ਵਿਭਾਗ ਪੰਜਾਬ ਅਤੇ ਪੰਜਾਬੀ ਅਕੈਡਮੀ, ਦਿੱਲੀ ਨੇ ਬੱਚਿਆਂ ਦੇ ਲਈ ਵਿਸ਼ੇਸ਼ ਪੁਸਤਕਾਂ ਲਿਖਵਾ ਕੇ; ਤਸਵੀਰ ਸਹਿਤ ਪ੍ਰਕਾਸ਼ਿਤ ਕੀਤੀਆਂ ਹਨ। ਪੰਜਾਬੀ ਅਕੈਡਮੀ ਦੀ ਤਰਫ਼ ਤੋਂ ਪ੍ਰਕਾਸ਼ਿਤ ਪੁਸਤਕਾਂ ਦੇ ਲੇਖਕ, ਨਾਮਵਰ ਰਚਨਾਕਾਰ ਹੈ ਜਿਸ ਵਿਚ ਜਸਵੰਤ ਸਿੰਘ ਨੇਕੀ, ਪ੍ਰੋਫੈਸਰ ਪ੍ਰੀਤਮ ਸਿੰਘ, ਬਚਿੰਤ ਕੌਰ, ਆਤਮਾ ਸਿੰਘ, ਗੁਰਬਚਨ ਸਿੰਘ ਭੁੱਲਰ ਆਦਿ ਦੇ ਨਾਮ ਵਰਣਨਯੋਗ ਹਨ। ਨੈਸ਼ਨਲ ਬੁੱਕ ਟਰੱਸਟ ਨੇ ਵੀ ਕੁਝ ਪੁਸਤਕਾਂ ਦਾ ਪ੍ਰਕਾਸ਼ਨ ਕੀਤਾ ਹੈ। ਸਾਹਿਤ ਅਕੈਡਮੀ ਨੇ ਕੁਝ ਰਾਸ਼ਟਰੀ ਮਹੱਤਵ ਦੀਆਂ ਬਾਲ ਪੁਸਤਕਾਂ ਦੇ ਪੰਜਾਬੀ ਅਨੁਵਾਦ ਪ੍ਰਕਾਸ਼ਿਤ ਕੀਤੇ ਹਨ।

ਅਗਲਾ ਪ੍ਰਸ਼ਨ ਇਹ ਉੱਠਦਾ ਹੈ ਕਿ ਇਹ ਪੁਸਤਕਾਂ ਬੱਚਿਆਂ ਤੱਕ ਕਿਵੇਂ ਪਹੁੰਚਣ ? ਪੁਸਤਕਾਂ ਦਾ ਪ੍ਰਚਲਣ ਹੁਣ ਖ਼ਤਰੇ ਵਿਚ ਹੈ। ਸੂਚਨਾ ਤਕਨਾਲੋਜੀ ਨੇ ਪੁਸਤਕਾਂ ਤੋਂ ਪਾਠਕ ਖੋਹ ਲਏ ਹਨ। ਬਾਲ ਪੁਸਤਕਾਂ ਲਈ ਪਾਠਕਾਂ ਵਿਚ ਆਕਰਸ਼ਣ ਕਾਇਮ ਕਰਨਾ ਇਕ ਹੋਰ ਬੜੀ ਲਲਕਾਰ ਹੈ। ਹੁਣ ਸਕੂਲਾਂ ਅਤੇ ਬਾਲ ਸਭਾਵਾਂ ਵਿਚ



ਜਾ ਕੇ 'ਸੁਣੋ ਕਹਾਣੀ' ਜਾਂ ਕਵਿਤਾ ਪਾਠ' ਦੁਆਰਾ ਬੱਚਿਆਂ ਵਿਚ ਪੜ੍ਹਨ ਦੀ ਰੁਚੀ ਪੈਦਾ ਕਰਨੀ ਹੋਵੇਗੀ। ਸਕੂਲਾਂ ਅਤੇ ਘਰਾਂ ਵਿਚ ਬੱਚਿਆਂ ਨੂੰ ਤੋਹਫ਼ੇ ਸੰਬੰਧੀ ਪੁਸਤਕਾਂ ਭੇਂਟ ਕੀਤੀਆਂ ਜਾਣ। ਬੱਚਿਆਂ ਲਈ ਵਿਸ਼ੇਸ਼ ਲਾਇਬ੍ਰੇਰੀ ਬਣਾਈ ਜਾਵੇ। ਬੱਚਿਆਂ ਦੀ ਰੁਚੀ ਅਨੁਸਾਰ ਰਚਨਾ ਹੋਵੇ। ਇਹ ਚੁਣੌਤੀ ਸਾਨੂੰ ਸਭ ਨੂੰ ਸਵੀਕਾਰ ਕਰਨੀ ਹੋਵੇਗੀ। ਸਾਨੂੰ ਅਜਿਹੇ ਪਾਤਰ ਬੱਚਿਆਂ ਨੂੰ ਦੇਣੇ ਹੋਣਗੇ ਜੋ ਉਹ ਬਣਨਾ ਚਾਹੁਣ। ਜਿਸ ਨੂੰ ਉਹ ਹੀਰੋ ਮੰਨਣ। ਜੇਕਰ ਬੱਚੇ 'ਸ਼ਕਤੀਮਾਨ' ਸੀਰੀਅਲ ਦੇਖ ਕੇ ਛੱਤ ਤੋਂ ਕੁੱਦ ਸਕਦੇ ਹਨ, ਬਲੂ ਵੇਲ ਖੇਡ ਖੇਡ ਕੇ ਆਤਮ ਹੱਤਿਆ ਤੱਕ ਕਰ ਸਕਦੇ ਹਨ ਤਾਂ ਨਿਸ਼ਚਿਤ ਤੌਰ 'ਤੇ ਸਾਕਾਰਾਤਮਕ ਸਾਹਿਤ ਦੁਆਰਾ ਉਨ੍ਹਾਂ ਦੀ ਸੋਚ ਨੂੰ ਬਦਲਿਆ ਜਾ ਸਕਦਾ ਹੈ। ਅਸੀਂ ਬੱਚਿਆਂ ਨੂੰ ਡਾਕਟਰ, ਵਕੀਲ, ਇੰਜੀਨੀਅਰ ਬਣਾਉਣਾ ਚਾਹੁੰਦੇ ਹਾਂ ਪਰ ਵਧੀਆ ਨਾਗਰਿਕ ਬਣਨ ਦੀ ਸਿੱਖਿਆ ਨਹੀਂ ਦਿੰਦੇ। ਇਹੀ ਕਾਰਨ ਹੈ ਕਿ ਅੱਜ ਦਾ ਯੁਵਾ ਆਪਣੀਆਂ ਜ਼ਿੰਮੇਵਾਰੀਆਂ ਤੋਂ ਭੱਜਦਾ ਹੈ, ਘਰ ਟੁੱਟਦੇ ਹਨ ਅਤੇ ਮਾਂ ਬਾਪ ਬਿਰਧ ਆਸ਼ਰਮ ਵਿਚ ਪਹੁੰਚ ਰਹੇ ਹਨ। ਸਾਨੂੰ ਸੰਸਕ੍ਰਿਤੀ ਦਾ ਵਿਕਾਸ ਬੱਚਿਆਂ ਵਿਚ ਕਰਨਾ ਪਵੇਗਾ ਤਾਂ ਕਿ ਉਹ ਦੇਸ਼ ਦਾ ਭਵਿੱਖ ਬਣ ਸਕਣ। ਇਹ ਕੰਮ ਜਿੰਨਾ ਬਾਲ ਸਾਹਿਤ ਸਹੀ ਢੰਗ ਨਾਲ ਕਰ ਸਕਦਾ ਹੈ ਓਨਾ ਸ਼ਾਇਦ ਹੀ ਕੋਈ ਹੋਰ ਕਰ ਸਕੇ, ਸਾਨੂੰ ਵਿਦੇਸ਼ੀ ਤੌਰ ਤਰੀਕੇ ਛੱਡ ਕੇ ਆਪਣੀ ਸੰਸਕ੍ਰਿਤੀ ਨੂੰ ਅਪਣਾਉਣਾ ਪਵੇਗਾ ਤਾਂ ਹੀ ਸਾਡਾ ਭਵਿੱਖ ਸੁਰੱਖਿਅਤ ਰਹੇਗਾ।

ਜਿਵੇਂ ਜਿਵੇਂ ਵਿਗਿਆਨ ਅਤੇ ਤਕਨੀਕ ਦਾ ਵਿਕਾਸ ਹੋ ਰਿਹਾ ਹੈ, ਬੱਚੇ ਵੀ ਸਮੇਂ ਤੋਂ ਪਹਿਲਾਂ ਜਵਾਨ ਹੋ ਰਹੇ ਹਨ। ਇਹ ਚਿੰਤਾ ਅਤੇ ਚਿੰਤਨ ਦੋਨਾਂ ਦਾ ਵਿਸ਼ਾ ਹੈ। ਸਮਾਜ ਵਿਚ ਫੈਲੀਆਂ ਬੁਰਾਈਆਂ ਅਤੇ ਕੁਰੀਤੀਆਂ ਨੂੰ ਵਿਸ਼ਾ ਬਣਾਉਣਾ ਪਵੇਗਾ ਤੇ ਬੱਚਿਆਂ ਨੂੰ ਜਾਗਰੂਕ ਕਰਨਾ ਪਵੇਗਾ। ਬੱਚੇ ਆਤਮ ਹੱਤਿਆ ਕਰ ਰਹੇ ਹਨ। ਉਨ੍ਹਾਂ ਦੀ ਮਾਨਸਿਕਤਾ ਨੂੰ ਬਦਲਣਾ ਹੋਵੇਗਾ। ਬਾਲ ਸਾਹਿਤ ਨੂੰ ਸਨਮਾਨ ਤੇ ਮਹੱਤਵ ਦੇਣਾ ਪਵੇਗਾ।

ਅੱਜ ਸਮਾਜ ਵਿਚ ਬਿਰਧ ਆਸ਼ਰਮ ਤੇ ਬਾਲ ਸੁਧਾਰ ਗ੍ਰਹਿ ਸਮਾਨ ਰੂਪ ਨਾਲ ਵਧਦੇ ਜਾ ਰਹੇ ਹਨ। ਇਨ੍ਹਾਂ ਨੂੰ ਰੋਕਣਾ ਪਵੇਗਾ। ਬੱਚਿਆਂ ਨੂੰ ਸੰਸਕਾਰਾਂ ਦੀ ਸਿੱਖਿਆ ਦੇਣੀ ਪਵੇਗੀ। ਘਰੇਲੂ ਹਿੰਸਾ ਨੂੰ ਰੋਕਣਾ ਪਵੇਗਾ ਕਿਉਂਕਿ ਇਸ ਦਾ ਸਿੱਧਾ ਅਸਰ ਬੱਚਿਆਂ 'ਤੇ ਹੁੰਦਾ ਹੈ।



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### प्राचीन ज्ञान परम्परा में गुरु शिष्य परम्परा

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प्रस्तावना

भारतीय संस्कृति के प्राण गुरु शिष्य परम्परा है जहाँ गुरु शिष्य को ज्ञान सम्प्रेषित करता है। यह ज्ञान परम्परा आध्यात्मिक ज्ञान से सम्बन्धित है। परम्परा अथवा पारम्परिक का शाब्दिक अर्थ है, एक निर्बाध श्रृंखला। यह परम्परा वैदिक काल के पूर्व से प्रचलित है। देवाधिदेव महादेव को भारतीय संस्कृति में प्रथम गुरु के रूप में मान्यता प्राप्त है। महादेव के शिष्य सप्तऋषि माने जाते हैं। यह सप्त ऋषि हैं – महर्षि अत्रि, जमदग्नि, कश्यप, विश्वामित्र, गौतम, भारद्वाज एवं वशिष्ठ। इन्हीं सप्तऋषियों ने महादेव से ज्ञान प्राप्त कर विभिन्न दिशाओं में इसका प्रचार-प्रसार किया। उसके पश्चात् गुरु परम्परा में भगवान दत्तात्रेय का नाम प्रमुख है। उनके प्रमुख तीन शिष्य थे जो तीनों ही राजा थे। दत्तात्रेय में ईश्वर एवं गुरु दोनों रूप समाहित हैं। इसलिए उन्हें श्री गुरुदेवदत्त भी कहा जाता है। जगद्गुरु आदि शंकराचार्य एवं गुरु गोरखनाथ भी इस परंपरा के प्रचारक हैं। गुरु परम्परा में ऋषियों एवं महर्षियों की श्रृंखला है। उदाहरणस्वरूप परशुराम, वशिष्ठ, विश्वामित्र, व्यास, द्रोणाचार्य, कृपाचार्य, अगस्त्य आदि। ये सब वह तत्त्वदर्शी गुरु हैं, जिन्होंने अपने अन्तर्ज्ञान को पूर्व समर्पण के साथ अपने शिष्यों तक पहुँचाया।

वैदिक युग के पूर्व से प्रारम्भ हुयी यह परम्परा आज भी विद्यमान है। गोविन्दपाद के शिष्य शंकराचार्य, शंकरानन्द के शिष्य विद्यारण्य, ईश्वरपुरी के शिष्य महाप्रभु, चैतन्य, पूर्वानन्द के शिष्य विरजानन्द, विरजानन्द के शिष्य दयानन्द, रामकृष्ण परमहंस के शिष्य विवेकानन्द, समर्थ रामदास के शिष्य शिवाजी इस प्रकार यह परम्परा निर्बाध गति से चली आ रही है। इन महान गुरुओं के त्याग एवं छत्रछाया में भारत राष्ट्र आज तक प्राणवान है।

इस गुरु शिष्य परम्परा को गुरुकुल व्यवस्था ने सजीव रखा था। प्राचीनकाल में यह कार्य नगरों एवं गाँवों से दूर रहकर शान्त एवं स्वच्छ प्रकृति के सान्निध्य में किया जाता था। भारतीय ज्ञान परम्परा में गुरु का महत्त्व अद्वितीय है।

स्कन्दपुराण में गुरु शब्द का अर्थ बताते हुए कहा गया है – 'गु' का अर्थ है अंधकार तथा 'रु' शब्द का अर्थ है तेज प्रकाश। अतः अंधकार से प्रकाश की ओर ले जाने वाला, अज्ञान को दूर कर ज्ञान का मार्ग दिखाने वाला 'गुरु' कहलाता है।<sup>1</sup> गुरु शब्द का प्रथम वर्ण 'गु' माया इत्यादि गुणों को प्रकट करने वाला है एवं द्वितीय वर्ण 'रु' ब्रह्म का द्योतक है जो माया की भ्रान्ति का विनाश करने वाला है।<sup>2</sup> गुरु शिष्य परम्परा का सर्वोत्तम उदाहरण 'वेद' है। पृथ्वी पर वेदों का अवतरण इसी परम्परा के अन्तर्गत हुआ था। वेदों का सार है उपनिषद्। उपनिषद् शब्द का अर्थ है ज्ञान प्राप्ति के लिए गुरु के पास जाना।<sup>3</sup> मुण्डकोपनिषद् के अनुसार विद्या गुरु द्वारा शिष्य को परम्परा क्रम से प्रेषित की जाती है।<sup>4</sup> कोई भी ऋषि मुनि यह नहीं कहते कि यह ज्ञान उनका अपना है सभी घोषणा करते हैं कि ज्ञान की प्राप्ति पूर्वज ऋषियों अथवा गुरुओं से प्राप्त है। शिक्षा संस्कारों, साधनों एवं विद्या से सम्बन्धित है।

संस्कार पूर्व जन्म के होते हैं। परन्तु साधन एवं विद्या के लिए गुरु अनिवार्य है। शास्त्रीय एवं आध्यात्मिक ज्ञान गुरु के बिना अधूरा है। तैत्तिरीय संहिता के अनुसार ऋषि ऋण से व्यक्ति तभी मुक्त हो पाता है

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जब वह गुरु के समीप शिक्षा ग्रहण करो<sup>5</sup> मुण्डकोपनिषद् में गुरु शिष्य परम्परा का बृहत् उल्लेख है जिसके अनुसार विश्व के निर्माता ब्रह्मा ने अपने पुत्र अथर्व को उपदेश दिया, अथर्व ने अङ्गिर को, अङ्गिर ने भारद्वाज सत्यवह को एवं भारद्वाज ने अङ्गिरस को उपदेश दिया, अङ्गिरस ने महागृहस्थ शौनक को ब्रह्मविद्या का उपदेश दिया इस प्रकार परम्परा क्रम से यह विद्या प्रचारित एवं प्रसारित हुयी।<sup>6</sup> कठोपनिषद् में गुरु के रूप में नचिकेता भी गुरु शिष्य परम्परा का उदाहरण है। इसी प्रकार आरुणी अपने पुत्र श्वेतकेतु को ब्रह्मविद्या सम्बन्धी ज्ञान देते हैं।<sup>7</sup> भगवान् श्रीकृष्ण का अर्जुन को श्रीमद्भगवद् गीता का उपदेश इसी परम्परा का सूचक है।

भारतीय संस्कृति में गुरु शिष्य परम्परा के अन्तर्गत गुरु शिष्य को शिक्षा देता है बाद में वही शिष्य गुरु के रूप में दूसरों को शिक्षा देता है यही क्रम चलता है। गुरु शिष्य परम्परा ज्ञान के किसी भी क्षेत्र में हो सकती है। इस परम्परा का निर्वाह प्राचीन काल में गुरुकुल एवं आश्रमों में होता था। भारतीय इतिहास स्पष्ट करता है कि गुरु की भूमिका समाज को सुधार की ओर ले जाने वाले मार्गदर्शन का कार्य करती है। गुरु का स्थान ईश्वर के समकक्ष माना गया है।<sup>8</sup> प्रश्नोपनिषद् में ज्ञान प्राप्त करने के लिए गुरु के पास जाने का विधिवत मार्ग बताया है जिसके अनुसार शिष्य समिधाएँ हाथ में लेकर नंगे पांव चलकर गुरु के चरणों में जाता है।<sup>9</sup> गुरु भी शिष्य की कठोर परीक्षा लेते थे। जिस प्रकार शिष्य उचित गुरु की खोज करता था वैसे ही गुरु भी योग्य शिष्य की खोज में रहते थे।

ऋग्वेद एवं अथर्ववेद आदि में शिष्य के गुणों का वर्णन है। इन गुणों से युक्त विद्यार्थी ही शिक्षा के अधिकारी माने जाते थे। अथर्ववेद के अनुसार आचार्य प्रवेश से पूर्व विद्यार्थी को तीन दिन परीक्षण में रखा जाता था जो उस परीक्षा को उत्तीर्ण करता था, उन्हें ही प्रवेश दिया जाता था।<sup>10</sup> शिक्षा प्राप्त करने के लिए शिष्य को गुरुकुल में रहना आवश्यक था। उपनयन संस्कार के पश्चात् विधिवत शिक्षा प्रारम्भ होती थी। ऋग्वेद<sup>11</sup> के अनुसार जिज्ञासु शिष्य ही शिक्षा का अधिकारी होता था। शिष्य शब्द विद्यार्थी के जीवन में अनुशासन के महत्त्व को प्रकट करता है।<sup>12</sup> अध्ययन के समय गुरु से अनुशासित शिष्य में संयम एवं अनुशासन की भावना दृढ़ हो जाती है। गुरु की आज्ञा का पालन, सेवा, भिक्षाटन इत्यादि कार्य शिष्य के द्वारा गुरु की सेवा में किये जाते थे। सत्य बोलना, विनम्र रहना, प्रियवचन बोलना ये सब गुण शिष्य के वाक्संयम में आवश्यक है। शिष्य का कर्तव्य है कि वह गुरु के प्रति मन में श्रद्धा का भाव रखे। मुण्डकोपनिषद्<sup>13</sup> के अनुसार गुरु में श्रद्धा रखने वाले शिष्य को ही विद्या दान का आदेश है।

गुरु को ईश्वर मानने के कारण ही शिक्षा समाप्ति पर शिष्य गुरु की स्तुति करते थे।<sup>14</sup> शिष्य का कर्तव्य है कि वह गुरु के प्रति अप्रिय आचरण कदापि न करें। मनुस्मृति में भी ऐसे अनेक नियमों का कथन है जिसका पालन ब्रह्मचारी के लिए अनिवार्य है।<sup>15</sup> यास्काचार्य ने शिष्य के गुणों एवं अवगुणों का वर्णन करते हुए कहा कि विद्या विद्वान से आग्रह करती है कि दोषदर्शी, कुटिल, असंयमी एवं गुरुद्रोही शिष्य के प्रति मुझे मत देना। जो शिष्य गुरु का आदर नहीं करता, शास्त्र भी उसकी रक्षा नहीं करता।<sup>16</sup> स्कन्दपुराण के अनुसार शिव के रुष्ट होने पर गुरु रक्षा करते हैं किन्तु गुरु के रुष्ट होने पर शिव भी रक्षा नहीं करते हैं।<sup>17</sup> अतः शिष्य कभी भी गुरुद्रोह न करे, कभी भी गुरु से

असत्य वचन न कहे तथा अहंकार का भाव भी न रखे। श्वेतकेतु बारह वर्ष गुरु के समीप रहा परन्तु अहंकार युक्त था पिता द्वारा उसका अहंकार दूर किया गया।<sup>18</sup> जो शिष्य श्रद्धा से गुरु के समीप जाते हैं ऐसे शिष्य को गुरु स्वयं समस्त विद्या उसके अन्तःकरण में उद्भासित कर देते हैं। शिष्य की पात्रता का वर्णन करते हुए शुक्रनासोपदेश में कहा गया है कि शास्त्र ज्ञान से स्वच्छ मन वाले व्यक्ति ही उपदेश के योग्य पात्र होते हैं।<sup>19</sup> उपदेश का महत्त्व पात्र की योग्यता पर निर्भर करता है। अयोग्य पात्र को दिया गया उपदेश कष्ट उत्पन्न करने वाला होता है। शास्त्रों में शिष्य के लिए आदेश है कि वह अपनी समस्त इन्द्रियों को संयमित रखें। शिक्षा समाप्ति पर शिष्य को सामर्थ्य के अनुसार गुरुदक्षिणा का विधान था। शास्त्रों में शिष्य शब्द के लिए अनेक समानार्थक शब्दों का प्रयोग प्राप्त है, जैसे - शिष्य, विद्यार्थी, अन्तेवासी, छात्र, ब्रह्मचारी इत्यादि।

गुरु शिष्य सम्बन्ध में गुरु का स्थान भारतीय ज्ञान परम्परा में उत्कृष्ट कोटि का माना गया है। शुक्रनासोपदेश में वर्णन है कि शिष्य चाहे कितना भी ज्ञानी हो परन्तु गुरु के बिना वह अपूर्ण है। स्वयं शुक्रनास कहते हैं कि चन्द्रापीड अत्यन्त विनम्र, सभी शास्त्रों के ज्ञाता हैं अतः उनके लिए उपदेश देने योग्य कुछ भी शेष नहीं है। परन्तु फिर भी उन्हें और विनम्र बनाने के लिए उपदेश दिया गया है।<sup>20</sup> जब चन्द्रापीड जैसे असाधारण व्यक्ति के लिए उपदेश आवश्यक है तो सामान्य व्यक्ति के लिए गुरु एवं उसका उपदेश अत्यधिक आवश्यक है। जीवन के चार पुरुषार्थों का आचरण गुरु प्रदत्त ज्ञान द्वारा ही सम्भव है। गुरु शब्द के समानार्थक अनेक शब्द प्रचलित हैं। यथा - आचार्य, उपाध्याय, अध्यापक इत्यादि। मनुस्मृति में इन सभी नामों के विशिष्ट अर्थ भी बताये गये हैं।<sup>21</sup> परन्तु इन सभी शब्दों में गुरु शब्द अति विशिष्ट एवं महत्त्वपूर्ण है। यह पद देवताओं को भी दुर्लभ है।<sup>22</sup>

मुण्डकोपनिषद् में गुरु की परिभाषा देते हुए कहा गया है - श्रोत्रिय ब्रह्मनिष्ठं गुरुमेवाभिगच्छते। यहाँ गुरु के लिए श्रोत्रिय होना आवश्यक है। ऐसा गुरु ही जिज्ञासु शिष्य को कर्म एवं ज्ञान का भेद स्पष्ट करके उसे उचित मार्ग पर ले जाता है। कठोपनिषद् के अनुसार भी ब्रह्मज्ञान गुरु के उपदेश से संभव है।<sup>23</sup> जब शिष्य शास्त्रविधि से गुरु के पास आये तब गुरु को सच्चे शिष्य को विद्या न देने का अधिकार नहीं है।<sup>24</sup> अपनी शिक्षा की सम्पूर्ण अवधि शिष्य को गुरुकुल में गुरु के समीप रह कर पूर्ण करने का विधान था। गुरुकुल में रहकर गुरु की आज्ञा पालन शिष्य का कर्तव्य था। इसी कारण प्रतिदिन पाठ करने से पूर्व गुरु एवं शिष्य एक साथ प्रार्थना करते थे।<sup>25</sup> गुरु का दायित्व था कि वह गुरुकुल के सभी छात्रों के प्रति समदृष्टि रखें। श्रीमद्भगवद्गीता<sup>26</sup> में गुरु को तत्त्वदर्शी संत कहा गया है।

गुरु की महत्ता को प्रदर्शित करने के लिए स्कन्दपुराण के उत्तरखण्ड में महादेव के द्वारा गुरु की महिमा का अत्यन्त सुन्दर वर्णन है जिसके अनुसार श्री गुरु के चरणों की सेवा करने से मनुष्य सब पापों से मुक्त होकर शुद्ध हो जाता है।<sup>27</sup> जिनके अस्तित्व से जगत् का अस्तित्व है, जिनके प्रकाश से वह (ईश्वर) प्रकाशित होता है, जिनके आनन्द से सब आनन्दित होते हैं, उन सच्चिदानन्द श्रीगुरु को नमस्कार है।<sup>28</sup> जिनसे यह जगत् चेतना स्वरूप लगता है, किन्तु चित्त जिसको प्रकाशित नहीं कर सकता, जागृति, स्वप्न, सुषुप्ति आदि अवस्थाएँ जिनके द्वारा प्रकाशित होती है, उन चित्तस्वरूप श्रीगुरु को नमस्कार है।<sup>29</sup> श्रीगुरुगीता

के अनुसार श्री गुरु का निवास स्थान ही काशी है, उसका चरणोदक गंगा है, ऐसे श्रीगुरु साक्षात् विश्वरूप हैं एवं तारक ब्रह्म हैं।<sup>30</sup> वह श्रीगुरु जिन्होंने संसाररूपी वृक्ष पर आरूढ़ होकर नरकरूपी समुद्र में गिरते हुए जीवों का उद्धार किया है ऐसे गुरु को प्रणाम है। वह गुरु तत्त्व गतिशील है, अचल है एवं दूर है वह समीप है। वह तत्त्व सबके अन्तःकरण में है तथा सबके बाहर भी है।<sup>31</sup> अतः ऐसे गुरु की सदैव अराधाना करें। गुरु शब्द के लिए अनेक समानार्थक शब्द हैं यथा – आचार्य, उपाध्याय, शिक्षक, अध्यापक इत्यादि। मनुस्मृति में इन नामों के विशिष्ट अर्थ प्रतिपादित है।<sup>32</sup> किन्तु गुरु शब्द इन सभी शब्दों में अति सम्माननीय है। गुरु शिष्य के अज्ञान को पूर्णतया नष्ट कर देता है। गुरु का उपदेश सभी क्लेशों को क्षीण कर देता है। शुकनासोपदेश में गुरु के उपदेश की महत्ता बताते हुए कहा गया है कि गुरु का उपदेश दोषों को भी गुणों में परिवर्तित उसी प्रकार कर देता है जैसे बुढ़ापा काले बालों को सफेद बालों में परिवर्तित कर देता है। अन्तःकरण की शान्ति का मूल गुरुपदेश है। जिस प्रकार प्रदोषकालीन चन्द्रमा अन्धकार को दूर कर देता है उसी प्रकार गुरु का उपदेश अत्यन्त मलिन दोषों को दूर कर देता है।<sup>33</sup> जिस प्रकार जल से किया गया स्नान समस्त मलों को दूर कर देता है उसी प्रकार गुरुपदेश मानसिक विकारों को दूर करता है।<sup>34</sup> गुरु का उपदेश समस्त सांसारिक वस्तुओं की तुलना में अलौकिक है। सद्गुरु अपने शिष्यों की त्रिविध तापों से रक्षा करते हैं। गुरु की महिमा का वर्णन अत्यन्त दुष्कर है ब्रह्म के समान ही गुरु कृपा भी सबको प्राप्त नहीं होती। सद्गुरु की प्राप्ति अनेक जन्मों के पुण्य फल से होती है। यह शक्ति अनन्त एवं अखण्ड है। मंत्र का मूल गुरु के द्वार कहे गये शब्द हैं तथा मोक्ष का मूल केवल गुरु की कृपा ही है।<sup>35</sup> गुरु का अस्तित्व भौतिक शरीर तक सीमित नहीं है। यह वह ऊर्जा एवं शक्ति है जिसे दिव्य चेतन परब्रह्म से भी उत्कृष्ट माना गया है। सर्व शुद्ध एवं पवित्र गुरुदेव जहाँ भी स्वभावतः रहते हैं, उस क्षेत्र में समस्त देवाओं का समुदाय वास करता है।<sup>36</sup>

अतः प्राचीन भारत की यह परम्परा समाज के कल्याण एवं उत्थान दोनों में आवश्यक है। पराधीनता ने इस परम्परा को नष्ट करने का प्रयास किया गया परन्तु भारतीय मनीषियों ने इस परम्परा को जीवंत रखा। वर्तमान में इस परम्परा को पूर्णरूपेण अपनाने का समय आ गया है। यह परम्परा ही नैतिक नियमों एवं सम्बन्धों को दृढ़ करने में सक्षम है।

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1. गुकारत्वन्धकार श्च रुकारस्तेज उच्यते।  
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AKSHAY KUMAR SINGH & DEEPTI SRIVASTAVA

## INSTABILITY FESTERING IN CENTRAL ASIA: PROBING THE INTERPLAY OF INTERNAL AND EXTERNAL FACTORS IN KAZAKHSTAN'S 2022 UNREST

*For the last three decades, the Central Asian region has been stumbling upon recurrent turmoils. Issues that are afflicting the region stem from an unrelenting dispute over the democratic transition, disquiet over nation-building concerns, inexorable involvement of great powers, and quest for development through economic restructuring. The continuing pandemic and Russia's Ukraine war intensify the never-ending quandary of the region. Almost all states of the region face similar issues to a varying degree, but the recent mass unrest in Kazakhstan is pointing towards the ensuing dynamics of mixing the internal and external factors. Kazakhstan's sudden descent into chaos is bound to leave a definite impact on its political system hitherto balanced by the bipolar power centre and the fast-changing regional security scenarios following Russia's Ukraine attack.*

**Keywords:** Kazakh-unrest, Ukraine War, Tokayev, Zhanaozen, CSTO, Colour revolution

## *Introduction*

**I**n contemporary times, tumultuous developments in the geopolitical landscape of the Central Asian region have obliged international relations analysts to appraise them in an appropriate context and come out with an objective analysis. The region, for the past few decades, has witnessed frequent upheavals owing to the persistent dispute over the issues of democratic transition, great power influence, troubled ethno-nationalistic upsurges, and economic instability. The ongoing wave of the Covid-19 pandemic, added with Russia's Ukrain attack, has further deepened the incessant predicaments of the region. Recently, in January 2022, Kazakhstan—hitherto a stable polity of the region—suddenly sunk into unrest that took a toll of more than 300 lives and caused destruction worth millions of dollars, besides erupting in a tensed geopolitical scenario within and outside the region. This has raised many questions which require a fair inquisition. However, out of five Central Asian states, Kazakhstan stands fairly ahead of the rest in terms of economic performance, democratic transition, and suitably fixing itself in the matrix of regional geopolitical and geostrategic calculus. Yet, the changing political dynamics in Kazakhstan from the first transition of power from Nursultan Nazarbayev to Kassym-Jomart Tokayev in 2019 and the entire course of developments following that transition to the people's protest in January 2022 shows the vestiges of a deeper malaise. In this specific context, this paper attempts to enquire into the undercurrents that caused recent instability and chaos in Kazakhstan and gaze out the prospective scenario considering internal and external factors.

## *Festering Instability in Central Asia*

Recently the two former Soviet fractions, Russia and Ukraine are fighting a war on the issues including conflicting strategic-security concerns. The escalated tension due to Russia's military attack on Ukraine has heavily disturbed the Eurasian region. This tension is a mix of multiple factors: Russia does not want to see Ukraine drifting closer to the Western alliance and upset its 'strategic zone of balance'. On the other, Ukraine's desperation of fixing its persistent conflict with Russia that was exacerbated after the annexation of Crimea in 2014



has brought it closer to the US and NATO.<sup>1</sup> NATO's pitch for its membership to Ukraine is perceived by Russia as a credible threat to its national interest. For instance, declaring war in February 2022, Putin accused NATO of threatening Russia's "historic future as a nation".<sup>2</sup> According to Robert Hunter, "the current crisis over Ukraine has deep roots and, of course, is not limited to Ukraine. ...Putin has selected Ukraine, on account of its strategic location in Central Europe, to be the leading edge of an attempt to reconstitute the Soviet Union or at least to establish a new sphere of influence in Russia's near abroad."<sup>3</sup> Russia's military onslaught, nevertheless, is "the largest military offensive in Europe since the Second World War [and], a prima facie breach of the prohibition on the use of force, as enshrined in Article 2(4) UN Charter and customary international law."<sup>4</sup>

This recent development apart, the disintegrated Soviet states in the Eurasian region have undergone recurrent turbulence during the last three years. Apart from the 2019 protest and 2020-21 political crises in Georgia and the largest anti-government protest in Belarus in 2020-21, the Central Asian states have also undergone frequent mass upsurges and unrest for multiple reasons. In 2019 and 2020, Uzbekistan witnessed a series of unrests over economic, social, and political issues. In 2020, Kyrgyzstan experienced a revolution over fraudulent political affairs. In 2021, Tajikistan's Gorno-Badakhshan region saw huge unrest on the issue of the region's political fate. Moreover, the beginning of 2022 saw Kazakhstan descending into violent unrest, which is the latest in a series of disturbances in the region. The recent years' disturbances in the Central Asian states can be construed in two ways: **Firstly**, the power transitions in the states of the region have yet to accommodate the political aspiration by bringing in the appropriate political structure comprehensively designed to represent fully the multi ethnic and multicultural social order giving due consideration to their

1 Fiona Hill, "Russia's Assault on Ukraine and the International Order: Assessing and Bolstering the Western Response", Brookings, February 2, 2022.

2 Paul Kirby, "Russia and Ukraine Conflict Explained" *BBC News*, February 24, 2022.

3 Robert Hunter, "The Ukraine Crisis: Why and What Now?", *Survival*, 64:1, 2022, p. 7.

4 James A. Green, Christian Henderson & Tom Ruys, "Russia's attack on Ukraine and the *jus ad bellum*", *Journal on the Use of Force and International Law*, 8:2, 2021, Published Online, March 25, 2022.

developmental concerns in a just manner.<sup>5</sup> This is no denying the fact that the transition had been borne in the way the regime designed it. Obstructions are many, but one of the most manifest reasons seems to be what Assel Tutumlu wrote, quoting Ian Scoones: “Regimes in Central Asia are not only engaged in setting up kleptocratic personalist hierarchies in and through the neoliberal international order but also use analogous tools to acquire power and legitimacy through the populist slogans.”<sup>6</sup> **Secondly**, the post-Soviet complex geopolitical scenario has its influence on the socio-economic and political dynamics of these states. The great power rivalries prominently occupying the strategic space and capturing the resource-rich market of the Central Asian states have often fuelled the convoluted disturbances. S. Enders Wimbush has appropriately contextualised the Central Asian dynamics as:

The competitive context in Central Asia is formed primarily by two larger dynamics that sometimes overlap, intersect, converge, or collide. The first dynamic is created by outsiders. Central Asia is a caldron of large actors..... Russia’s strategic interests in the region continue; indeed, they have intensified as the presence of other actors has become more pronounced. The second dynamic is created by insiders. Central Asia today is a dynamic mix of local actors redefining themselves along both vertical and horizontal strategic axes.<sup>7</sup>

However, the perceptible scenario in the ‘New Great Game’ as Paolo Pizzolo & Andrea Carteny argue, following the theoretical model of Power Transition Theory (PTT) that it has embraced the obvious shift in the relationship between Russia and China from an expedient Sino-Russian partnership, warranted by the shared concern of the US-led western domination in the wake of the war against terror at the doorstep of Central Asia to a veiled opposition, especially after “China inaugurated the Belt and Road Initiative

5 See: M.Y. Omelicheva, *Democracy in Central Asia: Competing Perspectives and Alternative Strategies* (Lexington, KY, University Press of Kentucky, 2015). Also, S. Abashin, “Nations and Post-Colonialism in Central Asia: Twenty Years Later”, in S. Hohmann, C. Muradian, S. Serrano, S. & J. Thorez (eds.) *Development in Central Asia and the Caucasus: Migration, Democratisation and Inequality in Post-Soviet Era* (London: I.B. Tauris, 2014).

6 Assel Tutumlu, “Central Asia: from dark matter to a dark curtain?,” *Central Asian Survey*, 40:4, 2021, p.

7 S. E. Wimbush, “Great games in central Asia,” In Ashley Tellis, Tavis Tanner, & Jessica Keogh (Eds.), *Strategic Asia 2011–12: Asia Responds to its rising powers*, Seattle and Washington, D.C: National Bureau of Asian research, 2012, pp. 259– 82.

(BRI) and linked it to Kazakhstan's Bright Path strategy and Uzbekistan's New Strategy of Development."<sup>8</sup> Above all, the fear that "Moscow has military beachheads in Central Asia and is always looking to exploit crises and societal fissures for its geopolitical gain"<sup>9</sup> cannot be disproved altogether.

### *Kazakhstan's Descent into Chaos*

**K**azakhstan, a relatively region's stable polity, the largest economy with an abundance of natural resources, geostrategically located at the intersecting axes of two great powers, Russia and China, has descended into chaos in the first week of January 2022 due to large-scale peoples' uprising. The turmoil is believed to be "the largest and the bloodiest after independence in 1991"<sup>10</sup> and of far-reaching political consequences. This was triggered due to an abrupt fuel price rise but ended up leaving behind significant and sweeping political changes in the country. The chaos began on New Year's Day in the southwestern city of Zhanaozen and spread across the country turning into a violent conflict. The issue started with the government's removal of the price cap on liquefied petroleum gas (LPG), leading to its price rise which sparked protests and demonstrations nationwide. But the focus shifted swiftly from LPG price rise to deteriorating socio-economic conditions and a frail political system, before "morphing into scenes of violence."<sup>11</sup> Zhanaozen, the epicenter of the unrest, saw more than 50 thousand strong protestors joining the battle without any definite leadership.<sup>12</sup> Maksat Ibagarov, head of the local

8 Paolo Pizzolo & Andrea Carteny, "The New Great Game in Central Asia: From a Sino-Russian Axis of Convenience to Chinese Primacy?", *The International Spectator*, Taylor & Francis Online, Published online on January 10, 2022, DOI: 10.1080/03932729.2021.2007611.

9 Andrew D'Anieri, "How the Central Asian States Can Protect Themselves From Russia", *The Diplomat*, January 24, 2022.

10 Dan Bilefsky, "Revolt in Kazakhstan: What's Happening, and Why It Matters", *The New York Times*, January 5, 2022.

11 Annette Bohr, "What Chance for Genuine Change in Kazakhstan", Chatham House, February 7, 2022.

12 Agnieszka Pikulicka-Wilczewska, "Do Kazakhstan's Protests Signal an End to the Nazarbayev Era? *Aljazeera*, January 11, 2022. To note that the head of criminal prosecution at the prosecutor's office claimed that it was strange to observe that more than 50 thousand odd people were led by none.

government of the region, attempted to convince the protesters but failed. Within a matter of days, the unrest spilled over to other regions of Kazakhstan. They spread all across major commercial cities from Nur-Sultan, Almaty to Aktobe. The protesters were not supported either by any ideological group, political party, or union, but they indeed constituted certain clusters of the society. In Zhanaozen, Aktau, and Aktobe mostly they were oil workers; in Karaganda coal workers; in Zhezkazgan they were drawn from copper smelters; while mostly civil society activists were involved in the country's financial centre Almaty.<sup>13</sup> In Almaty, thousands of protesters were involved in riots and arson. They set government buildings on fire, seized the city centre, and controlled the international airport. Private properties were also vandalised and robbed. "Whether this was a democratic uprising, a Colour Revolution, or an Arab Spring type of protest"<sup>14</sup>, analysts are struggling to conclude.

As a result of this unrest, a two-week state of emergency was declared on 5 January 2022 by President Tokayev in Almaty and the western Mangistau province and ordered security forces to "open fire with lethal force" levelling them as the "bandits and terrorists".<sup>15</sup> Tokayev called the protests a "coup attempt" supported by "foreign-trained Islamist radicals".<sup>16</sup> Moreover, the intensity of protest gradually increased and the law and order situation sharply fell. Tokayev consequently sought help from the Collective Security Treaty Organization (CSTO), of which Kazakhstan is a member. In response, the CSTO deployed around 4,000 troops. The entire incident witnessed the arrests of more than 10,000 civilians and hundreds of deaths. Before the order was established in the second week of January, as Serik Shalabayev, the head of the criminal prosecution at the prosecutor's office, said, during the state of emergency, a few hundred bodies of people were delivered to morgues, of which 19 were law enforcement officers and military personnel.<sup>17</sup>

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13 P. Stobdan, "Turmoil in Kazakhstan" *DPG Policy Brief*, January 17, 2022.

14 Ibid.

15 Shaun Wailker, Kazakhstan President Says He Gave Order to Open Fire with Lethal Force, *The Guardian*, January 7, 2022.

16 BBC News, "Kazakhstan Unrest was Coup Attempt, says President", January 10, 2022.

17 *The Guardian*, "Kazakhstan Authorities Raise Death toll from Unrest to 225", January 16, 2022.

## *Is the Unrest a Complex Interplay of Economy and Politics?*

The turmoil was not just a protest over the price rise of LPG, but it was more than that. Although the crisis erupted over an economic issue, it soon captured political and social issues and converted into a mass protest leading to riots and arson. However, the tipping point of the whole episode was the government's withdrawal of price controls on LPG in its successive de-subsidising move since 2019, which allowed the market to dictate prices. This resulted in a price rise from 60 tenges (\$0.14) to 120 tenges (\$0.28) per litre.<sup>18</sup> What is commonly believed turned out to be true that "fiddling with fuel prices was always bound to inspire rage."<sup>19</sup>

Moreover, the people involved in protests and turmoil underwent simmering discontent against the rising prices of commodities, shrinking opportunities for employment, widening economic inequality, narrowing space for political participation in the nation's crucial political decisions, and entrenched corruption at all levels of society. The protest started in the western Mangystau region—the region rich in petroleum resources but poor in living standards as compared to the big cities like Nur-Sultan, Almaty, and Shymkent. Poor infrastructure, below standard public amenities, and difficulty in having food availability due to remote access generally raise its cost even as compared to richer urban centres. However, the Mangystau region has been susceptible to recurrent upheavals. In 2011, there was unrest staged by oil workers that ran for more than six months and took a toll on more than a dozen people's lives. Since then, the Zhanaozen region has been sensitive for both the Kazakhstani government and the society at large.<sup>19</sup>

The involved but disgruntled masses had their long-held grievances—an interplay of politics and economy: "riddled by corruption, lack of political choice and civil freedoms where ordinary people often struggle to make ends meet while the elite lead luxurious lives."<sup>20</sup> For the last few years, the dissension among common people against the rise of crony-capitalist trends, capturing the economic power by a handful of elites has been on the rise. According to a report

18 Almaz Kumenov and Joanna Lillis, "Kazakhstan Explainer: Why Did Fuel Prices Spike, Bringing Protesters Out Onto The Streets?" *Eurasianet*, January 4, 2022.

19 *Ibid.*

20 Agnieszka Pikulicka-Wilczewska, "What is Behind the Protests Rocking Kazakhstan", *Aljazeera*, January 5, 2022.

by an international agency, “more than half of the nation’s wealth is held by 162 rich Kazakh”.<sup>21</sup> The lack of economic opportunity and poor functioning of the social safety net has added intensity to the growing restlessness. The young ethnic Kazakh who lived in rural areas and moved towards urban areas or big cities like Almaty or Nur-Sultan in search of jobs more often faced tough economic challenges such as income inequality, unremitting employment conditions, and poor living standards.<sup>22</sup> The pandemic has added further woe to the flagging economy. Besides financial problems, the pandemic has set off other issues such as low salaries, late paychecks, poor working conditions, and exacerbated corruption leading to the social, political, and economic discontentment amongst the people of Kazakhstan.<sup>23</sup> Further, due to the pandemic, “the growth rates were estimated to stay as low as 2.5% in 2021 and 3.5% in 2022 while inflation rocketed above 7%.”<sup>24</sup> The World Bank experts have observed that poverty and inequality have increased due to the protracted pandemic. Shrinking of growth not only led to erasing of per capita income gains but caused a reversal in plans to reduce poverty levels. According to Amelie Schurich-Rey, an analyst, “as many as 26% of women and 22% of men reported job losses”.<sup>25</sup>

This entrenched economic inequality has its political facets. President Tokayev in his address to the parliament, blamed Nazarbayev and oligarchs allied with him for entrenched inequality and bad economic conditions of the nation.<sup>26</sup> Nazarbayev ruled the country for 30 years before stepping down in the 2019 power transition and he had an overweening influence over the critical functions of the government. Tokayev himself was his ‘hand-picked’ and some of the key positions in political and economic spheres were occupied by Nazrbaev’s aide. Tokayev vociferously alleged that “the economy was dominated

21 KPMG, “Private Equity Market in Kazakhstan”, KPMG in Kazakhstan and Central Asia, May 2019, p. 23. URL: <https://assets.kpmg/content/dam/kpmg/kz/pdf/2019/09/KPMG-Private-Equity-Market-in-Kazakhstan-ENG-2019.pdf>

22 Agnieszka Pikulicka-Wilczewska, “What is Behind the Protests Rocking Kazakhstan”, *Aljazeera*, January 5, 2022.

23 Paul Stronski, “Kazakhstan’s Unprecedented Crisis”, Carnegie Endowment for International Peace, January 6, 2022.

24 Zaki Shaikh, “Economic fallout of pandemic stirs unrest in Kazakhstan”, *Anadolu Agency*, January 6, 2022.

25 Quoted by Zaki Shaikh, “Economic fallout of pandemic stirs unrest in Kazakhstan”.

26 Annette Bohr, “What Chance for Genuine Change in Kazakhstan”, Chatham House, February 7, 2022.



by a few wealthy oligarchs while millions of ordinary Kazakhs struggle to make ends meet.”<sup>27</sup> He added, “it is thanks to the first president...that a group of very profitable companies and a layer of rich people even by international standards has appeared.”<sup>28</sup> It is no denying the fact that the nephew of Nazarbaev, Samat Abish was second-in-command at the National Security committee. Timur Kulibayev, the son-in-law, served as chairman of the Central Asian nation’s main business lobby group. Kulibayev, together with his wife, owns Kazakhstan’s biggest bank, Halyk. Dimash Dosanov, another son-in-law, the husband of Aliya Nazarbayeva served as chairman, KazTransOil. Kairat Sharipbayev is believed to be the husband of Dariga, the oldest daughter, was chairman of QazaqGaz (formerly KazTranGaz). People’s frustration was evidently visible against the political elites who seemed to be busy making a shining fortune at the cost of people’s plight. There was an extensive public annoyance against the existing political system. The most pronounced slogan that reverberated throughout the protest ground was “Shal, ket!” – “Old man, get-go!”<sup>29</sup> This was most likely used for Nazarbaev. Nazarbaev’s monument was pulled down in the town of Taldykorgan. However, protesters carried banners in Almaty which wrote, “we are not terrorists, we are ordinary Kazakhs.”<sup>30</sup> All these led to sweeping changes in the political corridor. Nazarbayev was “removed” from his role as chair of the National Security Council. Prime Minister Askar Mamin resigned and consequently, Alikhan Smailov, previously First Deputy Prime Minister, has been chosen as the Acting Prime Minister. Later his key ally Karim Massimov, internal security chief, was arrested on the charge of treason, and his nephew Samat Abish, the deputy head of the National Security Council, was also fired. Murat Bektanov and Daryn Tuyakov were relieved from their duties as the Defense Minister and Deputy Minister respectively.

Apart from these reasons, conspiracy theories abound. Among them, the dominant was the theory of attempted coup. In fact, “the removal and arrest

27 Nastassia Astrasheuskaya, “Kazakhstan Leader Vows to Tackle Inequality behind Protests”, *Financial Times*, January 12, 2022.

28 *Ibid.*

29 Agnieszka Pikulicka-Wilczewska, “What is Behind the Protests Rocking Kazakhstan”, *Aljazeera*, January 5, 2022.

30 *The Times*, “Kazakhstan Protests: We Stood there with Flags and Banners. Then they Began Shooting”, January 2, 2022, URL: <https://www.thetimes.co.uk/article/kazakhstan-protests-we-stood-there-with-flags-and-banners-then-they-began-shooting-scnrznkrk>.

of Masimov on charges of treason point to the possibility that there was an attempted coup d'état against President Tokayev by Nazarbayev's clan."<sup>31</sup> It is believed that "Nazarbayev's family had left Kazakhstan, and he has not been seen in public since the end of December 2021."<sup>32</sup> However, this report was denied by Nazarbayev's close aide Aidos Ukibai, his press secretary. Moreover, taking control of the Kazakh Committee for National Security (KNB) building, the presidential palace, and the airport in Almaty without much resistance from the state apparatus deepens the doubt over the accountable offices, especially KNB and its head. "To many Kazakhs, it was clear who was behind these actions. Tokayev himself hinted at this when he accused the KNB of ignoring a "critical threat" and allowing their offices to be attacked without putting up a fight."<sup>33</sup> Tokayev told the CSTO: "Under the guise of spontaneous protests, a wave of unrest broke out.....It became clear that the main goal was to undermine the constitutional order and seize power. We are talking about an attempted coup d'état,"<sup>34</sup> Robin Forestier-Walker, an expert on Central Asia, observed that "perhaps [the unrest] was more an internal affair and an elite power struggle for control of Kazakhstan."<sup>35</sup>

### ***Probing External Factors: Regional Geopolitics and Kazakhstan's Stand***

The world cannot remain immune to the development of Kazakhstan. The "bloody protest" put strains on the regional powers such as Russia, China, and the extra-regional power the US and the EU, and they all seemed worried about their future stakes in the region. This incident allowed Russia to author again a script for itself as a security provider to the Central Asian region as "Kazakhstan has again come into Russia's orbit and the power vacuum which was created earlier in this region now can be filled by Russia again."<sup>36</sup> Russia-

31 P. Stobdan, "Turmoil in Kazakhstan" *DPG Policy Brief*, January 17, 2022.

32 *Ibid.*

33 Arkady Dubnov, "Kajakhstan: A Coup, a Counter-Coup and a Russian Victory", *Aljazeera*, January 16, 2022. URL: <https://www.aljazeera.com/opinions/2022/1/16/a-coup-a-counter-coup-and-a-russian-victory-in-kazakhstan>

34 *Aljazeera*, "Kazakh Leader Declares 'Coup d'état' over as Putin Claims Victory", January 10, 2022.

35 *Ibid.*

36 P. Stobdan, "Turmoil in Kazakhstan" *DPG Policy Brief*, January 17, 2022.

led Collective Security Treaty Organization (CSTO) intervened within days to quell the disturbance by deploying more than 4000 strong multinational forces drawing from Russia, Armenia, Belarus, Tajikistan, and Kyrgyzstan. The intervention took place after Tokayev's appeal and, for the first time, the security provisions under Article-4 of the CSTO were enforced.<sup>37</sup> Though, contrary to the analysts' apprehension that Russia's larger objective was to station its forces for a long time, the CSTO withdrew quickly after stabilising the situation; yet, leaving behind a strong message that Russia factors in Central Asia. Russia's step certainly makes China and the US circumspect as both major powers have economic and strategic interests entangled in the region.

Unquestionably, Russia has always been worried about its influence and strategic-security concerns in the breakaway regions of the erstwhile USSR. Russia's Ukraine attack strongly corroborates this thesis. To note, power equilibrium in the region including Kazakhstan after 9/11 was disturbed by the US presence in the name of fighting international terrorism. Russia's swift response and resolute support to President Tokayev's call for neutralising the instability revived its bonds. Undeniably, Russia's readiness to arrest unrest first and foremost can be seen in its calibration of maintaining a stable and peaceful Kazakhstan amidst the reality that the festering instability had crippled many of its ex-partners such as Armenia, Azerbaijan, Belarus, Kyrgyzstan, and Tajikistan; while other former Soviet states like Ukraine and Georgia have busted the relations with Russia.

Russia has some major interests, especially in the fields of defence, space, oil, and uranium mining in Kazakhstan. On the security front, however, the matter of worry for Russia remains its 7,600-km long porous border which the two states share. The porous border is susceptible to infiltration. This is a serious vulnerability considering the likelihood of spill-over of radical Islam and narcotics from the Af-Pak region. President Tokayev's assertion that "the protesters were terrorists drawn from the ranks operating in the Middle East, Afghanistan, and the IS"<sup>38</sup> intensified the Russian concerns. Another important factor is that the Northern Province of Kazakhstan is home to 3.5 million ethnic Russians, which are in the majority in that area and share their strong bond with Russia.

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37 Rounak Bagchi, "Explained: What is CSTO, the Organisation helping Kazakhstan President Deal with Protestors", *The Indian Express*, January 8, 2022.

38 *Eurasianet*, "Kazakhstan: Dozens Killed as Government unleashes Military Crackdown", January 6, 2022.

China's strong presence in the region in the field of energy and infrastructure development has diluted its dependence on Russia. In this whole incident what has been observed is that China adopted the policy of wait and watch. It is because of Beijing's long-standing policy of non-interference, as well as the belief that "a solid economic presence will automatically lead to a favorable image and increased voice in local politics." China maintains limited political interference and in the aftermath of this unrest, it has patiently reacted.<sup>39</sup> On the contrary, the unprecedented crisis in Kazakhstan has brought Russia and China closer but increased the political rivalry with the West. As Zhang Xiao, China's ambassador to Kazakhstan pointed out that "China planned to enhance law enforcement and security cooperation with Kazakhstan and its neighbors in order to oppose 'external interference', whether it be Islamic extremism or 'colour revolutions' plotted by the West."<sup>40</sup> He stated further that "the violence in Kazakhstan was evidence that more needs to be done in the fight against the 'three evils' of terrorism, separatism, and religious extremism, and at the same time offering to increase SCO involvement in the region."<sup>41</sup> How China and Russia observe the crisis and re-position their stands "reflects shifting views within the Kremlin toward Beijing and about Russian foreign policy as a whole.... Russia no longer views the engagement of other powers in its backyard as the zero-sum game that it did 10 or more years ago."<sup>42</sup> Even in Russia's ongoing war against Ukraine, China seems to stand with Russia to ensure unity against the West. In the future, there may be some sort of frictions or geopolitical competition between the two but both the countries shared a similar intention and scheme *vis-à-vis* Kazakh turmoil.

In this whole episode, the US closely followed the situation. The presence of Russian troops has brought criticism from the US Secretary of State Anthony Blinken, who said "one lesson of recent history is that once Russians are

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39 Igor Denisov, "After Kazakhstan Crisis, China Will Reassess its Influence in Central Asia", *The Diplomat*, January 18, 2022; URL: <https://thediplomat.com/2022/01/after-kazakhstan-crisis-china-will-reassess-its-influence-in-central-asia/>.

40 Reid Standish, "Crisis in Kazakhstan Pushes China, Russia Closer Together", Radio Free Europe Radio Liberty (RFERL), January 2022, URL: <https://www.rferl.org/a/kazakhstan-crisis-russia-china/31659765.html>.

41 *Ibid.*

42 *Ibid.*

in your house, it's sometimes very difficult to get them to leave.”<sup>43</sup> Russia's foreign ministry called Blinken's remarks offensive and responded with sharp words: “When Americans are in your house, it can be difficult to stay alive and not be robbed or raped.”<sup>44</sup> Russia sniffed the US-led west hands in the disturbance. Though, the US has denied any role in the unrest and also denied the allegations imposed by Russia on it to destabilise the region by invoking “colour revolution” type of episode in the name of democracy and human rights.<sup>45</sup> After the US-led war on terror in September 2001, the US gradually rose to a new rapprochement in the Central Asian region but as far as Kazakhstan is concerned, its significant investments in the energy sector brought the two countries much closer. The US and Kazakhstan share a strategic relationship as Kazakhstan is part of NATO's ‘Partnership for Peace initiative’ and it hosts an annual military peacekeeping exercise, ‘Ex Steppe Eagle’.<sup>46</sup> No doubt, Kazakhstan's development has generated a debate over the diminishing role of the western countries especially the EU and the US. Russia-led CSTO operation establishes that it is irreplaceable with either West including the USA or any other great power—newly anchored in the region—like China and in return Central Asian republics repose faith and allegiances in the same degree towards Moscow to get Russian support for any tension within or outside their territory.

Another side of the developments needs to be further inquired about. It may also be observed that the promptness with which Moscow responded to Tokayev's call was in some way an opportunity of shunting Nazarbayev—a leader who has had a background of having independent dealing with the Kremlin. Nazarbayev was not largely considered to be “Putin's yes-man”. The ‘multi-vector foreign policy’ pioneered by him accorded weight almost equally to the regional and the extra-regional powers such as Russia, China, the US, the EU, and even

43 *BBC News*, “Kazakhstan Unrest: Blinken Questions Russian Troop Deployment”, January 8, 2022.

44 *Reuters*, “Russia Reacts Furiously to Blinken Jibe over Troops in Kazakhstan”, January 8, 2022. URL: <https://www.reuters.com/world/russia-reacts-furiously-blinken-jibe-over-troops-kazakhstan-2022-01-08/>.

45 Tom O'Connor, “With Ukraine Tensions High, Russia Blames U.S. Armed ‘Interferences’ for Kazakhstan Crisis”, *Newsweek*, January 7, 2022, URL: <https://www.newsweek.com/ukraine-tensions-high-russia-blames-us-military-actions-kazakhstan-crisis-1666983>.

46 Deepak Kumar, “The Kazakh Unrest”, *IDSA Comment*, January 12, 2022, Manohar Parrikar IDSA; URL: <https://www.idsa.in/idsacomments/the-kazakh-unrest-kdeepak-120122>.

NATO. Nazarbayev, “being the ideological architect of the Eurasian Economic Union (EAEU), attempted to offset Russia’s enormous economic influence by different balancing measures within and outside the EAEU”.<sup>47</sup> His exit from key positions of Kazakh power and in his place Tokayev’s growing sway and all-out support from Moscow can reinforce Russia’s strategic concerns. Therefore, “supporting Tokayev was a natural decision for the Kremlin. .... Considering the situation unfolding in Kazakhstan, perhaps the CSTO acted just in time to prevent alternative leaders from emerging and thus kept Kazakhstanis marching around Tokayev.”<sup>48</sup>

The receding footprint of western countries in the region, as well as NATO’s withdrawal from Afghanistan, led to their further loss of influence. Several other powers, including Turkey, Saudi Arabia, Iran, Pakistan, India, Korea, and Japan have sought to develop some influence in the region. They all bring some unique advantages, but none of them has been able to transcend their limitations.<sup>49</sup> Nonetheless, Kazakh unrest has brought a new political scenario for both sides (Moscow and Washington). C. Rajamohan observes, “The West can continue to challenge Moscow’s efforts to reclaim regional primacy, but it is not in a position to secure Russia’s Eurasian periphery against the Kremlin and this would certainly improve Moscow’s chances of leading a new Eurasian geopolitical order.”<sup>50</sup> Moreover, Aliya Askar has argued that “seeing war in Ukraine, one can even suggest that Kazakhstan’s January events were a perfect opportunity to showcase the “goodwill and fairness” of Russia, ahead of the February invasion of Ukraine.”<sup>51</sup>

## Conclusion

Kazakhstan’s January 2022 unrest and its successful termination leave behind some fascinating analyses. There have been pointers towards

47 Sanshiro Hosaka, “Moscow-Backed Tokayev’s Coup Against Nazarbayev?,” International Centre for Defence and Security, Estonia, URL: <https://icds.ee/en/moscow-backed-tokayevs-coup-against-nazarbayev/>

48 Aliya Askar, “Kazakh-Russian Relations in the Context of the War in Ukraine,” *The Diplomat*, March 7, 2022.

49 C. Rajamohan, “Understanding Eurasian Turmoil,” *The Indian Express*, January 12, 2022.

50 *Ibid.*

51 Aliya Askar, “Kazakh-Russian Relations in the Context of the War in Ukraine,” *The Diplomat*, March 7, 2022.



internal instigation—a clash between political elites. This was substantiated by the president Tokayev's statement that the unrest was an attempt of *coup d'état* against his regime by an influential political power centre of the country, directing toward the former president and his aides. The turmoil, however, broke due to the rapid developments followed by the LPG price hike but festered across the country turning up into violent strifes. There has been a unipolar-political-power-arrangement in Kazakhstan until Tokayev became 2<sup>nd</sup> president in 2019, giving rise to a bipolar one. Tokayev remained constrained throughout his journey of over two years as most of the critical power centres were occupied by the Nazarbayev's confidante and his family members who perhaps contrived to replace Tokayev at an opportune moment. The gathering storm of protest which converted into an outsized upheaval provided this opportunity. Therefore, the theory of the elite-turf-war arousing the flame of unrest could not be thrust aside.

The three-decade rule of former president Nazarbayev is seen as mixed baggage of success and failure. The modernised economy and diversified foreign policy branded as multi-vector policy externally, fail to complement the quest for democratic transition internally. Therefore, openness and transparency in the system of governance, accountability of power centres, and just political order proved to be a chimaera. People were disgruntled due to long-standing politico-economic issues and they felt all these took place owing to carefully drawn out elite planning of aggrandising self-interest at the cost of their interests. Speedy action to suppress the unrest by the incumbent president Tokayev and his promptness of opening the avenues for economic reforms immediately controlling the situation and hammering out sweeping changes in the key positions of the country indicate that the current regime did not leave any scope for being exploited politically.

The era of Elbasy is over, and the stain of the controlled regime (by a powerful elite complex) is being worn down. Nonetheless, it is too early to establish that Kazakhstan has entered a new phase. Moreover, extra-regional powers' interests in Kazakhstan have been a critical factor in the country's political affairs. Russia's endemic concern of maintaining its influence in Central Asia to guard its vital interests serves both ways. Kazakhstan sought swift intervention by Russia-led Central Asia's security apparatus for quelling the unrest and successfully stabilising the situation which sets a pitch of trustworthiness between the two countries. Amidst fear of Russia's aggressive posture that is established with the Ukraine war, the West sees its interests undermined. Such tumultuous upheavals

and conflictual geopolitical dynamics in the region give rise to a fear of the return of the great game in Central Asia.

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# Social Media and Digital Marketing of Women Entrepreneurs in NCR

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**ABSTRACT:** In the present Era, Digital marketing and Social media has become an important tool to spread awareness, promotion of products & services and to connect the customers and to stimulate new business. This platform is creating opportunities to the existing as well as upcoming business venture. Social media is the way to connect the customers directly by identifying their needs and it also helps in customizing the product & services as per the requirement of customers. It is cheapest way of communication regarding the promotion of product and services. There are many types of social media platforms which serves as a podium to prospective entrepreneurs to set up their business and job creation and skill development.

Whether women working or homemaker are all contributor in the development of social system. Social media is playing an important role in change of the women's personality, carriage abs their passion. There are many women entrepreneur who belongs to the small cities but building big businesses and living their dreams. There are many examples like Ms Akansha founder of Celebrity Club in 2017 with less amount to invest, Kids Clothing brand listed on "Meesho" and other E-commerce platforms. She had turnover of Rs 5 crore in 2018 itself. She is also connected through WhatsApp and Instagram which helps her reaching to the customers directly and getting feedback immediately.

According to the sixth economic census, Ministry of Statistics and Program Implementation, women comprise around 14% of the total number of entrepreneurs based in India. As per World Bank Report 2018, India has been ranked on 120th position among 131 countries in terms of female labour force participation. The Indian government has announced many schemes for women owned businesses like Bhartiya Mahila Bank Commercial Loan Scheme, Dena Shakti Scheme, Udyogini Scheme, Mahila Udyam Nidhi Scheme and Stree Shakti Scheme.

With the assistance of social media, the business has no geographical boundaries for costumers. The target of this paper is to spot the adherence and dependency of women entrepreneurs on the social media platform through Primary knowledge assortment. This paper focuses on how social media is used sagely to empower ladies during a conservative culture like India.

**KEYWORDS:** Social Media, Digital Marketing, Women, NCR, Entrepreneurs

## 1. INTRODUCTION

In earlier period women were deprived from doing work outside. But with the increase in the urge of independency and sometimes due to some other factors, they are coming out of the house to work outside. Sometimes they start the business with full enthusiasm

but due to family factors, they had to discontinue the business.

During this current period, it has been observed that women are more oriented towards social media to earn as well as get recognition in the society. They are using this platform for the Digital marketing also which has changed the methods of establishment of their business,

doing promotion of the business Product, and promotion of new schemes. Digital marketing provides the information to the prospective customers. Digital marketing consists of both online and offline promotion strategies. It consists of Canvas, Google Analytics, Google Ads, Mail Chimp, Trello, Slack, Yoast SEO, Survey, Ahrefs, Semrush. These tools help in reaching the target customer and make the visual content which helps the business to attract the attention of the customers. Social media is one of the component of digital marketing.

Digital marketing provides the opportunity for the customers to get customized marketing channels as per their budget, target customer, to make customers aware about their brand and to add up the value in sale. Digital marketers keep changing the channels of advertisement as per the brand requirement. Digital Marketing provides attractive pamphlets and templates and audio-visual content. In this lead, Social media is considered fast and cheap mode of advertisement of the product.

In the present study, we focused only on social media. It has become a popular tool for mouth publicity which works very fast. Mostly businesses are using this tool to reach the customer globally. With help of social media, they can start their business with very less investment and can make it online advertise without spending more money. Now a day it has become a culture to promote the business online and to connect with their customers directly. It really gives them motivation to work upon their product in respect of quality as well as price. Customers are also getting regular updates regarding the launch of new products, drop in price of product or sale period without going anywhere. Social media is kind of window through which prospective customers can attract to the desired products and innovative products without roaming here and there. Through this platform, women entrepreneurs are engaging themselves in businesses as well as creating job opportunities for others also. This social media platform is giving the opportunity to them to do the business without considering any geographical boundaries. In this digital era, they are open to promote their products worldwide and getting orders.

With the help of digital marketing, they are creating innovative content to promote their products. Even through Facebook live, you tube live, Instagram and other live modes they are directly showcase their products to their idle customers and they can resolve the queries of their customers on the spot. This has totally changed the culture of doing business. They need only a device and active internet connection to connect with their customers. This is not only helping in connection of the Business to customer(B2C) but also connecting to the Business to Business(B2B) in case of wholesale and retail products. Even once videos are made, they get stored on that platform and desired customer can access those video for the products whenever they required.

## 2. SIGNIFICANCE OF THE STUDY

The purpose of the study is to find out those factors which motivates the women to have their own start-ups. As we know Digital marketing providing global exposure to new start-ups and gives a boost to business. It does not motivate gender biasness as it creates online unseen layer of the seller identity. As there is no opening and closing time for the business, it is 24\*7.

This study will help the Government to consider the importance of digital marketing concept should be introduced at school level itself.

The purpose of the study is to make Government and Non-Government agencies realize that how young women entrepreneurs are using social media as one of the tools of Digital Marketing to promote their business. More Digital marketing-oriented courses should be launched for women at free of cost or nominal charges

## 3. Objectives of the Study

- To find out the adoption level of digital marketing and social media among women entrepreneurs
- To study the factors which impact the awareness among women entrepreneurs regarding Digital marketing tools
- To examine the impact of digital marketing and social media on the business owned by women entrepreneur
- To study the impact of digital marketing and social media in Covid-19 pandemic period on the business owned by women entrepreneur

## 4. Hypothesis

Ho: There is no significant difference in the adoption level of digital marketing and social media among women entrepreneurs

Ho: There is no significant difference due to the factors which impact the awareness among women entrepreneurs regarding Digital Marketing tools

Ho: There is no significant difference in the impact of digital marketing and social media on the business owned by women entrepreneur

Ho: There is no significant difference in the impact of digital marketing and social media in Covid-19 pandemic period on the business owned by women entrepreneur

## 5. Review of literature

Anusuah (2018) Social Media has motivated women to start new business ventures with less amount as capital to invest. These social networking societies are playing very important role in the women empowerment in such Indian stereotype society. These are also encouraging civic participation among women in India.

During Covid-19, many entrepreneurs were facing financial challenges but social media provided a platform for the existing businesses to sustain as well as to set up new innovative business ventures. With the

help of social media instruments women entrepreneurs were able to connect their customers and aggressive brand promotion through facebook live, Instagram for pictures and whatsapp to get personally connect with the customers. (Rahayu, Ninik Sri 2021)

Social media has given platform to beat problems and challenges of women through blogs, chats, on-line campaign, on-line discussion forums and on-line communities which is generally not disseminated or propagated by thought media. (Kumari, Madhu 2020)

As a result of the development of social media as part of contemporary technological advancements, businesspeople are now able to conduct their operations successfully online. An increasing number of female business owners are transitioning their enterprises from the traditional brick and mortar business model to the online environment. (Queen Chioma Nworgu 2020).

Sometimes women pursue entrepreneurship because they want to start their own company or because they want to learn and grow their business knowledge and abilities. Alternatively, they may have wanted to start their own business in order to provide for their family by working at their own pace and for a consistent income, particularly during periods of unemployment or fear of unemployment. (Nworgu, Achinewhu-Nworgu & Natrajan, 2019)

Jonsson (2015), Through their network support, particularly online financial assistance, social media specifically helps companies function better. Nevertheless, several earlier studies have only briefly examined various forms of assistance or sources, regardless of how female entrepreneurs respond to and utilise social media in their regular company operations. Are doing This calls into question how well women company owners understand and utilise social media to assist their operations. Entrepreneurship is an initiative, innovation, and decision-making skills with respect to capital and responsibility (Cadaru & Badulescu, 2015).

According to Achinewhu-Nworgu (2014), more individuals have the chance to further their education, build successful careers for themselves, and enjoy family and personal life. These possibilities must be investigated and used in some way. However, there are difficulties associated with any possibility that is offered. The urge to run our own business can present both problems and rewards. It might be more difficult to start a business as a woman, especially if you're young and have no business expertise.

Online networking provides a real-time asset in terms of information, buyer requirements and market trends. These materials can be used by businesses to make changes and build unique focused on features for future products and promote messages. Businesses may assess if their brands are truly adapted to customers' needs and can figure out which features of their items make them stand out or exceptional in the buyer's view. Organizations can benefit from web-based social

networking and allow customers to participate in the creation of new brands (Cox, 2010).

Women who engage in entrepreneurial activities and take risks by creatively combining resources provide them the opportunity to take advantage of opportunities in their community by producing goods and services. (Mordi, C., Simpson, R., Singh, S., & Okafor, C. (2010).

Based on demographic characteristics (Lall, Madhurima, and SahaiShikha, 2008) established psychographic variables such as degree of commitment, entrepreneurial hurdles, and future growth plans. The study identified firm owner characteristics including self-perception, self-esteem, entrepreneurial enthusiasm, and operational difficulties as being important for future development and expansion ambitions. Despite the fact that the number of women opting to work in family companies has significantly increased, the poll indicated that they still have a lower status and face more operational difficulties. To begin with, businesses may gather an unlimited amount of feedback on their products and brands by monitoring customer internet chats, allowing them to spot trends endeavor to improve future brand performance (Madupu, 2006).

The customer's behavioural intents, perspective, perception of the system's utility and simplicity, and perceived usefulness of the structure all have an impact on how one uses an advancement system either indirectly or directly. According to the Technology Advancement Model, external influences should have an impact on intention and certifiable usage through mediated outcomes for perceived utility and ease of use (Venkatesh & Davis, 2000).

## 6. RESEARCH METHODOLOGY

In this study we focused on the women entrepreneurs in National Capital Region. For this study, a self-structured questionnaire was sent to sample size of 600 women who have established their business in NCR. The main objective of the study is to study the factor analysis of social media and Digital marketing which use by women entrepreneurs, to study the impact of digital and social media marketing on women entrepreneurs and to study the impact of digital and social media marketing in COVID-19 pandemic period. The study was administered to a sample of 553 women entrepreneurs because of non-response from the other women entrepreneurs. The convenient random sampling technique has been used by the researchers. The responses have been collected using a self-prepared questionnaire survey.

## 7. Results and Findings

The study was conducted on a sample size of 553 female entrepreneurs in NCR. Among the respondents 50.8% lies in the age group of below 25 years old and 29.3% belongs to the age group of 25-35-year-old and 14.5% falls between 35-45 years of age. When we study the



educational qualification 56.8% respondents are graduate while 22.1% are post-graduate. When we look into the marital status of the respondents, 61.3% are unmarried while 36.3% are married only. When we study source of initial capital for the establishment of the business, 40.3% invested from personal savings and 27.5% got it from spouse and family while 15.4% from financial institutions and 16.8% from others. When we study experience using social media for business, 34.7% respondents are using from more than 1 year but less than 3 years, 25.1% are using more than 3 but less than 5 years, 19.2% more than 5 years and 21% less than 1 year. For digital marketing, 41.2% women entrepreneurs are using Mobile phone only while 30.2% are using mobile phone and laptop both. When we study the region respondents belongs to, 72.8% belongs to Delhi, 13.3% Gurugram and 10.7% Noida and remaining to Faridabad. When we study Nature of business, it is found that 34.5% in Retail Business, 44.7% in Professional service and 20.8% Miscellaneous firm. When we study the year of establishment of business, 38.2% during 2010-2020 while 36.3% after 2020. It shows how women entrepreneur owned start-ups and small level scale businesses are growing up because social media and Digital marketing has given them a platform to connect with their customers even they can showcase their product live to their customers through Livestreaming.

**Table 7.1 Descriptive Statistics**

	N	Minimum	Maximum	Mean	Std. Deviation
Age(in Years)	553	1	4	1.75	.898
education	553	1	4	2.19	.762
Marital Status	553	1	4	1.67	.558
Annual Income	553	1	4	1.82	.937
Nature of Activity	553	1	3	1.86	.732
Year of Establishment	553	1	4	3.04	.911
Type of ownership	553	1	2	1.23	.419
ources of initial capital	553	1	4	2.09	1.106
Experience in social media	553	1	4	2.42	1.024
Intensity of usage	553	1	4	2.01	.690
Internal Motivational factors	553	1.00	5.00	3.3119	.88086
External Motivational Factors	553	1.00	5.00	3.2399	.96534
Impact of Covid-19	552	1.00	5.00	2.9565	.75338
Valid N (listwise)	552				

Table 7.1 represents the descriptive statistics for demographic variables (age, educational qualification, marital status, annual income, nature of activity, year of establishment of business, type of ownership & sources of initial capital) of the respondents. This table also represents the descriptive statistics of main characteristics variables (Intensity of usage of social media, Internal motivational factors, External motivational factors and impact of covid-19) used to measure the impact of these on adoption of social media and digital marketing by women entrepreneur to enhance and develop their business in NCR region. The mean value of variable is given in this table.

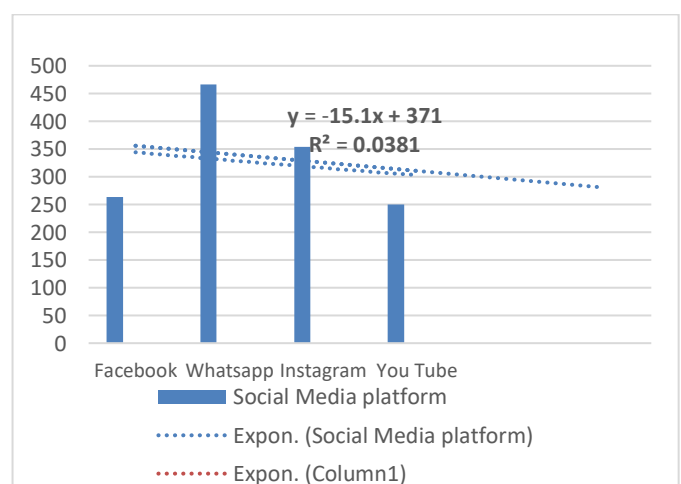
The success of any primary data based research depends on the reliability and validity of the instruments/variable scale used in the questionnaire to get the required response from the sample respondents, so in order to test the reliability of variable scales, used in the questionnaire, Cronbach's alpha statistics (Cronbach, 1971) is calculated and shown in the Table:7.2

**Table 7.2 Cronboach's Alpha**

Variable	Number of Items	Cronbach's Alpha
Internal Motivational Factors	17	0.950
External Motivational Factors	3	0.759
Covid-19 Factors	7	0.803

The values for Internal and External Motivational factors & Covid-19 factors are 0.950, 0.759 and 0.803 are more than 0.7 which is acceptable.

In order to study the impact of usage of social media applications and digital marketing, R<sup>2</sup> was calculated (Graph-1). But, in the study researcher have been find out very low significance of social media and digital marketing of women entrepreneurs. May be due to less awareness of women entrepreneurs and they don't know how to use of apps for the marketing purposes.

**Graph-7.1**

Impact of motivational factors on the adoption of social media and digital marketing by women entrepreneur



Year of establishment of business clearly depicts that the more motivation women entrepreneurs are getting through adoption of social media and digital marketing. For this purpose, motivational factors have been categorized into two categories i.e., Internal factors and External factors. The One-Way ANOVA test statistics conducted which compares the means of one or more groups based on one independent variable (or factor).

The most important assumption of One-Way ANOVA is that the variances amongst the groups must be similar. The table -7.3 shows the Levene's test of homogeneity of variances, which tests the hypothesis of similar variances. The Levene's test statistics is not significant since the p-value is less than 5% level of significance value of 0.05. Therefore, the assumption of homogeneity of variance is not met (except covid-19). So to further analyse equal variance assumption of one-way Anova, the robust tests of equality of means is reported in Table-7.5

		Levene Statistic	df1	df2	Sig.
Internal_MF	Mean	5.716	3	549	<.001
	Median	3.926	3	549	.009
	Median and with adjusted df	3.926	3	532	.009
	Trimmed mean	5.411	3	549	.001
External_MF	Mean	2.728	3	549	.043
	Median	2.297	3	549	.077
	Median and with adjusted df	2.297	3	544	.077
	Trimmed mean	2.649	3	549	.048
Covid_19	Mean	1.102	3	548	.348
	Median	.844	3	548	.470
	Median and with adjusted df	.844	3	544	.470
	Trimmed mean	1.085	3	548	.355

Table-7.4 represents the output of Anova analysis and whether there is a statistically difference between the group means. For Internal Motivational the significance level is <0.001(p-value=<.001) which is below 0.05. Therefore, there is a statistically difference in the mean internal motivational factors between women entrepreneurs with different year of establishment of business. Similarly, impact of covid-19 on the adoption of social media and digital marketing is statistically different between the two categories. But external motivational factor is not statistically different between the two categories. We can see that the significance value of the external factors (p-value=0.056) is higher than 0.05. Therefore, there is no statistically significant difference in the external motivational factors on growing number of business establishments.

		Sum of Squares	df	Mean Square	F	Sig.
Internal Motivational Factors	Between Groups	14.228	3	4.743	6.288	<.001
	Within Groups	414.079	549	.754		
	Total	428.306	552			
External Motivational Factors	Between Groups	7.038	3	2.346	2.539	.056
	Within Groups	507.357	549	.924		
	Total	514.395	552			
Covid_19	Between Groups	5.357	3	1.786	3.183	.024
	Within Groups	307.380	548	.561		
	Total	312.736	551			

As per discussion in previous paragraph, there is a violation of the assumption of homogeneity of variances while determining the effect of internal & external motivation factors and impact of Covid -19 on the growing number of establishment of the businesses. This can be determining whether there were significant differences between the groups by using Welch test (see Table-7.5). Like the ANOVA Test, the significance value(p-value) is less than than 0.05 (except external motivational factors, p-value=0.056) thus are statistically significant differences between groups.

		Statistic	df1	df2	Sig.
Internal Motivational Factors	Welch	5.753	3	147.830	<.001
external Motivational Factors	Welch	2.580	3	149.168	.056
Impact of Covid-19	Welch	2.954	3	148.008	.035

a. Asymptotically F distributed.

## 8. CONCLUSION

In this study, it was find out that internal motivational factors play very important role in the increasing number of business establishments by women entrepreneurs. While External motivational factors like-are government schemes helpful for getting funds, importance of government support in learning digital marketing strategies and role of government in conducting awareness programmes regarding government schemes, respondents found that these factors don't make any difference in the adoption level of social media and digital marketing.

The study reveals that the impact of Covid-19 on women owned business that it definitely leads to decline in the sale but for very short period of time and it gave them an opportunity to adopt social media and digital marketing

to give a boost to their business. It was found out that social media helped them to connect with their customers directly and get feedback immediately regarding their products and services. But again there is negative relationship between role of government in supporting of their business during Covid-19.

The study found that there are so many government schemes for women Entrepreneur but due to lack of awareness they are not able to avail them. Government is also considering the contribution made by women entrepreneurs in the socio-economic of the country. For this to encourage women entrepreneurs, NITI AAYOG launched 'Women Entrepreneurial and Innovation Cell', Mudra Micro loan scheme and mentorship to women entrepreneurs. But still there is lack of awareness regarding these schemes. In order to this, government should conduct awareness programmes regarding schemes in schools and educational institutes. So that upcoming women entrepreneur could be aware of these schemes and could be motivated to have their own start-ups.

Due to global reach and flexibility in digital marketing leads to women entrepreneur to manage their business entirely on internet. It is also known as cost effective strategy because there is no involvement of any middle agent and this leads to direct contact between buyer and seller as well as low cost of the product which motivates buyer to shop online. Through whatsapp, Instagram and facebook etc, customer can easily connect with seller and seller can get immediate feedback of the product. This leads to make business communication more easy. It provides fastest means of executing financial transactions under digital marketing. Customers can make online payments effortlessly.

## 9. LIMITATIONS OF THE STUDY

This study is limited to only Delhi & N.C.R i.e., Noida, Faridabad and Gurugram and Sample Size also limited. Digital Marketing has so many tools. But this study has mainly limited to the one of the digital marketing strategies i.e Social Media. In order to have a more comprehensive study with a greater impact, the study may be further expanded to the other Metropolitan cities around the nation.

## 10. SUGGESTIONS

- Government should provide a platform for women entrepreneurs who owned micro and small businesses can get expert assistance for digital marketing strategies. Even leadership qualities and other features to become an entrepreneur should be inculcated in the curriculum itself at the very beginning stage. All kinds of necessary information regarding how to start their own ventures should be made available on single portal
- Government should conduct awareness programmes on regular basis to make women entrepreneur regarding the existing schemes

especially available for them. So that they can make full utilization of those existing schemes.

- Government should provide the aid to the women entrepreneurs networking groups so that those groups can conduct networking sessions on regular basis. It will give opportunity to small business owned women entrepreneurs to connect with networking groups and can do business in the targeted groups.
- Government should recognize the women entrepreneurs work on regular basis, it will give motivation to the women to have their own start-ups and business.
- So that a greater number of women entrepreneurs may actively participate in entrepreneurial activities and become entrepreneurs, even entrance and exit primarily SME's should be loosened and made simple for women entrepreneurs.

In the present scenario, there is a need of adoption of digital marketing tools to boost comprehensive business since it may result in business across all religions, castes, geographical locations, genders, etc. This will definitely help in growing in the number of new ventures which is the ultimate purpose of our government to promote "Make In India".

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# A STUDY OF FACTORS AFFECTING INVESTMENT DECISION MAKING DURING COVID-19

## Abstract

*This study examines how pandemic COVID-19 affected individual investors' investment decisions. Investors' COVID-19 risk perception, risk propensity, stock market volatility anxiety and vaccine update information were studied. A systematic online questionnaire collected data from 400 Indian respondents of various ages, incomes, marital statuses, and occupations. The study period was November 2021 to March 2022. SPSS was used for cronbach alpha, factor analysis and multiple regression. Risk perception, vaccination updates, herding tendencies and fear affected investor investment decisions during COVID-19 pandemic/emergency situations, while risk propensity and investor anxiety due to stock market volatility did not affect investment decision in a similar way.*

## INTRODUCTION

To maximize wealth with little risk, an investor carefully examines investment quantity, market, and timing. This article explores an investor's post-COVID investing decision. Investors must understand numerous decision-making factors to avoid blunders. Investors select financial instruments and industries depending on risk and expected returns (Kahneman & Tversky, 1988; Rothschild, 1985; Linciano et al., 2012; Nasic & Weber, 2010). Investors evaluate risk (Keller & Siegrist, 2006). Kahneman (2003) discovered uncertainty influences investor decisions. Since COVID-19, share markets globally have been unpredictable, placing investors at greater risk (Ashraf, 2020). Global travel restrictions and monetary policies affected economic activity. Research shows psychological and technological factors affect investment decisions. Market fluctuations effect investor decisions (J. Shiller, 1991). Experts evaluate corporate financial statements, risks, and rewards to invest. Individual investors must evaluate investment sustainability using psychological factors (Moueed & Hunjra, 2020).



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Financial experts employ parametric and hunches (Riaaz & Hunjra, 2015). Thus, psychological factors and events like COVID-19 and SARS affect investors' decisions (Wang et al., 2013; Ali, 2020; Conlon & Mc Gee, 2020).

This study tries to discover behavioral traits that influenced individual investors' investment decisions during and after the COVID-19 epidemic. The epidemic has affected the daily life, business and the stock market (Sansa, 2020). This caused Nifty to vary by thousands in a short period, scaring low-risk investors. COVID-19 is the first natural disaster to affect every country on an individual, economic, and national level, causing share market instability. This study investigates post-pandemic investor psychology. Descriptive study used factor loading, Cronbach Alpha, descriptive analysis and multiple regression.



## Coping with Shrinkflation: A Comprehensive Analysis of Socio-Economic Factors Shaping Consumer Awareness in the National Capital Region

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### ABSTRACT

**Purpose:** The present study aims to explore consumer awareness on Shrinkflation in Education, Marital status, Income, and Employment status across Socio-Economic factors in online and offline shopping also assess familiarity with the Consumer Protection Act, 1986.

**Design/Methodology/Approach:** A quantitative study employed a self-structured questionnaire within the NCR, utilizing Convenient Random Sampling. For statistical data analysis with a sample size of 1368 responses, Chi-Square and Spearman's correlation coefficient were used.

**Findings:** Initially, consumer age exhibited no notable impact on product awareness, but the Consumer Protection Act awareness rejected this. Gender played a role, with females surpassing males in awareness levels. Education significantly influenced awareness. Marital status of consumer had no impact except for unmarried females having higher product awareness. Employment status varied in influencing awareness levels. It was observed that young educated consumers and those with less annual income are more aware and have concern towards change in the quantity of the product with no change in price of the product. This study emphasizes the intricate relationship between socio-economic factors and consumer awareness, urging consideration of diverse variables.

**Originality/Value:** The study urged marketers and public policymakers in India to pay more attention to the customers' opinions and perspectives. Producers justified Shrinkflation due to rising costs. Consumer awareness prevents brand loyalty, prompting companies to maintain prices despite product downsizing.

**Paper Type:** Empirical Research Paper

**KEYWORDS:** Downsizing | Shrinkflation | Consumer Awareness | Consumer Protection Act and National Capital Region (NCR)

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## Introduction

Consumer means who consumes the products available in the market. Consumer awareness depends on the consumer knowledge with respect to consumer law, consumer rights, right to be informed about price of the product, right to be informed about quantity of the product, right to represent grievances, right to seek redressal etc. For this Consumer Protection Act 1986 was introduced to protect the consumers from any kind of unfair trade and practices. Sometimes consumers are not aware that the quantity of the product(s) they purchased have been reduced but the producer has neither changed the price of the product nor the packaging. This gives false impression on the consumer that the brand has not increased price of the product even the price of the ingredients has been increased as well as transportation cost also. But due to lack of awareness, consumers are not aware that they are paying same price of the product but for the reduced quantity of the product. This has become practice with the large number of products available in the market.

Consumer awareness also get affected due to consumer perception and behavior while buying the products. There are many other factors which may affect the level of consumer awareness. It has been observed that consumers are more aware while buying the big household items in comparison to daily consumable items like Groceries. Consumers are hardly paying any attention towards the downsizing of the product. Sometimes it depends on urge of the product that they are considering the reduction in quantity of the product with same price. For this the reason could be that consumer are price sensitive rather than quantity sensitive. This concept is known as “**Shrink inflation**”. This term is blending of two terms i.e., Shrink and Inflation. This concept was coined by British economist Pippa Malmgren in 2009 (wikipedia, n.d.). Shrinkflation refers to the decrease in the size of a product while maintaining its price. Consumers’ attitudes towards shrinkflation are generally not highly favourable, indicating that companies will need to work hard to maintain customer loyalty (Saleh, Ramzani, & Phung, 2018). In his concept, basically producers are downsizing the quantity of the product but no change in price with this they are able to maintain the same sales volume as well as with no reduction in their operating profit. This is not illegal practice made by the producers because they mention about it on the backside of the product. But due to consumer’s unawareness that they hardly read that information. In other words, it can be said as duplicitous or concealed inflation.

There are many reasons behind the shrinkflation i.e. Increased price of raw material, increased cost of production and due to extreme competition in order to address these small issues but of utmost importance the researchers tried to look into this so that their assumptions become robust. s

## Significance of the Study

The Current study mainly focuses to make consumers aware about the shrink inflation with respect to their daily consumable items. It will help the society to become more aware about the downsizing of the packaging of the product with same price as even before. To spread the awareness regarding the exploitation of the consumers through producers by not providing all information with respect to change in the price and quantity of the product. In addition, it will help the consumers to be more aware about the Consumer Protection Act, 1986.

Therefore, the study has been performed by the researchers to take stock of the small issues but of utmost importance that will ultimately help the consumers at large.

## Objectives of the Study

Taking into consideration the literature and significance of the study, the researchers have decided the following three objectives for the present study.

- To investigate the level of consumer awareness regarding the Shrinkflation with special reference to Education, Marital status, Income, and Status of Employment across various socio-economic factors scenarios in both online and offline mode of shopping.
- To examine the consumers awareness regarding the Consumer Protection Act, 1986

## Review of Literature

Consumers’ awareness level regarding the price varies across different studies. One study found that “price-conscious” consumers are less attentive to price information and tend to be quicker decision-makers compared to “non-price conscious” consumers (IONESCU & MEGGIOLARO, 2022). Another study focused on the coffee industry and aimed to determine the level of awareness among regular customers regarding price fluctuations. The research found that customers have noticed the change in prices and different data-gathering methods were used to determine their level of awareness (Hebsale et al., 2023). In the context of fish consumption, a study found that fish consumers in Gujarat, India, have insufficient knowledge about the health and nutritional benefits of fish, which hinders the growth of fish consumption in the region (He & Deng, 2020). Furthermore, a study on “Consumer Environmental Awareness” (CEA) discovered that product differentiation strategies and price competition are negatively impacted by the subjective and social effects of CEA (Rihn et al., 2018). Finally, a study on consumer perception of retail store brands found that conscious price variable was a major influence in consumers’ purchase intention (Levrini & Jeffman dos Santos, 2021). Consumers strongly prefer downsizing to package price increases, and this preference does not diminish over time (Kim, 2022). Package size has less of an impact on consumers’ purchasing decisions



than price; the demand elasticity for package size is about one-fourth that of the demand elasticity for price (Çakır & Balagtas, 2014). Changes in unit and retail prices have a greater impact on consumer decisions than package size changes (Gourville & Koehler, 2004, Yao et al., 2020). By competing on package sizes, manufacturers may be able to increase margins and lessen the level of price competition in downstream markets (Yonezawa & Richards, 2016). A simple model was developed to study the reasons behind the fully alert consumers less sensitivity towards downsizing rather than the increase in package price. In South Korea, Retail plain milk market divided into convenience stores, union shop, supermarket chains, independent stores, hypermarkets to study comparison and contrasting the costs and sales patterns of GT's small (200 ml) and big (1,000 ml) packages. The manufacturer of GT, Namyang, increased the price per package for the little package while lowering the size of the large box to 900 ml. In the post-downsizing period, it was discovered that the large package's unit price climbed by an average of 4% in comparison to the tiny package's unit price. Surprisingly, the latter's sales volume declined by an average of 10.7% in comparison to the former's sales volume over the same period. Shrinkflation is an illegal strategy regarding downsizing the product but it helps the manufacturers to survive in the market (Prasain, K., & Pandey, P, 2022). Businesses use this method as a covert strategy to boost their profit margins or keep them stable in the face of increased input prices. Keeping this in mind that shrinkflation involves downsizing (Liberto 2021).

Reduced household purchase volume is significantly impacted by smaller package sizes, suggesting a positive relationship between package size and consumption of food at home (Çakır et al., 2021, Metin et al, 2014). The quantity of packages or getting a volume of non-downsized products are not significantly impacted by downsizing (Frank et al., 1967). Manufacturers employ downsizing as a covert means of raising prices, which raises average yearly household expenditures for the goods (Çakır et al., 2021). While shelf-stable tuna's volume consumption is roughly 10% less than it was prior to downsizing, peanut butter's yearly volume consumption is still constant (Patel & Bhatt, 2015). One significant component of consumer behavior is the impact of package size on purchasing decisions. shrinkflation presents an ethical conundrum and serves as a clear illustration of the stakeholder theory vs shareholder theory debate (Wood, 2022). Firms and consumers both had valid reasons towards the attitude of shrinkflation and principal causes of it in their own way. Shrinkflation could be an effective strategy but awareness programmes must be conducted to make customer aware.

(Chatterjee et al, 2022) The cost of inexpensive single-serving packages of essentials like soap and cookies isn't changing as India's inflation rate rises; instead, they're simply getting lighter. For Example, Britannia has decreased the weighting of current pricing points in order to pass on 65% of the incremental rise in input prices for 2021–2022.

In the present, the volume decrease “might potentially be considerably bigger,” according to managing director Varun Berry.

The role of consumers, as well as company and market-related factors, in shrinkflation was examined. It also focused on how these factors affect the fairness perception of consumers towards firm's strategy regarding downsizing packaging. For this Scenario-based experiment was conducted to study what degree consumer dubiousness, firm's competition and firm's target affect the justice or injustice regarding the package downsizing. t, M. M (Golovacheva, 2016).

The type of product and customers' expectations for content, quality, or performance, it is likely that the relationship between consumer expectations and cognitive dissonance varies (Wilkins et al., 2016). Because most producers of fast-moving consumer products employ this strategy, package shrinking has an impact on every customer (FMCG). Package downsizing reflects an unseen price rise of items that most customers are unaware of unless selling prices are decreased. Based on the results of the first structural model, the “bootstrapping mediation test” method was employed to determine the possible mediating role of consumer conflict between consumer expectations and repurchasing intentions.

The “Random Utility Model” of demand was performed to examine the consumer's sensitivity packaging size and price using household scanner panel data on bulk ice cream purchases in Chicago. Through study it was found that consumers are less sensitive towards packaging size in comparison to price which motivates the firms to adopt the strategy of downsizing (Çakır & Balagtas, 2014).

“Hyper-Competition” explained how firms affect an invisible price increase for their product. Package downsizing is ethical in terms of law because companies mention price and product quantity on product still consumers are not able to detect change in quantity of the product due to visual impression of the package size (Gupta et al., 2007).

## Research Methodology

The present study is Quantitative in nature. The data has been collected through a self-structured questionnaire design by the researchers within the N.C.R. The questionnaire has been divided into four categories viz (1) Socio-Economic Factors (2) Consumer awareness regarding the product (3) Consumer awareness regarding the price and quantity of the product and (4) Consumer awareness regarding the Consumer Protection Act, 1986.

The Convenient Random Sampling technique has been adopted by the researchers for the study. The SPSS (Statistical Package for Social Science) 26 was used for data analysis.

## Hypothesis of the study

Based on the above cited objectives, the researchers have made the following hypothesis to examine and evaluate their study:

Ho1: There is no significant impact of socio-economic factors variables on consumer awareness regarding the product details.

Ho2: There is no significant impact of socio-economic factors variables on consumer awareness about the price and quantity of the product.

Ho3: There is no significant relationship between the Education level of the consumer and consumer awareness regarding the Consumer Protection Act, 1986.

## Data Analysis

In order to conduct the questionnaire survey, a pilot testing was conducted on 10% i.e., 150 respondents of the total sample size i.e., 1500, though due to non-response of the respondents the sample settled at 1368. Even for the reliability of the data, Cronbach's alpha was calculated for all multi-item scales as shown in the following Table 1

**Table 1: Cronbach's Alpha**

Variable	Number of Items	Cronbach's Alpha
Consumer Awareness about the Product	6	0.685
Consumer Awareness about the Price and Quantity of the Product	6	0.629
Consumer Awareness regarding the Consumer Protection Act, 1986	9	0.911

As Cronbach's alpha for all multi-item scales are greater than 0.50, hence acceptable. Kehoe (1995) suggests that an alpha of at least 0.50 should be achieved for accepting the items "as is" within a dimension, as long as they are within a short instrument.

The descriptive statistics for all variables i.e., Socio-economic factors Variables and other multi-item scaled variable which were used to measure the level of consumer awareness about the product, price and quantity and Consumer Protection act, 1986 reported in Table 2. The mean value of variables is given in the Table 2.

**Table 2: Descriptive Statistics**

	N	Minimum	Maximum	Mean	Std. Deviation
Age	1368	1	5	2.50	.949
Gender	1368	1	3	1.58	.500
Education	1368	1	5	3.25	.807
Marital Status	1368	1	5	1.35	.612
Current Employment status	1368	1	6	3.97	1.922
Annual Income	1368	1	6	2.21	1.451
Consumer awareness about the product	1368	1.00	3.00	1.5359	.39841
Consumer awareness about the price & Quantity	1368	1.00	3.00	1.6835	.38615
Consumer awareness regarding the Consumer Protection Act, 1986	1368	1.00	3.00	1.3787	.45816
Valid N (list wise)	1368				

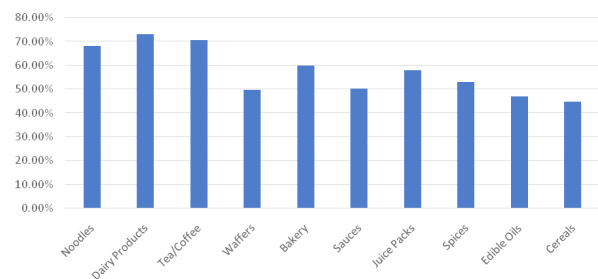
Amongst the 1368 respondents, 61.1% respondents lie in the age category of 18-25 years and 17.9% respondents lie in the age category of 25-35 years and 9.9% belong to the age category of 35-45 years, 5.3% below the age of 18 years and 5.8% above the age of 45 years. The mean of Age is 2.50, including that most of the respondents lies in the age category of 18-35 years.

In the present study out of total respondent, 580 respondents were female and 780 males and 4 others. 63.2 % respondents are graduate and 15.2% are post graduate. The percentage of respondents who are unmarried amounts to 69.4% whereas 28.6% are married. In terms of employment status, 332 respondents are in full time job, 276 respondents are self-employed whereas 111 respondents were found in part time job and rest falls in the category of homemaker and student's category. When we talk about the Annual Income of the respondents, 43.8% respondents have no annual income as most of them are Homemakers and Students whereas 24.5% respondents have annual income of less than 3 lacs. As per the mean value of the mode of shopping i.e., 1.64, Major number of the respondents shop in Offline mode than Online mode.

If we observe the total number of filed cases in the consumer court, 8.4% respondent of the total sample have filed case in the Consumer Court. The mean Value of Consumer awareness about the product is 1.535 which indicates that most of the respondents are oftenly check the details like Ingredients, Manufacturing & Expiry date, Weighs mentioned on the product, Promotional offers attraction, asking Bill for their purchase and matching the same with pricing of the item purchased. As per mean value of Consumer awareness about the price and quantity of the product comes true 1.68 representing that consumers often compare the prices of the product available online, checking MRP before buying the

product, noticing any change in the price of the product, have ever charged more than MRP and loyalty towards the product in case price of the product increase. With respect to the consumer awareness regarding the Consumer Protection Act, 1986, the mean value of 1.378 shows that most of the respondents are fully aware about the Act.

The above analysis with respect to Daily Consumable Items-Noodles, Dairy Products, Tea/Coffee, Wafers, Bakery, Sauces, Juice Packs, Spices, Edible oils and Cereals has also been presented in the following Charts followed by a brief explanation of the same.



**Figure 1: Percentage of Respondents Using Daily Consumable Items**

Figure 1 shows that 75% of respondents of total sample using daily consumable items. The respondents majorly consume Dairy Products, Tea/Coffee and Noodles while only 45% of the respondents consume cereals daily.

In order to check the hypotheses, Chi-square test was conducted to analyse the impact of independent variables on dependent variables and also Spearman's Correlation test was conducted to check the relationship between the dependent and independent variables.

**Table 3: Hypotheses Testing**

Hypotheses	Chi-square value of Socio-economic factors Variables	Spearman's Correlation Analysis
Ho1: There is no significant impact of socio-economic factors variables on consumer awareness regarding the product details.	Age (.099)	Age (-.111)
	Gender (.000)	Gender (-.003)
	Education (.000)	Education (-.093)
	Marital Status (.123)	Marital Status (-.103)
	Annual Income (.011)	Annual Income (-.133)
	City belongs to (.000)	City belongs to (.034)
	Current Employment Status (.021)	Current Employment Status (.121)
Ho2: There is no significant impact of socio-economic factors variables on consumer awareness about the price and quantity of the product.	Age (.064)	Age (.028)
	Gender (.000)	Gender (.058)
	Education (.001)	Education (.004)
	Marital Status (.959)	Marital Status (.049)
	Annual Income (.004)	Annual Income (.025)
	City belongs to (.584)	City belongs to (.019)
	Current Employment Status (.105)	Current Employment Status (.069)
Ho3: There is no significant relationship between the Education level of the consumer and consumer awareness regarding the Consumer Protection Act, 1986	Education (.000)	Education (-0.050)



## Findings

In this study, we examined the impact of socio-economic factors variables on consumer awareness related to product details, price and quantity, and awareness of the Consumer Protection Act. The analysis involved chi-square tests and Spearman's correlation coefficient to explore relationships among variables.

Firstly, the age of the consumer was found to have no significant impact on awareness about the product, price, and quantity. However, the awareness level of the Consumer Protection Act yielded a p-value of 0.005, surpassing the 5% significance level (0.05), leading to the rejection of the null hypothesis.

Regarding gender, it was revealed that gender significantly influences awareness levels regarding product, price, and quantity. Females exhibited greater awareness of the Consumer Protection Act compared to males, supporting the rejection of the null hypothesis for the former but acceptance for the latter.

Education emerged as a significant factor influencing consumer awareness across product details, price, quantity, and the Consumer Protection Act. The Pearson Chi-square value of 177.523, with a p-value less than 0.001, indicated a strong dependence of consumer awareness on education level, leading to the rejection of the null hypothesis.

Marital status showed no impact on consumer awareness about the product, price, quantity, or the Consumer Protection Act. However, unmarried females demonstrated greater awareness of product-related details.

Employment status was associated with varying awareness levels. Employed consumers exhibited heightened awareness of product price and quantity but not of general product information. The annual income of consumers was found to significantly impact their awareness across all dimensions studied.

Spearman's correlation coefficient further elucidated relationships between variables. Notably, a negative correlation between age and overall consumer awareness suggested that younger consumers are more informed about product details. Conversely, age displayed a positive correlation with price and quantity awareness and Consumer Protection Act awareness.

In conclusion, this study provides comprehensive insights into the complex interplay of socio-economic factors variables and consumer awareness. The rejection of null hypotheses in several instances underscores the need to consider diverse factors when assessing consumer knowledge and highlights the nuanced relationships between socio-economic factors variables and consumer awareness.

## Conclusion

The researchers tried to assess the level of consumer's awareness regarding Shrinkflation. In conclusion, it can be said that young consumers and Homemakers are more aware about the product details, price and quantity of the product whereas have less knowledge regarding Consumer Protection Act. In this study, it has been observed that females are more into buying and ordering groceries in comparison to males. Even it was observed that consumers hardly pay any attention towards the manufacturing and expiry date of the product. It has been observed that the consumers who are married or unmarried both are equally concern regarding the change in the price of the product in comparison to the change in quantity of the product. Those consumers have high annual income, less concern towards change (decrease) in the quantity of the product with increase in the price.

It has been observed during the study that if consumers notice the change in the quantity and price of the product, 55.12% respondents oftenly shift to other brand whereas 30.99% respondents always prefer to shift to the other brand. As it may also create disappointment among consumers and worsening the emotions towards the brand of the product. Even after noticing decrease in the quantity of the product with the same price, they are not aware where to report or what to do. In that scenario, they are not interested to report shrink in inflation of the price & quantity of the product.

Sometimes expiry date is also mentioned in the number of months which is due from the date of manufacture and that date is printed on crimp which might not be visible to the consumers due to packaging colour and at times may be lay aside by the consumers because of use of small font. In relation to Consumer Protection Act, it has been observed that large number of consumers are aware about the Act but if they feel cheated while buying the product, are more hesitant to file the case against the producer in the Consumer Court.

Regular consumers are aware of some price swings for coffee-based items, but they are unable to explain the specifics or provide answers to the two most important questions: "why" and "how much?" Examining these results reveals many aspects: not even the habitual coffee drinkers are interested in the price rise; all of the customers in question lack understanding in the sector. This gave us the impression that either individual is becoming accustomed to the present inflation and don't mind spending a little more because of their income, or they have a greater price tolerance (IONESCU & MEGGIOLARO, 2022).

## Limitations of the study

The study was limited in the sense that it is being performed only in the Delhi, Faridabad, Gurugram and Noida (NCR). The study may further be extended to four



Metropolitan cities of the country in order to have a more in-depth study with a larger impact.

## Suggestions

Producers held Shrinkflation valid also because of increase in the price of petrol, labour charges and raw material cost and inflation. (Taak, S., 2022) Customers would switch brands or switch brands if they were aware that the quantity of the product was continually decreasing. A product may be reformulated or have components removed while keeping the same price to avoid this. Even in this regard established companies can reduce the expenses incurred on advertisement and marketing of the product so that they don't feel urge to increase the price of the product with decrease in the quantity of the product.

The school education curriculum should include practical knowledge of Consumer Protection Act and process of filing the illegal/cheating cases in consumer court. Even government should come forward to make it mandatory for manufacturing or producing companies not to continue with same packaging but less quantity at same price because sometimes consumers don't get to know that they are buying less quantity at same price in comparison to earlier. The Central Consumer Protection Authority should introduce a policy for the producers to show the quantity along with price on shelf display in bold letters so that consumers could be aware that the quantity along with the price of the product has been changed as well as the tracking of shrinkflation should be done (Wood, 2022).

At the end, it is the responsibility of the consumers also to check the product details, price and quantity of the product before buying the product. Caveat Emptor, it is only responsibility of consumer to be beware". The study recommended that public policy makers and marketers in India focus more on the views and opinions of their customers on a broad scale.

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## Annexure 15.4.1

Submission Date	Submission Id	Word Count	Character Count
31-Oct-2023	1319756 (DrillBit)	4471	29274

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1.1 ERP1_Anil_GJEIS Oct to Dec 2023.docx	kumshaani@yahoo.co.in	Anil Kumar	08%

		<b>8</b> <b>11</b> <b>A</b>		<small>A-Satisfactory (0-10%) B-Upgrade (11-40%) C-Poor (41-60%) D-Unacceptable (61-100%)</small>	
SIMILARITY %		MATCHED SOURCES		GRADE	
LOCATION	MATCHED DOMAIN	%	SOURCE TYPE		
1	Mortality risks induced by the costs of regulations by Ralp-1994	2	Publication		
3	research.iisuniv.ac.in	1	Publication		
4	businessmanagementideas.com	1	Internet Data		
5	Thesis Submitted to Shodhganga, shodhganga.inflibnet.ac.in	1	Publication		
6	studentsrepo.um.edu.my	1	Publication		
7	erepository.uonbi.ac.ke	1	Publication		
8	philpapers.org	<1	Internet Data		
9	ir.canterbury.ac.nz	1	Publication		
10	mdpi.com	<1	Internet Data		
11	springeropen.com	<1	Internet Data		
13	www.ncbi.nlm.nih.gov	<1	Internet Data		

### Reviewers

#### Memorandum



**Reviewer's Comment 1:** The paper is based on a quite interesting theme. It explores consumer awareness on Shrinkflation in Education, Marital status, Income, and Employment status across Socio-Economic factors in online and offline shopping also assess familiarity with the Consumer Protection Act, 1986.

**Reviewer's Comment 2:** The paper's structure is flawless, and the sample size is sufficiently large to apply the appropriate statistical methods for this type of research. Also it provides noticeable implication for practice by urging marketers and public policymakers in India to pay more attention to the customers opinions and perspectives.

**Reviewer's Comment 3:** The study provides wonderful future avenues for the researchers. It can further be extended to four Metropolitan cities of the country in order to have a more in-depth study with a larger impact.



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 had no conflict neither financially nor academically.

**Editorial Excerpt**

The article has 8% of plagiarism which is the accepted percentage as per the norms and standards of the journal for publication. As per the editorial board's observations and blind reviewers' remarks the paper had some minor revisions which were communicated on a timely basis to the authors (Anil and Kalpana), and accordingly, all the corrections had been incorporated as and when directed and required to do so. The comments related to this manuscript are noticeably related to the theme "**Coping with Shrinkflation**" both subject-wise and research-wise. It aims to make consumers aware about the shrink inflation with respect to their daily consumable items. It will help the society to become more aware about the downsizing of the packaging of the product with same price as even before. To spread the awareness regarding the exploitation of the consumers through producers by not providing all information with respect to change in the price and quantity of the product. Overall, the paper promises to provide a strong base for the further studies in the area. After comprehensive reviews and editorial board's remarks the manuscript has been categorized and decided to publish under "**Empirical Research Paper**" category.

**Acknowledgement**

The acknowledgment section is an essential part of all academic research papers. It provides appropriate recognition to all contributors for their hard work and effort taken while writing a paper. The data presented and analyzed in this paper by (Anil and Kalpana) were collected first handily and wherever it has been taken the proper acknowledgment and endorsement depicts. The authors are highly indebted to others who facilitated accomplishing the research. Last but not least, endorse all reviewers and editors of GJEIS in publishing in the present issue.

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### **Abstract**

Rapid industrialisation around the world since the turn of the 20th century has led to a number of climate-related and environmental problems. In order to address these issues, the idea of "green finance" came to light in 2009. The term "green financing" refers to a notion that envisages a collaboration of the public and private sectors when it comes to technological development and innovation under the ambit of a "green economy." Environmental change, energy limitations, and financial emergencies are just a few of the issues that are arising as a result of the rapid advancement of technology. In order to support environmentally friendly development that significantly reduces emissions of pollutants, there is a concept known as "green finance." The economy of the nation also benefits from green funds used for a variety of green initiatives, such as green construction and green security.

This article will discuss the effect of the green finance mechanism on the sustainable goals of India by exploring the various sides of green banking approaches. The article also analyses the policies that developing nations like China have implemented to initiate green finance and implement green banking practices.

Green finance is critical because we must recognise that economic growth comes at a cost to nations in the form of environmental degradation. It will also help to achieve a balance between the economy and the environment.

This study emphasised how significantly fewer greenhouse gas emissions will result from green financing. Hence, it can be said that India has great potential to develop the green infrastructure required for green finance by removing obstacles and raising corporate citizens' awareness of the need for more sustainable development. The potential of green finance in India has been investigated by looking at the existing literature and secondary source of data.

### **Introduction**

In the COP26 meeting in Glasgow, Sir David Attenborough stressed that once the whole world comes together, the planet can definitely be saved, as we also have the power to destabilise it when we are working apart.

Any development work must be environmentally sustainable and safe, as nations are currently experiencing the most dramatic climatic changes and their repercussions worldwide. Recent upheavals like the flash floods in China, the extreme snow in parts of the US, and the drought in Europe are precursors to what lies ahead in terms of the weakening of climatic conditions in particular zones and the erratic changes that are sure to have an adverse effect on flora and fauna in those areas.

In the prevailing scenario, the developing nations' ecosystems are far more threatened as the economy is highly vulnerable to climate change. India accounts for about 17% of the world's population but only 4% of the world's freshwater resources. In terms of agricultural output, India ranks second worldwide. Agriculture and allied sectors will hold about 12 per cent of the GDP (gross domestic production) in 2022 and employ about half of the workforce (Dhawan, 2017). Sustainable development projects with green finance are the silver lining behind the clouds.

Green finance refers to funds allocated to activities, initiatives, and projects that prioritise sustainability and climate protection. When it comes to green finance, the environment should be safeguarded to the greatest extent possible. The adoption of actions to reduce environmental harm should be supported by policies that are issued in order to achieve a clean climate (Durrani, Rosmin, & Volz, 2020). Green

investments, structured green funds, and green bonds should be brought into India's financial system. Numerous other socio-economic issues of green financing should also be taken into consideration.

The Paris Pact of 2016, which made the fight against climate change mandatory and legally binding for countries to participate, was a significant milestone in the international climate change processes. The Paris agreement also promotes the voluntary participation of various other parties, and the agreement stresses that the nations that are developed should help the underdeveloped and developing nations while they can (Viuales, 2016).

In a country like India, which has a population of approximately 1.41 billion, a strategy and a developmental framework are of utmost importance and can prioritise the well-being of the environment. As a developing country, India has realised why it is necessary to involve green financing in its regime. The Indian economy is largely dependent on agriculture. More than half of its workforce is included in agriculture itself; hence, a slight change in the environment can also bring massive changes in the economy. Changes in climate, like drought, excessive rainfall, cyclones, etc., can ruin crops and inventories, which further hampers the attainment of national development goals (Luthra et al., 2015). The issues of climate change are deeply associated with economic and social aspects of India, such as poverty, access to energy resources, education, health, and well-being; hence, green financing is a big step toward holistic, sustainable growth.

In India, a scheme was launched in 2016 under green finance, the Pradhan Mantri Ujjwala Yojana (PMUY). This scheme was launched to reduce the dependency on fossil fuels and switch to green and clean energy resources such as biogas and other safer alternatives to reduce greenhouse gas (GHG) emissions. This scheme had to face many hurdles in its way, such as unaffordability by the rural masses and irregularities in distribution when a large number of people were switching to LPG (Dabadge, 2018). Public transport was enhanced by the launch of metro trains across the country in different cities. This is also a major development under green finance in India. Projects like these aim to reduce greenhouse gases while creating sustainable transport systems. Green financing is allowing India to efficiently meet its energy requirements from various sectors. Green finance includes renewable energy research and production. Today, renewable energy accounts for about 41.4% of India's energy consumption. India is adamant about maintaining a clean climate and reducing carbon in the atmosphere, ensuring a better future for future generations.

The green climate fund (GCF), a part of the Paris Agreement, accounts for the largest fund source around the globe. The GCF is running a number of committed projects, such as waste management, renewable energy, pollution management, etc.

### **Literature Review**

Green financing is one of the most researched topics. According to Gao (1998), the one solid way to promote sustainable development in China is the ability to intertwine the economy and the developmental strategy of the nation.

Labatt and White (2002) argued that green finance expands the financial and economic instruments of a nation while also improving the environmental structure of the country. According to Ma (2018), these economic instruments comprise "green bonds" and similar instruments that aid in the financial situation while serving the environment to help erase the troubling factors; green finance balances the ecological environment and development (Zhou & Li, 2019).

Jensen says that the owners and shareholders of a company are a group of individuals who can either affect or be impacted by the happenings of their company. This definition refers to the fact that the welfare of a firm is largely dependent on how the designated group of individuals makes decisions that meet the community's expectations, which include environmental concerns as well.

For finance and economics, the corporate purpose is the most talked-about topic. Milton Friedman gave the shareholder view, according to which the only goal of a corporation is to make profits. The decision-makers, according to this viewpoint, play a critical role in the decision-making process. Even though broader stakeholder responsibilities may add value to many spheres of society, it is still an argumentative topic.

Jensen and Meckling suggested in their seminal paper that the sole purpose of an organisation is to focus on the primacy of the shareholder. This is also obvious since the owners of the firms directly invest their funds in the company and bear a considerable amount upon the liquidation of the investment.

With changing times, this outlook is changing, and the top management in a company, along with the employees and staff, is reaching out for change. Benabou and Tirole concluded that the emergence of CSR (Corporate Social Responsibility) is because the top management has started to follow its own self-interest. It is also emphasised that holding cash is no longer a valuable asset, but donating a large sum of corporate funds is. The authorities prefer making donations to director-affiliated charities. This expansion of charity ideas in society has also given rise to green bonds and green stocks. Basically, the influence of green labels on corporate bonds is what is being propagated today as a part of green financing.

The existing literature on green financing emphasises the influence of green labels on corporate bond spreads. This influence is motivated by two strong motives: the first is financial motives or an expectation of better financial performance and less risk. Wang et al. supported the financial motives by documenting a pricing premium for corporate green bonds as compared to the more traditional regular bonds in the market. This premium was discovered to have not only economic benefits but also better performance potential in CSR and lower risk reinforcing.

Flammer (2020) asserts that the use of green bonds enhances a company's performance and long-term impact. In order to further corporate goals, it also strengthens a company's green innovations and attracts new green investors. On the basis of the concept of agent-based computing, the market for environmental innovation was actively operating. Public investment banks notably pushed the combination of green investments and buyers' significant desire for environmental protection (Liao & Shi, 2018). Li and Cheng (2008) argued that the secret to developing green finance is internalising the ecological impact.

Additionally, public pressure and encouragement helped the government enact tough environmental regulations, which in turn compelled both public and private businesses to prioritise green investment (Yang D. et al., 2019). The development of a significant game model between public and private businesses and the banking industry demonstrated how adopting green finance practices reduced environmental costs and allowed businesses to allocate resources to society in an efficient manner (Han et al., 2017). The selection of an enterprise's environmental conduct and its regulatory effectiveness are the primary determinants of how effectively green finance is implemented in policymaking banks under multiple ecological regulation policies (Moledina et al., 2003). To promote more products with a lower carbon supply chain, the manufacturers should be encouraged by government initiatives such as subsidy policies and green taxes (Sheu & Chen, 2012).

After reviewing the aforementioned literature, we can see that the educational resources now available primarily to evaluate the green finance strategies and policies of the government and corporate entities. Since there are no genuine or logical conditions that can be identified in real-world scenarios to link theory and practice, investigating the development of various strategies in the green finance sector is crucial. The majority of academics opt not to treat customers as subjects of green finance, and they solely work to advance a nation's green financial system by examining the competing interests of businesses and financial institutions.

Green financing is an umbrella term that encompasses many sectors. Rajput N. and Oberoi S. (2012) talk about the role of the Indian finance sector in green financing, emphasising the importance of investing in environmentally sustainable industries.

Despite concerted efforts from all ends, climate actions might get overshadowed by developmental priorities, and effective mainstreaming will be further pushed off the agenda (Prasad R & Sud R, 2018). From the above discussion, it is understandable that India is in dire need of green financing, and maximum efforts should be put into exhausting every plausible option to achieve this. The majority of the national and international funding has come from small projects, which may not create the required impact in the green finance sector of India (Mandal, K. 2019).



### **Objective**

Through this study, the main objectives to be covered are as follows:

- To understand the scope of green finance.
- To investigate the government's efforts to mitigate the effects of climate change.
- To review the challenges and solutions of green finance in sustainable development in the Indian context.

### **Methodology**

This study uses secondary data sources for all reference purposes, like online published articles, government data sources, and websites.

### **Data analysis**

India has established various objectives to fulfil its sustainability mission. India promises to reduce its emissions by 33–35% below what it was in 2005 levels by 2030 in order to achieve these goals. Additionally, India intends to use 40% more renewable energy (RE) by 2030. According to the Indian government, it will take about \$4.50 trillion over the next ten years to reach the sustainability goals that have been set. The Indian government set the goal of producing 175 GW of RE by 2022 in the 2015 budget. According to reports, India's public and private sectors committed about \$2570 million to support the government in achieving this objective.

To address the need for green finances, the Indian government primarily uses borrowed funds.

Non-convertible debentures and other kinds of funding are also used to extend debt to renewable projects. "Green bonds" are fixed-income bonds that promote environmental concerns. Investors can gain access to the domestic capital market using green bonds, a particular category of financial instrument. In India, there have only been 20 green bond issuances so far, and the market is still developing. Through green bonds, India has raised \$22.1 billion through the first half of 2022.

Sustainable infrastructure, pollution control, industry, energy-intensive trade, and green transportation are all included in green financial planning.

Even if loan instruments make up the majority of green finance, other income sources like the government and both public and private businesses are also contributing to its value.

Through venture capital and private equity, equity investors participate in green finance. For instance, RBI has launched numerous initiatives in this regard. India has received \$43 million in assistance from the UNDP to increase its coastal region's ability for adaptation. Banks are also making efforts to become greener financial institutions. An innovative form of fundraising called "crowd finance" is also starting to take off in India. With this strategy, a large number of people combine their resources to support a significant undertaking. International organisations and humanitarian organisations also employ green money.

The notion of creating "green banks" was investigated in India to support renewable energy and its funding, and the initial move in that direction was the founding of the "Indian Renewable Energy Development Agency (IREDA)" in 2016.

### **Challenges and Solutions**

In order to create a sustainable future, green finance is needed in a few industries, including infrastructure, energy production, and agriculture. Green financing promotes ecological integrity while valuing social and environmental well-being. India is having trouble achieving its goals for sustainable development due to problems including population growth, rapid industrialisation, and urbanisation.

In India, a few significant environmental issues are:

1. Severe pollution and widespread environmental degradation
2. Ecosystem destruction and loss of biodiversity
3. Poor waste management causes a loss of drinkable water.

All these issues that are listed above have to be resurrected if a country wants to achieve sustainable growth. The role of green finance is huge in mitigating these aforementioned environmental concerns. Even if it is the utmost duty of each citizen to come together and work towards this, it must be on the



government's urgent list of actions. The government has taken various measures and launched schemes regarding the same. These are:

1. Green Skills Development Initiative
2. Mission Swachh Bharat
3. The Compensatory Afforestation Fund Act (CAMPA)
4. Namami Gange Initiative
5. National Mission for Green India
6. National River Conservation Programme
7. Conservation of Natural Resources and Ecosystems

The Brundtland Commission (1987) presented in its report that sustainable development is a type of development that meets the requirements of the present generation while taking utmost care of the incoming generation's requirements as well. Sustainable development means building an inclusive ecosystem for the people and the people residing in it.

The main features of sustainable development include

1. Higher per capita income
2. preventing the manipulation of natural resources
3. not exhausting the natural resources so that future generations can also use them.

A few challenges for attaining SDGs in India are discussed below.

1. For India, it is crucial as well as daunting to scale the progress of green financing under the ambit of the SDGs.
2. Shortage of funds to sponsor activities related to green financing: To attain the sustainable development goals as well as match the green financing parameters, there is a huge shortage of funding.
3. Supervising the Implementation Process: NITI Aayog is holding the reins on the implementation process, but the ayog is facing a huge lack of manpower that is required to carry out many significant tasks when it comes to green financing.
4. Scaling the growth: Their growth is steady but less than expected as the government of India faces the non-availability of data from rural areas and remote areas. Despite this, administrative data is incomplete, making it difficult for the government to track progress toward the Millennium Development Goals (MDGs).

An adequate balance among all key stakeholders ensures smooth fund flow toward sustainable development.

A public-private partnership needs to emerge in India and work largely in the interest of the masses to mitigate the adverse impact of climate change and make green financing the only viable option for all upcoming projects.

### **Importance of the national policies**

When the national strategies and frameworks are simple and adhere to the needs of the environment, it is easier to implement these strategies at the grassroots level and on large scales. The easy-to-follow frameworks also ensure a proper tandem between the national level and local administration. It is crucial for India to have a framework to track pricing signals for externalities such as GHG emissions with the help of central government intervention.

The environmental objectives should be paired with intergovernmental grants. The intergovernmental grants make up for the funds invested in activities that promote green financing; for example, if an area is converted into a park, the charges will be compensated by the intergovernmental grants. The local government also benefits from the green finance-promoting policies that cost them but also generate broader benefits.

The amenities related to green financing, such as carbon financing, should be made easily accessible to the cities and other urban local bodies. To achieve a cleaner climate, local and central governments should work together to shape programmes like the Clean Development Mechanism and other initiatives that require both bodies to participate, ensuring that the right resources are delivered to the

right hands, and no one is left behind. To limit carbon emissions and introduce carbon finance, it is important to include the city councils and their emission factories in the picture.

Along with government involvement, there are numerous opportunities to investigate the role of the private sector in green financing. There are still hazards to opportunism, and morality is attached to it.

### Conclusion

The term "green financing" refers to financial services and goods that assist in the shift to a low-carbon and environmentally friendly economy. As India attempts to lessen its carbon footprint and advance sustainable development, green financing has gained popularity in recent years. This covers a variety of programmes, such as financing for renewable energy, green bonds, and sustainable infrastructure. In order to promote green funding, the Indian government has also put in place policies and rules, such as tax breaks for financiers of renewable energy projects. In addition, a special liquidity facility has been established by the Reserve Bank of India for NBFCs, ND-SIs, and on-lending to qualified sectors, such as the renewable energy sector.

Jonathon Porritt said the future would either be green or not green at all. Ever since rapid industrialisation began, there has been a huge disruption in the environment and climate harmony. The industrial revolution has led to the mission of the dangerous greenhouse gases, and if appropriate sanctions are not put in, the GHG emissions will imbalance the environment and the emerging nations will have to bear the maximum brunt. India is trying its best to include green financing in the socio-economic structure and repair the damage that is already done to the environment. All the startups and unicorns in India are expected to contribute immensely to the economy as well as the environment through corporate social responsibility. Social entrepreneurship creates unique solutions to treat environmental issues.

In conclusion, India's attempts to encourage sustainable growth and lessen its carbon footprint include green financing as a key component.

In order to promote green financing, the Indian government has put up a number of laws and policies, such as tax breaks for financiers of renewable energy projects.

With an increasing number of financial institutions providing green financial products and services, the private sector is also playing a significant role in green financing in India.

In spite of these initiatives, there is still a sizable vacuum in the supply of green finance in India, especially for small and medium-sized businesses and rural projects.

However, it is believed that green financing would be crucial to India's transition to a low-carbon, environmentally sound economy.

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# Examining the Media Consumption Behaviour of females in India

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**ABSTRACT:** *This paper aims to examine the media consumption behaviour of females in India. The understanding of the media consumption behaviour of females in terms of why, what, when, and how they consume different media options will enable various stakeholders to identify their interactive effects on females' overall well-being, access to affordable and quality health care, educational opportunities, empowerment, decision-making skills, development, and social status by effectively including their media consumption behaviour. This is an empirical study carried out through a cross-sectional web survey of 383 Indian females in the age group of 11-50 years. This study contributes to the understanding of the emergence of females as media consumers in patriarchal Indian society and provides cognizance for the marketing practitioners, governments, policymakers and researchers to take note of the copious opportunities in this area.*

**Keywords** – Uses and Gratification, Digital Divide, Media Consumption, India

## INTRODUCTION

Communication is the foundation of any society. Communication facilitates information and knowledge sharing, socialization process, entertainment, and creating a common understanding of issues (Schramm, 1977). A human being starts communicating as soon as he starts producing his first noise in the act of drawing his parents' attention. It is quite hard to imagine a life without communication. When the communication is targeted to disseminate information to a mass audience in a short time some media technologies are used. These technologies are collectively called mass media. In short, mass media refers to a diverse array of media technologies such as television, movies, advertising, radio, the Internet, magazines, and newspapers that reach a large audience via mass communication (Capriotti et al., 2020; Camilleri, 2019). Companies use mass media to reach customers, create awareness

about the products/services, build brand image, boost brand engagement, improve sales and develop brand loyalty (Hair et al., 2020; Dolan, 2019; Dhir, and Torsheim, 2016). Mass media has also been an active socialization agent for all (Capriotti et al., 2020; Dhir, and Torsheim, 2016). Television shows, movies, ted-talks, YouTube content, music, newspapers, radio, magazines, social media, websites, and other numerous aspects of mass media influence our views, perceptions, beliefs, and practices about politics, religion, culture, gender biases, lifestyles, clothing, and food-habits (Gamage et al., 2022; Hair et al., 2020; Kaur et al., 2020).

The evolution of media, from traditional or non-digital media (television, movies, advertising, radio, magazines, and newspapers) to new digital media (the Internet), has transformed the way we understand the world around us. As

compared to traditional media, the new digital media is an interactive, customized, and diverse user-oriented way of communicating (Haridakis and Humphries, 2019). Media expose us to various viewpoints that shape our understanding and knowledge of the activities around us. Both, the content and the medium through which information is shared with others play a significant role in creating an understanding of that information (Gamage et al., 2022; Capriotti et al., 2020). With the emergence of new forms of media and media technology, the pattern of media consumption is also undergoing rapid changes. The Internet represents a great prospect for both kids as well as adults (Dolan, 2019; Dhir, and Torsheim, 2016). Substantial research has been undertaken to assess how the different media has been consumed by people across generations, countries, and age groups (Livingstone 2003). After the spread of Internet connectivity and smartphones, although the research on mass media consumer behaviour has grown multi-fold, it remains a relatively small body of literature (Joo et al., 2018; Kim and Weaver, 2002) in economically emerging countries like India.

Media, if used appropriately, has the potential to be the guiding force behind the policies developed, or to be developed, for the betterment of female health issues (Hair et al., 2020; Dolan, 2019) which are not yet been discussed openly in India, i.e., what to inform (the content), who to inform (the beneficiary), and how and where to inform (media), how much to inform (depth). Removing the ambiguity, misinformation, and unawareness around available options will help marketers,

policymakers, and females to make more informed choices for their well-being. However, there is hardly any research that may confirm the media consumption habits of females, particularly in India, hence this study aims to fill this gap.

## **LITERATURE REVIEW**

Numerous studies have identified long-term implications of media used for human behaviour in terms of philanthropic behaviour (Haridakis and Humphries, 2019), inclination towards violence (Hair et al., 2020; Dhir, and Torsheim, 2016), eating habits, sexual experiences, absorption of values (Dolan, 2019), development of worldview, perception of gender equality, political attitudes, career aspirations, spiritual values, stereotypes, and cognitive skills (Lemish, 2015). Media expose us to various viewpoints that shape our understanding and knowledge of the activities around us. The evolution of media, from traditional or non-digital media (television, movies, advertising, radio, magazines, and newspapers) to new digital media (the Internet), has transformed the way we understand the world around us (Camilleri and Camilleri, 2019; GWI, 2019). As compared to traditional media, the new digital media is an interactive, customized, and diverse user-oriented way of communicating resulting in exponential growth in the time spent with digital media by everyone on a daily basis. People are not only using the media but also doing media multitasking (Hair et al., 2020; Herrero and Martín, 2017).

Media socialization is an ongoing “mediatisation” process encompassing three basic dimensions: (i) accessibility of media content and devices; (ii) extent of



media usage and exposure; and (iii) liking for a specific variety of media (Livingstone, 2003). In the past decades, as compared to traditional media, there has been an exponential growth in the amount of time spent with digital media by everyone on a daily basis due to the greater availability of cheaper smartphones, cost effective Internet connectivity, and a huge variety of interactive media. People are not only using the media but also doing media multitasking (Haridakis and Humphries, 2019; Dhir, and Torsheim, 2016). Collectively, these elements provide an ample scope for an important, spirited, and well-timed field of further enquiry and examination. In the digital era, media permeate all spheres of life at every life cycle stage with its presence in children's rooms, in schools, in families, in offices, and in senior citizens' homes. However, at each stage, depending upon various factors such as one's peer group, professional life, family life, income, social status, and number of children the different types of media will matter.

Technology also keeps evolving over time and gradually offers increasing access to media and media content similarly, new digital devices shape the media habits of people who may or may not have grown up with digital media (Hair et al., 2020). Studies have documented many differences in behaviour of media users both at a global and local levels, and observed that media usage preferences are shaped by various variables such as age, gender, country of residence, educational qualification, social status, income, personality, technical affinity, and cultural background. Researchers have

found children and younger people to be more exposed and influenced by the effects of media. (Dolan, 2019; Dhir, and Torsheim, 2016).

Family households are also becoming technologically equipped and family members autonomous about integrating media in their daily lives. Different media are used to strengthen bonds between family members. Meanwhile, ubiquitous and multi functional devices along with access to global media content have resulted in the individualization of media use. Consequently, some studies have found adults to be more involved with the Internet than children and youth (Herrero and Martín, 2017). People want to be “always on” and regularly update their social media profiles, post pictures, status, and gadgets. In the digital era, societies are becoming hyper connected in which a large number of people have adopted: (i) a digital lifestyles; (ii) learning to use media as a resource for private, educational, and professional purposes; (iii) recognizing the potential risks of over consumption of media; and (iv) becoming aware of distorted media realities, digital distractions, information overload, and privacy risks. Being a networked individual has become essentially an identity in its own right. From a socialization perspective, media literacy assists as a tool in adoption of different processes, cultures, values, beliefs, and lifestyles (Capriotti et al., 2020; Herrero and Martín, 2017).

## STUDY OBJECTIVES

1. To examine the media consumption behaviour of females in India.
2. To understand the media consumption behaviour of females



in terms of why, what, when, and how they consume different media options.

3. To identify the interactive effects of different media options on females' overall well-being, access to affordable and quality health care, educational opportunities, empowerment, decision-making skills, development, and social status.

### **HYPOTHESES**

H1: Females' consumption of media varies across traditional and digital media.

H2: Females' most preferred media choice varies across the nature of activity undertaken.

H3: Females' frequency of the Internet consumption varies across the activities undertaken.

### **MATERIAL AND METHOD**

This is an exploratory primary data-based study conducted to provide an overview of the media consumption behaviour of females in India from a digital health marketing perspective. The primary data were obtained through a web survey of 383 Indian females in the Delhi NCR region. A non-disguised questionnaire comprising two sections was used as a tool for data collection. The study sample covered a wide range of respondents from 11 to 50 years of age. The survey's preconditions ensured that all respondents were able to surf the Internet independently. Every possible effort was made to ensure a representative sample of Indian females covering a wide range of age groups across different socio-economic backgrounds.

The respondents were ensured confidentiality and their right to freedom to refuse to respond to any

particular statement. The questionnaire link was shared with the prospective respondents via WhatsApp groups and e-mails, resulting in the collection of data from 549 females out of which few were discarded (being incomplete) and consequently, the final sample comprised 383 females (response rate 71 per cent). The response set was one response-one person, with a time limit of two weeks; i.e., the third, and fourth week of August 2022. The surveyed sample of 383 comprised 52 per cent rural (N = 200) and 48 percent urban (N = 183) females. The respondents were spread across four age groups, with the maximum being 21-30 (36 per cent) years old. All were educated, and about one-third (35 per cent) working.

### **RESULTS AND DISCUSSIONS**

The first hypothesis (H1) proposed that females' consumption of media varies across traditional and digital media. In this direction, all the available media options, for different possible activities that may have been undertaken by respondents on an average daily bases, were identified and categorized into two types of media, one that needs the Internet for execution herein termed as digital media that includes studying/working online, messaging on phone, and Internet surfing including social media usage, and another for whom the Internet is not needed herein termed as traditional media that includes studying/working offline, reading, watching television, and listening radio. Table 1 summarizes the corresponding data. The results show that about three-fourths of the respondents spend more than one hour on studies/working both online (43.1 percent + 32.1 percent = 75.2 percent) and online (42.8 percent + 30.8 percent = 73.6 percent). The

next most utilized option is Internet surfing, on which the respondents spend about 1.75 hours daily followed by reading ( $M = 1.54$ ), chatting/messaging ( $M = 1.45$ ), watching television ( $M = 1.33$ ), and listening to radio ( $M = 1.22$ ). Among all the listed activities, listening to the radio emerged as the least preferred activity of females 80.4 percent of them spent less than one hour. Minute observation of analysis results also revealed the higher indulgence of females in digital media-based activities as compared to traditional media-based activities. The results, thus, supported the first hypothesis.

Type of Activity	Low Consumption	Moderate Consumption	High Consumption	Mean (SD)
	0 to 1 hour (%)	1 to 3 hours (%)	3 to 5 hours (%)	
Digital Media Based				
Studying/working (online)	24.8	43.1	32.1	2.07 (0.75)
Surfing Internet	42.6	39.7	17.8	1.75 (0.74)
Chatting/messaging on phone	62.9	29.2	7.8	1.45 (0.64)
Traditional Media Based				
Studying/working (offline)	26.4	42.8	30.8	2.04 (0.76)
Reading (books/magazines/newspapers )	53.0	39.2	7.3	1.54 (0.63)
Television viewing	70.0	26.6	3.4	1.33 (0.54)
Listening to Radio	80.4	17.5	2.1	1.22 (0.46)

Analysis of data reveals that out of the five media options (Internet, magazines, newspapers, radio, television), the Internet is the most preferred media, whereas radio is the least preferred media used by the respondents across the three types of activities. Within the activities, the use of the Internet is most popular for work-related information (4.5 percent), non-food shopping (94.3 percent), food shopping (88.8 percent), travel and tour-related information (86.7 percent), and

information on health issues (80.4 percent) followed by rest of the activities. Television is the next most preferred media option by respondents for entertainment (33.4 percent), news/current events (24.5 percent), and weather forecast (17.8 percent) followed by newspapers for news/current events (18.0 percent), magazines for entertainment (12.0 percent), and radio for health issues (4.4 percent). The results (Table 2) thus confirmed the assertion made in the second hypothesis.

**Table 2: Factor analysis of media choice across activities**

Type of Activity	Factor Loading <sup>a</sup>	Internet %	Magazines %	Newspapers %	Radio %	Television %
<b>Factor 1- Consumption</b>						
New products' information	.75	88.0	1.8	4.7	1.0	4.4
Food shopping	.75	88.8	6.0	2.3	1.0	1.8
Non-food shopping	.63	94.3	3.4	0.5	0.5	1.3
<b>Factor 2 - Entertainment</b>						
	.78	52.5	12.0	1.3	0.8	33.4
<b>Factor 3 - Information</b>						
News/current events	.81	44.4	11.2	18.0	1.8	24.5
Weather forecast	.67	66.8	6.5	7.6	1.3	17.8
Travel and tour	.54	86.7	7.0	3.4	1.0	1.8
Work related	.45	94.5	2.9	1.8	0.5	0.3
Health Issues	.43	80.4	5.7	6.0	4.4	3.4

<sup>a</sup> – Extraction Method: Principal Component; Rotation Method: Varimax with Kaiser Normalization; Eigen Value > 1.

The third hypothesis (H3) proposed that females' frequency of the Internet consumption varies across the activities undertaken. To this end, twelve activities were identified under three headings (consumption, entertainment, and information activities) for which the Internet may be used by the respondents, most frequently daily. The respective data were collected using a 5-point scale (Table 3). The mean Internet usage scores as enlisted in Table 3 are different from each other and the majority of them are well above the scale mid value (2.5) indicating that the frequency of Internet usage varies across activities. The mean

scores also indicate that usage of the Internet is more popular for informative purposes than for consumption and entertainment in this order. Rankings were assigned to the listed activities based on mean usage scores. As per these rankings, the usage of the Internet is highest for gathering health-related information ( $M = 3.96$ ; Rank = I) and the least for making friends ( $M = 2.07$ ; Rank = XII). For statistical verification, one sample t-test was applied by taking 2.5 (scale mid-value) as the test value. All the t-values were found to be significant at  $p < .001$ , and  $P < .05$  leading to the acceptance of H3.

**Table 3: Internet Usage: t-test**

Type of activity	Mean (SD) <sup>1</sup>	Ranking <sup>2</sup>	Mean Difference <sup>3</sup>	t-value	Sig.
<u>Consumption</u>					
Products' information	2.66 (1.39)	X	0.16	2.30	.022*
Food shopping	3.35 (1.32)	V	0.85	12.62	.000**
Non-food shopping	2.69 (1.23)	IX	0.19	3.10	.002*
<u>Entertainment</u>					
Watching movies/shows	3.14 (1.29)	VI	0.64	9.67	.000**
Listening Music	3.13 (1.32)	VII	0.83	12.07	.000**
Playing Games	2.20 (1.35)	XI	-0.30	-4.33	.000**
Making friends	2.07 (1.28)	XII	-0.43	-6.59	.000**
<u>Information</u>					
Weather	3.42 (1.13)	IV	0.92	15.98	.000**
Travel and tour	3.01 (1.38)	VIII	0.51	7.28	.000*
Work/studies related	3.68 (1.27)	III	1.18	19.32	.000**
Health Issues	3.96 (1.12)	I	1.46	25.51	.000**
Further education	3.74 (1.19)	II	1.24	18.16	.000**
Notes: 1. Five point scale (1= never, 5 = always) 2. Ranking is based on mean scores 3. Mean difference = Mean Scores – Scale Mid value (2.5) 4. * $p < 0.05$ , ** $p < 0.001$					

## CONCLUSIONS

The study focused on examining the media consumption behaviour of Indian females in terms of why, what, when, and how they consume different media options (traditional and digital). This understanding will guide the stakeholders to work collectively in the direction of taking measures to strengthen females' overall well-being, access to affordable and quality health care, educational opportunities,

empowerment, decision-making skills, development, and social status by effectively including their media consumption behaviour. The mean usage scores for traditional and digital media revealed that females use both traditional and digital media mostly for their studies/official work. Among all the listed activities, listening to the radio emerged as the least preferred activity of females. As expected, the analysis results also revealed the

higher indulgence of females in digital media-based activities as compared to traditional media-based activities.

Study results also revealed that females' most preferred media choice varies across the nine activities that have been chosen for this study. Here also out of the five media options, i.e., Internet, magazine, newspapers, radio, and television, the Internet emerged as the most preferred media option. The most favored reason behind the popularity of the Internet is the speed, secrecy, authenticity, multiple available websites, sources, and options, at which information and insights can be derived apart from the sophistication of actions that can be created to provide compelling virtual product experiences. Via Internet, companies can launch products faster, reach consumers synchronously across demographically segmented beneficiaries, test content in real-time, and respond to the needs, doubts, and requirements of users in a fraction of the time.

Government organizations can make good use of the Internet to spread important messages to families by targeting females by making websites more useful, attractive, and interactive. The digital revolution added to the venues in which marketers can attract increasingly female consumers. The girls also face various kinds of discrimination as well in accessing nutrition, education, employment opportunities, and health services. Sometimes they are forced to marry at a very young age, have a pregnancy, have unsafe abortions, and have childbearing thereby posing grave health issues. For this, the girls from a very young age may be provided with proper and timely sexual and reproductive health

information that too with due protection to their right to privacy, confidentiality, and respect.

The governments at various levels may develop strategies and policies to promote and support women's education, awareness regarding various government schemes, microcredit facilities, small-scale industries, and full and equal participation in economic development. Women must be encouraged to contribute actively to creating content for females which may help them in becoming more empowered. The governments may also promote the balanced, and empowered portrayals of females by the media which may lead to better female participation in the workforce, production, and decision-making. Females may be given training to make use of the available information, risks of cyberbullying and fraud, authenticity and accuracy of available information, etc.

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# The Economic and Social Implications of Religious Tourism

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## Abstract

**Background:** The popularity of religious tourism in India has steadily grown over the years, however, significant research work precludes this area. Keeping the patriarchal male-dominance orientation of Indian society this study attempts to fill this void with the aim to examine the economic and social implications of religious tourism in India from females' perspective. **Aim:** The study aims to explore the economic and social implications of religious tourism in the Indian context by creating new research avenues, offering new and fresh insights, and drawing conclusions based on personal experiences, beliefs, and perceptions of respondents on the topic studied. **Setting:** This study focused on the perspective of females in terms of the economic and social implications of religious tourism in Indian context. **Methods:** The empirical study is based on an extensive literature review and one-hour in-depth interviews of 45 females selected through purposive sampling technique across a broad age group of 30-60 years residing in India. Study results were obtained by using the constructive "Grounded Theory Approach". **Results:** Results indicate the important structural changes that are taking place in India regarding females' participation, particularly in religious tourism. Important insights were obtained about religious tourism's economic and social implications from the perspectives of females. **Conclusion:** It is, therefore, concluded that the religious tourism is gaining popularity of amongst females in India not only for the fulfilment of various purposes such as rejuvenation, entertainment, stress-busting, empowerment, employment, and socialization of children but also as a tool for income generation, social and cultural development, balanced regional growth, better infrastructure, and promotion of cultural diversity. The study results will provide the vital guidance to the policy makers in the area of women empowerment.

**Keywords:** Religious tourism, empirical study, purposive sampling, grounded theory, India

**JEL Classifications** - Z30, Z32

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## Introduction

Tourism is a social, cultural, and economic phenomenon that entails the travel activity undertaken by people by visiting a particular place(s) outside their usual environment for personal, business, and/or professional purposes. Tourism is a multidimensional and multidisciplinary activity supported by various facilities and service providers, i.e., individuals, communities, businessmen, and government. As an activity, tourism is emerging as a (i) manifestation of fulfilment of social and recreational needs of individuals; (ii) source of employment; and (iii) interaction between the government(s), tourists, and entrepreneurs. Consequently, across the globe, the tourism industry holds significant importance at domestic and international levels in terms of its contribution to economic development (Shyju et al., 2021; Dhali, 2020; Bajpai and Lee, 2015).

Based on goal orientation, researchers have identified various types of travel activities: (i) business tourism (travel to complete a business transaction/event); (ii) nature tourism (travel to enjoy a natural setting/wildlife); (iii) cultural tourism (travel to experience the history/folklore/culture of a people); (iv) social tourism (traveling with others, bus-



tours, family tours); (v) recreation tourism (traveling to escape the routine of daily life); (vi) active tourism (traveling to explore new activities); (vii) sports tourism (traveling to experience a sport/sporting event); (viii) adventure tourism (traveling that involves challenge and adventure); (ix) health tourism (traveling to improve one's health/medical treatment); and (x) religious tourism (traveling to a place of spiritual significance) (Shyju et al., 2021). Religious tourism refers to travel for religious or spiritual purposes. One of the oldest forms of tourism and also known as spiritual tourism, is faith tourism, sacred tourism, and/or spiritual tourism undertaken by people by visiting sacred sites as a way to worship, enjoy salvation, and fulfil their religious beliefs. India, being one of the most ancient civilizations in the world, has always been a nurturing ground for almost all the major religions of the world. Some of the most prominent ones are Hinduism, Islam, Buddhism, Christianity, Sikhism, Jainism, Vaishnavism, and Judaism. Corresponding to these religions, there exist an impressively large number of religious places to offer prayers to God such as temples, mosques, churches, gurudwaras, and monasteries (Dhali, 2020). These religious places of worship beckon domestic and international travellers to visit a spiritual country like India (Julta, 2002). The quest to attain spirituality has also propelled a large number of people to visit these religious destinations at least once a year resulting in exponential growth in this sector in India, especially during the last decades. Religious tourism is highly significant for India from the economic perspective for two major reasons: firstly, the proportion (about 60 percent) of this kind of tourism out of the total domestic tourism, and secondly, the huge target market which consists of everyone irrespective of age, gender, religion, caste, colour, education, social and economic status (Dhali, 2020). In India, the religious tourism has acquired many forms such as: (i) pilgrimages; (ii) missionary travel; (iii) leisure/vacations; (iv) faith-based; (v) monastery visits; (vi) and religious tourist attractions (FICCI, 2012).

Indian government has already recognized the significance of religious tourism both as an economic enabler and as a tool to ensure communal harmony, and accordingly has also taken various initiatives to promote the religious tourism sector of the country that include: (i) e-Visa for the citizens of 161 countries; (ii) promotion of India as a 365 days destination; (iii) establishment of IRCTC (Indian Railway Catering and Tourism Corporation) in the year 1999; (iv) boost to the Buddhist Circuit; (v) development of infrastructure in terms of roads, airports, Internet connectivity, better health services, online booking platforms, help-desks, tourism boards in every state, transportation, and accommodation; (vi) Identification and development of more than 89 destinations under Sufi, Buddhist, and Jain, Christian, Sikh, Hinduism, and Sarva Dharma circuits (13 in number) (Arora, 2020; Joseph et al., 2019; Griffin & Raj, 2017). As per the report of the Ministry of External Affairs, in the year 2017, the tourism industry employed about 6 percent of India's total workforce and contributed US\$234 billion to the national GDP (Ministry of External Affairs, 2019). Another report by the India Brand Equity Foundation estimated this contribution to GDP to be about US\$492.2 billion in the year 2028 (IBEF, 2022). The government of India is taking every possible effort to develop and exploit the potential of this sector with the aim to (i) effectuate foreign exchange (IBEF, 2022); (ii) attract higher direct foreign investment; and (iii) generate maximum possible jobs (Ministry of External Affairs, 2019). Exponential growth in the travel and tourism sectors in India has contributed immensely to the development of religious tourism in a holistic manner (Shyju et al., 2021; Joseph et al., 2019). In India, a growing middle class and rising disposable income are reshaping the growth in this sector. The popularity of this sector has also steadily grown over the years with overseas Indians and foreigners. However, significant research work precludes this area. Keeping the patriarchal male-dominance orientation of Indian society this study attempts to fill this void with the aim to examine the economic and social implications of religious tourism in India from females' perspective.

## Literature Review

Past scholars have found religious tourism as a means to provide an intrinsic divine experience (Batson and Ventis, 1982) and consequently fulfill the spiritual needs of an individual (Shyju et al., 2021). As a culture-oriented travel activity, it significantly impacts the political, economic, and socio-cultural environment of a country (Raj and Morpeth, 2007; Singh, 2006; Pickering, 1984). Almost all religions motivate followers to undertake pilgrimage for their physical and spiritual refinement (Shyju et al., 2021). Supported by a wide range of factors attributed to the individual and society (Collins-Kreiner, 2020; Slojan & Liro, 2020; Shinde, 2007; Winkelman and Dubisch, 2005), religions from the time immortal playing a significant role in directing people to perceive pilgrims to holy-sites with religious-orientation (Griffin and Raj, 2017; Pickering, 1984) for internal transformation (Barber, 1993).

Researchers have found religious tourism as a cultural phenomenon (Collins-Kreiner, 2020). Across the world, various religious authorities are playing an active role in structuring, facilitating, initializing, and promoting pilgrimages to holy sites by providing every possible support in the form of monetary assistance, and developing the physical and social infrastructure for all (Slojan and Liro, 2020; Smith, 1992; Adler, 1989).

India is a country of spiritual orientation with an ancient tradition of pilgrimages (Shyju et al., 2021). Even Indian emperors have duly supported the development of various facilities to give a boost to religious tourism by building rest houses for pilgrims known as “Dharmashala” or “Sarai”, funding religious visits, and attracting scholars from far and wide (Sen, 1991). In India, the religious texts have defined visits to sacred holy sites as “Tīraths” and talk explicitly about the “Eternal Order” or “Eternal Path” which according to them are attainable only by visiting these holy sites (Behrendt, 2009; Raj and Morpeth, 2007).

Children are socialized about “Tīrath” at sacred sites through folktales, myths, and history. India is home to several such sacred sites which are identified at several places in the sacred scriptures of different religions. The revered texts of these holy writs have recommended followers visit these sites to attain “Salvation” (Singh, 2006; Jutla, 2002) accordingly, many of the followers do undertake long arduous journeys on foot to visit these sacred sites (Shinde, 2007). Indian people, in general, are socialized with the perception that God exists in the form of the presiding deity of a temple (Shyju et al., 2021) which has immensely supported religious tourism (Singh, 2006).

In India, some of the sacred religious sites are for: (i) Hindus – “Char Dhams Yatra (four divine abodes or shrines), 12 Jyotirlinga Sites (Lord Shiv), 51 Shakti Peethas (shrines of Goddess Shakti/Parvati)”; (ii) Jains – “Girnar, Shravana Belagola, Parasnath Hill”; (iii) Buddhists - “Sarnath, Kushinagar, Bodh Gaya”; (iv) Sikhs - “Golden Temple, Hem Kund Sahib, Patna Sahib, Paonta Sahib”; and (v) Muslims – “Hazratbal Shrine, Jama Masjid, Ajmer Sharif, Sheikh Salim Chisti's Dargah, Haji Ali Dargah” (Arora, 2020; Dhali, 2020; Jutla, 2002). Researchers have also focused on the detrimental effect of growing religious tourism on the environment (Dhali, 2020). Currently, India is ranked second in terms of annual demand growth (about 10 percent) for global and domestic tourism sectors (Shyju et al., 2021). The travel market in India is projected to reach US\$ 75 billion in 2020 to US\$ 125 billion in 2027 (IBEF, 2022). India is emerging as a “must-see destination” among domestic and international travelers. Some of the most promising tourism segments in India include eco-tourism, wildlife tourism, farm tourism, cultural and heritage tourism, health tourism, business tourism, medical tourism, recreational tourism, leisure tourism, and religious tourism (IBEF, 2022). A study conducted by the Centre for Study of Developing Societies (Ministry of External Affairs, 2019) in 2017 highlighting the growing importance of religious tourism in India proposed that religious tours are predominantly a family affair, and about 25 percent of Indians are oriented towards touring religious places and preferred these places as a pilgrimage destination, and a location of choice for vacations.

## Methodology

### *Sample and Procedures*

This paper aims to examine the economic and social implications of religious tourism for females in India. Due to the absence of a similar study in the Indian context, this study adopts an inductive research approach (Brinkmann and Kvale, 2018) based on an extensive literature review and one-hour in-depth interviews of 45 females selected through the purposive sampling technique across a wide age group of 30-60 years residing in rural and urban areas of India. The inductive qualitative research approach also ensured the collection of comprehensive information-rich first-hand data in terms of objectivity, reliability, validity, and replicability (Charmaz and Thornberg, 2021; Ayon et al., 2017). Past scholars have recommended the use of the interview method for qualitative research for greater flexibility and intensive information extraction from the respondents (Bryman, 2016).

The target population is constituted of Indian females who have visited at least one religious' site in the previous two years. Initially, 72 such females were chosen and contacted telephonically. Detailed discussions were held with them to make them understand the study objectives, their rights as respondents, and assurance of the confidentiality of the

information to be provided by them. Finally, 45 of these females agreed to provide the necessary data for this study. The data was obtained in the form of a semi-structured questionnaire divided into two parts. A semi-structured questionnaire was adopted for creating a friendlier and more normal conversation with the respondents where the interviewees can speak their actual mindstyle without hesitation (Bryman, 2016). Literature review laid down the foundation for the preparation of the questionnaire regarding the study themes. For the ease of respondents, the questionnaire was pre-tested with a sample of 5 females and drafted in the local language, i.e. Hindi. For analysis purposes, these responses were translated into English. Respondents' demographic appears in Table 1.

**Table 1: Sample Profile**

Characteristics	Number (N = 45)	%	Characteristics	Number (N=45)	%
<b>Age (years)</b>			<b>Educational Qualification</b>		
30-40	12	27	Not educated	06	13
40-50	18	40	Below class 12	24	53
50-60	15	33	Graduation and above	15	34
<b>Residential Area</b>			<b>Employment status</b>		
Rural	20	44	Working	09	20
Urban	25	56	Non-working	36	80
<b>Family Type</b>			<b>Family Size</b>		
Joint Family	18	40	Small Family	28	62
Nuclear Family	27	60	Large Family	17	38

The surveyed sample consisted of respondents from rural (44%) and urban (56%) areas across three age groups: 30-40 years (27%); 40-50 years (40%); and 50-60 years (33%). More than half (60%) of the respondents were: (i) from nuclear families; (ii) educated (53%+34%) (iii) non-working (80%); and (iii) having smaller size families with a maximum of two children (62%).

### **Data Analysis Method**

The “Grounded Theory” has been used for this study for theoretical analyses. Grounded theory is a non-mathematical widely used research design (Charmaz and Thornberg, 2021; Faija et al., 2017) that offers useful strategies to the researchers to collect, understand, organize and develop a persuasive theoretical understanding of a wide-ranging qualitative investigation from the perspective of respondents' experiences, beliefs, and perceptions. This theory was first developed by American sociologists Barney Glaser and Anselm Strauss in 1967 (Strauss and Corbin, 1990; Glaser and Strauss, 1967) and was gradually modified by several researchers (Faija et al., 2017). Grounded theory is a process of construction, interaction, and interpretation of qualitative information to generate some theoretical explanatory results (Strauss and Corbin, 1990).

Charmaz and Thornberg (2021) have defined Grounded theory as “a systematic method of conducting research that shapes collecting data and provides explicit strategies for analysing them”. The main focus of this method is to build an understanding of the core concerns of the research undertaken based on the collected qualitative data (Charmaz and Thornberg, 2021; Ayon et al., 2017; Gibson, 2016; Scull et al., 2016). This theory is based on the inductive approach method. The analysis process comprised four stages: (1) Codification of each interview precisely line-by-line whereby collected data were labeled based on some intrinsic similarities entailed in the data; (2) Memoing of each information obtained at the previous stage. It includes both the identification and segregation of fragmented information under a distinct, descriptive and analytic head; (3) Sorting of the information under separate heads (stage 2) on the bases of commonality in a fewer number of broader headings; and (4) Enumeration of final results in the light of literature review.

### **Data Analysis Procedure**

Grounded theory based on the collected data guided the construction of initial codes. The focus of this stage was to explore, iterate, and interpret the information ingrained in the collected data, consequently, first, the data was

compared with data, then data with codes, and finally codes with codes (Thornberg et al., 2013). These codes were considered provisional or initial codes. Based on similarities and differences initial codes were further grouped into focused codes, thirteen in this study (Tables 2 and 3). For example, the focused code “*source of rejuvenation*” had been created by merging the initial codes like ‘entertaining’, ‘energizing’, ‘me time’, ‘enlightening and self-engaging’, ‘attaining spirituality’, ‘socializing with others’, ‘sweet memories’, and ‘better human relations’. Similarly, the focused code, “*Religion obligation*”, had been created by merging the initial codes like ‘fulfilling god’s order’, ‘religion obligation and duty’, ‘others doing it’ (Tables 2 and 3). The whole process resulted in the creation of the “core theme” of this study, i.e., economic (Table 2), and social (Table 3) implications of religious tourism.

### **Data Reliability and Validity**

Literature review, pre-testing of the questionnaire, constant comparison while creating codes, and systematic use of grounded theory have ensured that the result of the study on “economic and social implications of religious tourism” reaches the empirical grounding (Corbin and Strauss, 2015; Thornberg et al., 2013) as the codes have tightly fitted the data (Corbin and Strauss, 2015). The whole process also ensured the credibility, trustworthiness (Strauss and Corbin, 1990), workability (Glaser, 1998), understanding (Charmaz, 2017), and relevance (Charmaz, 2017; Glaser, 1998) of the collected data and results thereof as the majority of the respondents could recognize almost all the issues and implications relating to the religious tourism in the Indian context.

**Table 2: Coding for Core Concept “Financial Implications of Religious Tourism”**

<b>Representative Quotes</b>	<b>Initial Coding</b>	<b>Focused Coding</b>
<i>“I arrange such trips exclusively for females at my village on commission bases”</i> <i>“seen many females selling hand-made artistic things.... handling small tea shops, grocery shops, confectionery shops etc. at such sites”</i> <i>“we buy new clothes to visit holy places.... the cloth merchants and tailors mint money on such occasions”</i> <i>“our beauty-parlor expense also increases”</i> <i>“my husband bought a mini bus on loan to ferry pilgrims”</i>	Self-reliant; Small scale entrepreneurs; Income generation for others; Increase in spending; Creation of employment.	Employment and income generation
<i>“met people from different places, got to know about their culture....it was indeed very soothing”</i> <i>“really amazed to see how people with diverse interests, eating habits, clothing, etc. becomes one in the abode of God”</i> <i>“travelling with non-family members makes it possible to understand, adopt, and learn from others”</i>	Knowledge enhancement; Broad horizon; Unity in diversity; Respect for others.	Promotion to cultural diversity
<i>“with every visit I find an improvement in availability of drinking water, washrooms, help booths, security, and cleanliness”</i> <i>“followers offer too much money, silver, gold, and what not”</i> <i>“many people in our neighborhood have started providing travel packages making it easier to go anywhere”</i> <i>“governments at various levels have taken initiatives in this regard in terms of providing funds for development of these places”</i>	Better Infrastructure; Funds-availability for development; Government initiatives; Economy booster; Online facilities; Better safety measures.	Development of better infrastructure

<p><i>"I visited many holy sites free of cost on a government scheme"</i></p> <p><i>"seen various trusts/ boards managing things at such places"</i></p> <p><i>"smart phones are really handy... you can do anything, anywhere, anytime... a real blessing"</i></p> <p><i>"Internet connectivity even at far reaching places have made it possible for me to visit any place so frequently"</i></p> <p><i>"I don't have to carry too much money all the time...it gives me a feeling of safety... plastic money is very convenient"</i></p>	<p>Government funding; Internet based facilities; Online booking; Credit and Debit cards; Online payments.</p>	Facilitating factors
<p><i>"I have visited sacred places of other religions as well...it's so assuring, peaceful, and powerful"</i></p> <p><i>"all religions are same"</i></p> <p><i>"each religion teaches us to live and let others also live"</i></p> <p><i>"we all are same irrespective of the fact which religion we follow"</i></p>	<p>Promotion of equality; Country's goodwill; Respect for other religions; Country-image.</p>	Communal harmony
<p><i>"my children planned everything for this trip of ours, they made sure to save money wherever it was possible"</i></p> <p><i>"this time my teenage son booked our air tickets, hotels, car on rent, etc., did the bargaining at his own"</i></p> <p><i>"by spending money on the trip, my kids have started realizing the value of money, how to save it, and how to spend it, the whole process is so satisfying for us as parents"</i></p>	<p>Financial management; inculcation of saving habits; Understanding about the value of money; Better financial skills.</p>	Financial socialization of children

**Table 3: Coding for Core Concept "Social Implications of Religious Tourism"**

Representative Quotes	Initial Coding	Focused Coding
<p><i>"for visiting religious sites I am allowed to go with my friends and neighbors... the whole process is so energizing "</i></p> <p><i>"I got a chance to talk to different people and learn many new things such as recipes, home-remedies, religious songs, career opportunities and what not"</i></p> <p><i>"Used to had frequent fights at home... this pilgrimage gave a chance to refresh our relations...these visits are a total package for entertainment without any kind of botheration about safety"</i></p>	<p>Entertaining; Energizing; Me time; Enlightening and self-engaging; Attaining spirituality; Socializing with others; Sweet memories; Better relations.</p>	Source of rejuvenation
<p><i>"only such visits provide me a chance to think about myself and God without any interruption"</i></p> <p><i>"I got an order from God to undertake this pilgrimage"</i></p> <p><i>"most of my known people have already undertaken such pilgrimages in their life"</i></p> <p><i>"I promised God to undertake the pilgrimage if my son get an admission in a good college .... by God grace he got it ... now I had to fulfill my promise"</i></p>	<p>Fulfilling God's order; Religion obligation and duty; Others doing it.</p>	Religion obligation
<p><i>"Office assignment was too draining... this visit was such a breather"</i></p> <p><i>"Whenever I feel depressed... I visit the sacred sites, it gives me immense pleasure and mental peace"</i></p> <p><i>"Following the same routine every day is so depressing... visiting holy places gives me strength to keep me going...I am too busy throughout the day... I don't have time for myself except such visits"</i></p>	<p>Mentally relaxing; Gateway of stress busting; Monotony buster; Break from deadlines; Mini-celebration; Scenic beauty; Mental well-being.</p>	Stress-busting activity



<i>"A real learning from arranging everything at my own"</i> <i>"with every visit I am becoming more confident as I am dealing with situations and strangers many a times at my own"</i> <i>"My knowledge about these places, there religious importance, geographical location, etc. is improving ... my colleagues also take my inputs while going .....a real empowerment"</i>	Experience orientation; Confidence booster; Learning management skills; Knowledge enhancement; Able to open-up; Motivational.	<i>Tool of empowerment</i>
<i>"getting permission to visit places other than religious places is really difficult in my family"</i> <i>"easily get sufficient money to spend on such visits"</i> <i>"family members encourage me to take more such visits"</i> <i>"my in-laws stay with us whenever I undertake such visits"</i>	Easy permission; Encouragement from kids and husband; Supportive in-laws.	<i>Family support</i>
<i>"my children got attracted towards religion by visiting temples"</i> <i>"I make sure to take my kids with me while visiting any holy places... they also have to learn about our religion"</i> <i>"children felt the power of God at holy sites"</i> <i>"kids understand the concept of religious harmony by being at sacred sites...I learnt about our religion mostly by visiting with my parents... my kids will also learn like this"</i>	Imbibing religion; learning rituals of various religions; Accustomization with divine power; Understanding 'Holy Verses'.	<i>Religious socialization of children</i>
<i>"getting clean drinkable water and washrooms are a big issue at these places"</i> <i>"during peak seasons, it's really too costly to arrange for lodging and food at such places"</i> <i>"I think the problems are at my end... I think too much before going out on any kind of trips... mentally too engaged"</i> <i>"family financial resources is a deterrent factor"</i> <i>"safety and hygiene are two major issues...better roads and transportation facilities are also needed"</i>	Infrastructure; Affordability; Issue of on-off-season; Safety; Hygiene; Transportation; Family engagement; Lack of confidence.	<i>Challenges</i>

## Findings

The study findings are structured as per the focused codes identified concurrently in the process of analysis of collected data. For making the results more apprehensive certain abbreviations too are adopted such as majority (34-45), many (23-33), several (12-22), and few (1-11) respondents.

## Economic implications

**Employment and Income generation** –The majority of the respondents affirmed the role of religious tourism in creating employment across all age groups in general but specifically for women, youth, migrant workers, rural communities, and people with limited financial resources. The major areas concerned are service sectors directly linked with tourism such as transportation, artifacts, travel guides, food and beverages, general provision stores, priests, adorers, hotels, and restaurants. Many of the respondents stated that they and their family members directly depend on religious tourism for their livelihood. Better employment opportunities result in income generation and a better standard of living for the stakeholders. For example, a 53 years old mother of three children said:

*"During my several visits to holy places, I have seen a large number of street hawkers, tea sellers, etc. I am also graduate and never thought about earning at my own, however, observing the scale of people visiting such places I have started providing travel and tour services to people at a nominal charge"*

**Promotion to cultural diversity** – Tourists are attracted to the cultural diversity of sacred sites as stated by a few of the respondents. Religious tourism improves and promotes the tourism competitiveness of religious places thereby making them even more popular with prospective tourists. Culture is an important element of the tourism product, which gives distinctiveness to a place, state, and country in a crowded global marketplace along with providing

important means for strengthening cultural heritage, cultural production, and creativity. A post-graduate student has expressed:

*“Religious visit gives me an opportunity to realize that we all are same irrespective of our birth places, eating habits, interests, beliefs, customs, castes, clothing etc..... we all are one at holy places”*

**Development of better infrastructure** – The religious places are becoming tourist-friendly, senior citizen-friendly, and disabled-friendly due to the high influx of tourists at these places as mentioned by many of the respondents. These places are now well connected via different modes of transport. Many of the supporting facilities have also been developed at these places including the availability of healthy food, roadside washrooms, and drinking water, personalized room services, local transportation, high-quality bedding, different stay options, noise-free surroundings, easier access for differently-abled people through wheelchairs, ramps, 24x7 medical attention, and doctor on call. A newly married women said:

*“Being a regular visitor at sacred sites I found a drastic improvement in basic infrastructural facilities, drinking water, sanitary facilities, travel agencies, online booking, phone connectivity, government support and funding making various types of tourism easier to undertake”*

**Facilitating factors** – The majority of the respondents identified various factors that have contributed to the unprecedented growth in this sector apart from better infrastructure. They have also recognized the significant role played by smartphones, online booking for the visit (darshan), aarti (prayer), and sacrament (prasad), Internet connectivity, plastic money (debit/credit cards), online payments, online booking for everything, higher disposable family income, smaller family size, family-time, peer-pressure, education, direct flights, helicopter services at difficult areas, food choices, and reviews on social media.

**Communal harmony** – Several respondents have shared their personal experiences about the peaceful, powerful, and assuring environment of sacred places of every religion. Many of them have also stated that all religions are an equal and powerful medium for establishing communal harmony, for example, one of the respondents aged 49 years expressed:

*“In the eyes of God we all are same irrespective of our caste, religion, wealth, income, education, and skin-colour....this is really reassuring and can be easily seen by me at all the sacred places I have visited so far”*

*“Being on religious tour gives a sense of security that nothing wrong can happen at such places as even the unknown people are so helpful”*

**Financial socialization of children** – Many of the respondents have asserted that religious tourism is instrumental in teaching children about the management of finances, the importance of saving, planning, budgeting, etc., which otherwise is difficult to impart. For example, a mother of two school-going children has stated:

*“By getting my teenage children involved at every planning and execution stage, I succeeded in teaching them the fundamentals of handling finance in a better and effective way, and they did enjoyed this”*

## Social Implications

**Source of rejuvenation** - Most of the respondents identified religious tourism as their prime source of entertainment when they can (i) spend time with people other than their family members; (ii) devote time to attain their spiritual goals; and (iii) internally energize themselves to take on difficult tasks. Few of the respondents were of the opinion that getting permission to visit religious places with neighbours, friends, and sometimes even with strangers is much easier to obtain as compared to while visiting other places.

*“Simple thought of going on tours trills me and fills me with energy ... and getting easy permission to visit holy places is a boon.... I cannot ask for more”*

**Religion obligation** – Majority of the respondents agreed that they visit places of religious significance as they are directed to do so in their religions. Few of them also stated that in general these are physical journeys most of the time on foot to a sacred site to the adherent of a particular religious belief system. Visiting holy places is also popular on the fulfilment of wishes of the followers.

**Stress-busting activity** – Religious tourism is an ideal stress buster, rejuvenating therapy, and a gateway to go away from a hectic lifestyle and stressful work environment. Many respondents agreed that in today's time life is full of negativity, stress, and anxiety. Few respondents have expressed their dissatisfaction with life even after earning quite sufficient money to lead a comfortable life. Most of them have perceived the religious tours as a divine order to reconnect with God and a much-needed break from the hustle-bustle of routine life. Religious tourism is generally undertaken as a family or a group activity, thus providing an opportunity to: (i) ease out the stress generated by pressing issues; (ii) understand others' religions; and (iii) seek mental well-being and peace. Many of the religious sites in India have started providing health benefits to people in terms of 'Yoga retreats' and 'Ayurvedic spas'

**Tool of empowerment** – Religious tours provide different experiences and strength to face adverse situations in real life. Independently taken tours are confidence boosters, expand the knowledge, and empower people to take better decisions. Many respondents asserted that every time they undertake any type of travelling activity it increases their confidence by way of: (i) tackling money; (ii) taking quick decisions in different situations; (iii) talking to strangers; (iv) gaining knowledge through surfing Internet; and (v) advising others to visit these different places. Some of them have also stated that they feel empowered when they share their pictures taken at such places on social media.

**Family support** – Some respondents admitted that as compared to other types of tours, visiting sacred places is fully supported by families, hence easier to undertake by females in India. Being a patriarchal society, Indian females at large enjoy limited freedom to undertake outdoor activities on their own but the situation is different in the case of religious tours when they get easy permission and full support from their spouses, in-laws, children, and others as reported by one of the respondents:

*"My in-laws and husband create no fuss in taking care of the kids in my absence whenever I visit any of the holy sites"*

**Tool for religious socialization of children** – The majority of the respondents have accepted that traveling to religious places ensures that their children get first-hand knowledge and understanding to remain connected to traditions, customs, rituals, religions, faith, deities, and heritage. Religious tourism is not restricted to traveling to religious destinations only the travellers try to explore and learn more about the surrounding areas for local food options, historical background, adventure activities, and art and craft. One respondent said:

*"I always make sure to take my sons to the sacred places to feel the 'Divine power' of such places...they also appreciate the Godly ambience, devotees, food, facilities, management and everything... as a mother it's so satisfying to see them connecting with God and our religion"*

**Challenges** – Several respondents have admitted that keeping in view the high footfall at such places, a lot needs to be done in terms of crowd management. Some have also suggested outsourcing maintenance and discipline as at some of the places people have to wait for many hours to get a sight ('Darshan') of God. Few have also suggested that proper management of waste also needs to be undertaken at a larger scale.

## Conclusions

This study by following an open and exploratory approach develops an original grounded theory on "economic and social implications of religious tourism", and contributes to the literature by creating new research avenues, offering new and fresh insights, and clarifying personal experiences, beliefs, and perceptions of respondents on the topic

being studied. Based on empirical grounding, this study ensures credibility, relevance, workability, modifiability, and resonance of the analysis results. On a larger scale, the results may also be verified, revised, and elaborated through quantitative data analysis. The study results indicate the growing popularity of religious tourism amongst females in India for the fulfilment of various purposes such as rejuvenation, entertainment, stress-busting, empowerment, employment, and socialization of children. The respondents have recognized religious tourism as a tool for income generation, social and cultural development, balanced regional growth, better infrastructure, and promotion of cultural diversity. They have also asserted the full support of their family members to undertake such traveling independently. These results are parallel to the literature (Shyju et al., 2021; Arora, 2020; Dhali, 2020; Shinde, 2007; Jutla, 2002). These results are even more significant at a time when India is witnessing growing weekend travel culture duly supported by the nuclear middle-class families with both parents working and higher disposable income. India has great potential for developing lesser-known and off-beat religious and spiritual tourist destinations around the more well-known places. This will lead to better and balanced regional development along with employment and income generation. From time to time, the Ministry of Tourism has launched various schemes to boost the growth in this sector, for example, the “Swadesh Darshan”, “Pilgrimage Rejuvenation and Spiritual Augmentation Drive (PRASAD)”, “Make in India”, “Mukhyamantri Tirth Yatra Yojana”, “Swami Vivekananda Etihadik Paryatan Yatra Yojana”, and “Senior Citizen Yatra”.

An integrated approach may be adopted to improve the quality of tourism services and the effective management of tourism. The results will particularly provide new dimensions to the policymakers for better management of new investment opportunities in the vast religious tourism space. With millions visiting these sites throughout the year the government should focus on investment in hospitality, transport, waste management, and technology sectors. Future researchers may explore the results of this study in new settings with qualitative data from the bigger probabilistic sample.

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ARTICLE

# Parental Perception of Alpha Kids' Influence in General Buying Decisions During the COVID-19 Pandemic in India

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## Abstract

This paper aims (i) to identify the parental perception of alpha kids' influence on general buying decisions, and (ii) to examine the impact of alpha kids' demographics (age, gender, and sibling) on the influence exerted by them in general buying decisions in families in India during the Covid-19 pandemic. This study is based on a cross-sectional survey approach. Primary data for the study was obtained in February 2021 through a structured questionnaire generated on Google Forms from a sample of mothers of 400 alpha children (aged 8-11 years) from rural and urban areas of Delhi (India). Notable findings emerged from this study revealed that Indian parents perceive their alpha kids to exert significant influence in general buying decisions and this influence is moderated to some extent by the age, gender, and birth order of the children. The results of this study extend interesting theoretical and practical implications for marketers and practitioners to have a better understanding of family consumption behavior in India. Marketers must take note of these observations while designing and implementing marketing mix strategies in respect of various goods and services meant for children/family consumption in India to sustain the impact of the Covid -19 pandemic.

**Keywords:** Generation Alpha; Influence; General Buying Decisions; Covid-19; India.

## 1 Introduction

Family is an important decision-making and consumption unit (Assael, 1989) that regularly buys and consumes a large number of goods and services and has attracted the interest of marketers and consumer behavior researchers over the years (Manouchehri and Burns, 2021; Moore et al., 2002) across countries. In these studies, children too are observed to exert considerable influence in family buying decisions for a wide array of goods and services, and this influence is increasing exponentially over time (Tabassum and Nabi, 2021; Ghose et al., 2020; Madhavi et al., 2004; Chavda et al., 2005). Children's influence on family buying decisions is positively related to various factors such as the age of parents (older), family size (smaller), education facilities (better), socio-economic (slightly wealthier), availability of time to parents for children (lesser), the impact of external socialization variables (higher), life expectancy (higher), media exposure (greater), Internet consumption (greater), cultural mix (more diverse), ownership of mobile phones per member per family (higher), thereby, graduating the children from being mere observers to influencers to deciders in the family purchase decisions (Senevirathna et al., 2022; Manouchehri and Burns, 2021; Tabassum and Nabi, 2021; Rao, 2020; Chaudhary et al., 2018).

“Generation Alpha”, a term coined by sociologist McCrindle (2009) for children born/to be born between 2011 and 2025, is a growing and lucrative consumer market (Senevirathna et al., 2022; Rao, 2020; Chaudhary, 2015) across the world irrespective of their place of birth. Alpha kids are not only spending billions of dollars out of their own pocket money but are also having a strong influence on the shopping behavior of their parents who are equally willing to spend a lot of their resources on their children (Castro et al., 2021; Fluxtrends, 2016). Across generations so far, this is the first group that is expected to be huge in numbers (an estimated 2.5 million alphas are born globally every week), the wealthiest, highly-educated, more assertive, well-informed, social media-friendly, and deeply immersed in technology throughout their lives (Manouchehri and Burns, 2021; McCrindle, 2009).

The intensity of spread of Covid-19 with more than 118 million confirmed cases and causing more than 2.63 million deaths as of 10 March 2021 (Worldometers), makes it one of the deadliest pandemics to date. To mitigate the spread of this pandemic, as a preventive measure, most governments worldwide have imposed, re-imposed, and still imposed strict lockdowns with the closure of most of the services, educational institutions, and offices (Vyas and Butakhieo, 2021). The Indian Government too ordered the first complete nationwide lockdown on 24 March 2020 for 21 days followed by second (19 days), third (14 days), and fourth (14 days) lockdowns respectively (Jeffrey and Kai, 2020). To conclude, one year on, the coronavirus still has the upper hand (Koshy, J., 2021).

The Covid-19 pandemic as compared to pre-pandemic time has two major implications in the area of children's participation in family buying behavior: firstly, due to the complete closure of schools and outdoor physical activities (UNICEF, 2021), children's media usage for studies, gathering information, and entertainment has increased manifold (Deka, K. and Anand, S., 2021), thereby children are becoming more informed than parents in respect of many new products, gadgets, apps, websites, and e-commerce platforms; and secondly, children and parents are now spending more time with each other and forming closer bonds with each other (Gupta and Kaur, 2020) resulting in more open and democratic discussions and involvement of children in most of the buying decisions. Though not yet tested empirically, both the implications will only improve the position of the children across all age groups in family buying decisions.

There exists an extensive body of knowledge about the influencing behavior of children in the pre-pandemic era, though these studies are important and provide a framework for further research, essentially there is an emergent need to validate the findings of these studies during the on-going Covid-19 pandemic in an emerging market economy like India mainly for five reasons: firstly, India is the second most populous country in the world after China with the current population of 1389 million (Worldometers); secondly, India is ranked as the sixth biggest economy in the world by the (Centre for Economics and Business Research, 2021); thirdly, India is a culturally distinct country where despite many cultures, languages, religions, and traditions, people live together with peace and harmony resulting in different consumption choices as compared to other countries; fourthly, more than 31.1 percent of current Indian population is under the age of 14 (Worldometers), and finally, very few studies that have been conducted in India so far are extremely restricted in scope and have only partially examined children's involvement in family buying decisions. Against this backdrop, the present study is being undertaken to empirically investigate the following research questions in the Indian context:

**Research Question 1** Whether parents perceive their alpha kids to exert influence in general buying decisions in Indian families during the pandemic Covid-19?

**Research Question 2** What relationship do the alpha kids' demographics (age, gender, and siblings) have with the influence exerted by these kids in the general buying decisions?

## 2 Literature Review and Hypothesis Formulation

Literature has revealed that children are no longer passive observers but are important participators who exert considerable influence in their families' buying decisions (Ghouse et al., 2020; Senevirathna et al., 2022; Chaudhary et al., 2018) and are increasingly becoming an important distinct consumer segment for various industries (McNeal, 1992). Therefore, to increase the market share in the segment of consumer goods, companies are increasingly directing their marketing campaigns toward children (Sellers, 1989) along with/without parents. Children's participation in family buying decisions is often supported by parents who want to spend more quality time with their children (Senevirathna et al., 2022; Castro et al., 2021; Tabassum and Nabi, 2021; Pratap, A, 2020; Gram, 2007). Parents are also becoming 'curling parents', who try to do everything possible to please their children, and hence, they let their children decide in most cases (Rao, 2020).

The majority of previous research examined children's influencing role in family buying decisions across the stages of the decision-making process, sub-decisions, and type of products and services (Ghouse et al., 2020). Children, in most of the past studies, have been documented to exert the maximum influence in the initial stages and minimum at the final stage (Wang et al., 2004). Past studies have also examined children's contribution to general buying decisions (Foxman and Tansuhaj, 1989a; Foxman et al., 1989b).

The results of these studies have confirmed the significance of children's participation across all the selected decision aspects. Against this backdrop, it seemed relevant to investigate past findings in the context of the role played by alpha kids in family buying decisions in Indian families from the point of view of their parents during the ongoing Covid-19 pandemic. Thus, it seemed relevant to hypothesize that:

**Hypothesis 2.1.** *Parents perceive their alpha kids to exert influence in general buying decisions in India.*

**Hypothesis 2.2.** *Alpha kids' influence in general buying decisions varies across the select buying decisions.*

Previous studies have also examined the impact of various child demographics on the influence exerted by children in family buying decisions (Ghouse et al., 2020; Senevirathna et al., 2022; Ali et al., 2013; Chaudhary et al., 2018). The most commonly investigated child demographics are children's age, gender, and siblings. Past research validated that children's age and the extent of influence exerted by them are positively related, i.e., older children are more influential than younger children (Darley, 1986) in family purchase decisions. With increases in children's age, parents' yielding behavior becomes more affirmative (Levy and Lee, 2004), and children's influence attempts also extend to more product categories (McNeal and Yeh, 2003). Hence, it may be hypothesized that:

**Hypothesis 2.3.** *The influence exerted by alpha kids in the family buying decisions varies across the gender of the child.*

Past studies have considered the gender of children as an important variable (Lee, 2009; Flurry, 2007) in explaining the influence of children on family buying decisions. However, the findings of these studies are mixed, for example, studies by McNeal and Yeh (2003), and Lee and Collins (2000) have reported female children exert more influence in family buying decisions than male children; study by (Halling and Tufte, 2002) found boys to exert more influence than girls in these decisions, and studies by (Wang et al., 2004), and (Williams and Veeck, 1998) and Veeck (1 have concluded that the gender of the child is insignificant in affecting a child's influence in family decisions. These mixed results make it worthy of further examination in a patriarchal Indian society. Based on the above discussion, it seems reasonable to hypothesize that:

**Hypothesis 2.4.** *The influence exerted by alpha kids in the family buying decisions varies across the gender of the child.*

An extremely limited number of past studies have explored the impact of the presence/absence of siblings on the influence exerted by children in family purchase decisions (Wimalasiri, 2004). In psychology, the research has examined the effect of siblings on the development of personality traits of children (Skinner, 1985) and concluded that children without siblings (s) are more intelligent than sibling children (Parker, 1998). Similarly, (Ronner et al., 2007) have proposed a negative impact of siblings' on a child's perception of his/her influence in family purchase decisions. Based on the limited literature available, the following hypothesis is formulated:

**Hypothesis 2.5.** *The influence exerted by alpha kids in the family buying decisions varies across the birth order of the child.*

### 3 Research Methodology

Based upon the literature review, a systematic approach is adopted in this study to gain an in-depth understanding of the influence exerted by alpha kids in Indian families' general buying decisions. A cross-sectional survey method was carried out through a structured questionnaire, administered to a convenience sample of mothers of 400 alpha kids' (aged 8 – 11 years) studying in grades III to VI from rural and urban areas of Delhi (India) during February 2021. To maintain the norms for social distancing due to the Covid-19 pandemic, the questionnaire was generated on Google Form. The questionnaire was bilingual (in English and regional language Hindi), pretested on a sample of 25 mothers, and developed based on scales used in similar previous studies after due modifications as per the Indian context. The questionnaire consists of two parts, whereby, Part I covered demographic (age, gender, and birth order) related questions and Part II contained questions on the influence exerted by children in general buying decisions. Initially, principals of 18 schools situated in

**Table 1.** Sample Profile

Characteristic	Frequency (N = 400)	Percent
<b>Age (years)</b>		
8–9	154	38.5
9–10	178	44.5
10–11	68	17.0
<b>Gender</b>		
Male	226	56.5
Female	174	43.5
<b>Siblings</b>		
No siblings/single child	152	38.0
Siblings	248	62.0

different rural and urban areas of Delhi (India) were approached (via telephone and Google Meet), the research plan and questionnaire were discussed in detail, apprehensions were resolved, and then the request was made for permission to conduct the proposed web survey. After the due discussion 9 schools agreed to participate. The school principals were emailed a copy of a questionnaire and forwarded this questionnaire to the relevant student groups with a direction that the questionnaire must only be filled by the mother keeping in mind (i) only one of her children, (ii) the selected child must

be 8 to 11 years old. The response rate was restricted to one mother-one response. Schools were selected on a purposive sampling basis to allow a reasonable representation of different socio-economic groups. Responses were received from 480 mothers out of which only 400 could finally be used. Collected data was first summarised and tabulated in MS Excel and then analyzed with suitable statistical tools using SPSS.

The demographic profile of the sample population is provided in Table 1. The average age of the children surveyed was 9.3 years spread across 8 – 9 years old (38.5 percent), 9 – 10 years (44.5 percent), and the remaining from 10 – 11 years (17.0 percent). Gender-wise, a slightly higher number of the children were male (56.5 percent), and a comparatively higher number of children had siblings (62 percent).

### 3.1 Dependent Measures

In this study, the dependent variable, i.e., alpha kids' influence in general buying decisions is conceptualized as the extent to which s/he exerts influence in each of the eleven-items measure specifically developed for this purpose. Similar types of measures have also been used in past studies of identical nature (Foxman and Tansuhaj, 1989a; Foxman et al., 1989b)). Mothers of these children were asked to rate one of their children's influence in general buying decisions across eleven-item measure using a five-point scale (5 = almost every time to 1 = never), and the selected child must be 8 to 11 years old. Cronbach alpha reliability coefficient values were computed for all the 11 scale items which indicated satisfactory internal consistency, with an alpha coefficient value of 0.79 (Nunnally, 1967).

### 3.2 Independent variables

Based upon the literature review, three of the most prominent children characteristics having a moderating impact on children's participation and contribution in family buying decisions were identified and included in this study for further investigation: children's age (8–9 years, 9–10 years, and 10–11 years), gender (male, female), and siblings (no sibling/single child, one or more siblings).

## 4 Findings and Discussion

**Table 2.** Alpha Kids' Influence on General Buying Decisions

Influence Source	Almost every time %	Very often %	Often %	Sometimes %	Never %
In suggesting products to buy	18.6	16.8	45.3	17.5	1.8
In suggesting the timings to buy products	7.9	9.9	31.4	30.1	20.7
In suggesting stores to shop	18.1	14.9	33.0	19.6	14.4
In suggesting brand to buy	33.8	20.2	24.3	14.9	6.8
In suggesting products' sizes/quantities	17.5	16.2	29.6	22.0	14.7
In suggesting type/style of products	37.2	22.8	25.7	9.7	4.6
In suggesting the color of the products	36.4	18.3	26.2	12.3	6.8
Co-shopping with parents to buy products	28.0	17.8	31.9	15.4	6.9
In suggesting price range for the products	13.1	9.9	27.2	24.1	25.7
In noticing new products first in the family	44.0	22.8	19.9	10.4	2.9
In finding out the best deals about products	28.5	21.5	27.2	11.5	11.3

The Hypothesis 2.1 suggests that parents perceive their alpha kids to exert influence in general buying decisions in India. To test this hypothesis, children's influence across eleven general buying decisions was obtained on a five-point scale (5 = almost every time to 1 = never) and the respective responses are summarised in Table 2. The results show that the majority of the parents perceive their children to exert considerable influence in all the general buying decisions. Children's influence is highest in the case of suggesting the products to buy in which except 1.8 percent of children, rest have been involved in influencing this decision to some extent, and the influence was least in suggesting the price range for the products where almost one-fourth (25.7 percent) kids did not exert any influence at all. A deeper look into the results revealed that in a significant number of families (44 percent), the new products were initially noticed by alpha children. The results reveal that although children's influence was limited to indecisive decision areas that include their influence in suggesting the timings to buy a product, and the price range for the product, quite an impressive number of children actively participated in the rest of the decision areas whereby more than 30 percent of the surveyed children almost every time played an active role in suggesting the products' type/style (37.2 percent), color (36.4 percent), and brand (33.8 percent). Another point of importance is that except for about 11.3 percent, the rest of the children do contribute to finding out the best price deals,



**Table 3.** Alpha Kids' Influence on General Buying Decisions: t-test

Influence Source	Mean(Standard Deviation)	Mean Difference	t-value	Sig.	Never %
In suggesting products to buy	3.33 (1.027)	0.827	15.738	.000***	1.8
In suggesting the timings to buy products	2.54 (1.156)	0.042	10.708	.049*	20.7
In suggesting stores to shop	3.03 (1.284)	0.526	8.012	.000***	14.4
In suggesting brand to buy	3.59 (1.276)	1.092	16.721	.000***	6.8
In suggesting products' sizes/quantities	3.00 (1.294)	0.500	7.552	.000***	14.7
In suggesting type/style of products	3.78 (1.181)	1.280	21.182	.000***	4.6
In suggesting colour of the products	3.65 (1.270)	1.152	17.724	.000***	6.8
Co-shopping with parents to buy products	3.45 (1.236)	0.948	14.980	.000***	6.9
In suggesting price range for the products	2.61 (1.319)	0.107	11.590	.043 *	25.7
In noticing new products	3.95 (1.148)	1.445	24.608	.000***	2.9
In finding out the best deals about products	3.45 (1.315)	0.945	14.051	.000***	11.3

<sup>a</sup>1 = never, 5 = almost every time, \* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001

and excepting 6.9 percent the rest of the children also co-shopped with their parents. The analysis results thus lead to the acceptance of Hypothesis 2.1. These results are similar to the results of past studies (Ghouse et al., 2020; Chaudhary et al., 2018; Foxman and Tansuhaj, 1989a).

The Hypothesis 2.2 states that the alpha kids' influence on general buying decisions varies across the selected decisions. To validate this claim, firstly, children's mean influence scores for eleven general buying decisions were calculated, then the mean differences were obtained from the mid-value (2.5 on a scale of 1–5) to see the extent to which children's influence in these decisions differs from the mid-value, and finally, a one-sample t-test was used to see if these differences are statistically significant or not. The analysis results are presented in Table 3. Alpha children's influence was found to be statistically significant across all the general buying decisions. The analysis results thus lead to the acceptance of the Hypothesis 2.2. The results also indicate that as compared to areas relating to the monetary aspect of the purchase, children exert the most influence in areas relating more to the expressive aspects of the purchase such as in case of noticing the new products, suggesting the style, the color, the brands, and finding out the best deals about the products. These results are similar to the results of past studies by (Martensen and Gronholdt, 2008; Belch et al., 1985; Foxman and Tansuhaj, 1989a).

The Hypothesis 2.3 proposed that alpha kids' influence on general buying decisions varies across the age of these children. To assess the statistical significance of this hypothesis, the ANOVA test was applied by taking alpha kids' influence on general buying decisions as a dependent variable and kids' age as an independent variable (Table 4). Contrary to the expectations, significant differences were observed only across three buying decisions while suggesting: (i) type/style of products ( $F = 3.249$ ,  $p < .05$ ), (ii) color of the products ( $F = 8.956$ ,  $p < .001$ ), and (iii) the best deals about products ( $F = 3.241$ ,  $p < .05$ ), thus leading to the partial acceptance of Hypothesis 2.3. This result is parallel to the findings of existing literature (Ali et al., 2013; Laczniaik and Palan, 2004; Jenkins, 1979) to a limited extent only.

**Table 4.** Impact of Alpha Kids' Age on their Influence in General Buying Decisions: ANOVA

Influence Source	Mean (Standard Deviation)			Type III Sum of squares	df	Mean Square	F-value	Sig.
	8–9 Years	9–10 years	10–11 years					
In suggesting products to buy	3.10 (0.969)	3.51 (1.018)	3.32 (1.105)	0.475	2	.238	.224	.799
In suggesting the timings to buy products	2.42 (1.218)	2.59 (1.097)	2.68 (1.167)	0.554	2	.277	.206	.814
In suggesting stores to shop	2.96 (1.368)	3.05 (1.249)	3.12 (1.181)	5.037	2	2.518	1.533	.217
In suggesting brand to buy	3.35 (1.296)	3.81 (1.195)	3.51 (1.377)	4.193	2	2.097	1.290	.277
In suggesting products' sizes/quantities	2.94 (1.354)	3.01 (1.277)	3.14 (1.202)	4.676	2	2.338	1.399	.248
In suggesting type/style of products	3.88 (1.247)	3.80 (1.106)	3.47 (1.212)	8.960	2	4.480	3.249	.040*
In suggesting colour of the products	3.73 (1.279)	3.60 (1.229)	3.61 (1.386)	27.739	2	13.870	8.956	.000***
Co-shopping with parents to buy products	3.55 (1.237)	3.34 (1.237)	3.54 (1.226)	2.676	2	1.338	.875	.418
In suggesting price range for the products	2.41 (1.246)	2.74 (1.352)	2.68 (1.352)	7.670	2	3.835	2.218	.110
In noticing new products	3.73 (1.257)	4.07 (1.057)	4.09 (1.074)	3.363	2	1.682	1.279	.280
In finding out the best deals about products	3.13 (1.383)	3.64 (1.283)	3.63 (1.080)	11.071	2	5.535	3.241	.040*

The Hypothesis 2.4 claims that alpha kids' influence on general buying decisions varies across the gender of these children. For the statistical assessment of this claim, the ANOVA test was applied by taking kids' influence on general buying decisions as a dependent variable and kids' gender as an independent variable (Table 5). The analysis results

**Table 5.** Impact of Alpha Kids' Gender on their Influence in General Buying Decisions: ANOVA

Source	Mean (Standard Deviation)		Type III Sum of squares	df	Mean Square	F-value	Sig.	Sig.
	Male	Female						
In suggesting products to buy	3.30 (1.045)	3.37 (1.005)	12.860	2	6.430	6.261	.002**	.799
In suggesting the timings to buy products	2.52 (1.167)	2.58 (1.145)	3.777	2	1.888	1.417	.244	.814
In suggesting stores to shop	2.99 (1.290)	3.09 (1.296)	5.232	2	2.616	0.392	.676	.217
In suggesting brand to buy	3.47 (1.290)	3.68 (1.252)	15.838	2	7.919	5.424	.005**	.277
In suggesting products' sizes/quantities	2.95 (1.358)	3.04 (1.188)	4.636	2	2.318	0.505	.604	.248
In suggesting type/style of products	3.74 (1.209)	3.85 (1.120)	10.752	2	5.376	2.278	.035*	.040*
In suggesting colour of the products	3.38 (1.234)	3.54 (1.241)	1.305	2	0.652	0.403	.669	.000***
Co-shopping with parents to buy products	2.71 (1.330)	2.47 (1.293)	3.979	2	1.989	1.303	.273	.418
In suggesting price range for the products	3.68 (1.290)	3.04 (1.358)	9.446	2	4.723	2.938	.046*	.110
In noticing new products	3.88 (1.053)	4.05 (1.053)	10.849	2	5.425	4.187	.016*	.280
In finding out the best deals about products	3.26 (1.363)	3.54 (1.218)	23.282	2	11.641	6.947	.001***	.040*

<sup>a</sup> 1= never, 5 = almost every time, \* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001

revealed that female children have exerted higher influence in all the eleven general buying decisions than the influence exerted by male children. This result is following the findings of past research (McNeal and Yeh, 2003; Lee and Collins, 2000), however, these differences were found to be significant only across six of the eleven decisions, thus leading to the partial acceptance of Hypothesis 2.4. This result, to a limited extent, is parallel to the findings of a study by (Akinyele, 2010) who also found girls to be slightly more influential on certain decisions involving expressive aspects of the product than boys (Chavda et al., 2005).

The Hypothesis 2.5 states that alpha kids' influence on general buying decisions varies across the presence/absence of children's sibling(s) in their families. To examine this claim, again an ANOVA test was applied by taking children's influence in general buying decisions as a dependent variable and kids' sibling/non-sibling as an independent variable. The respective results are summarised in Table 6.

The mean influence scores of children's influence indicate that single children, as compared to children having siblings, have exerted more influence in all the eleven general buying decisions in their families. However, these differences were found to be statistically significant only in five out of the eleven general buying decisions thus leading to the partial acceptance of Hypothesis 2.5. This result is in line with the past studies that have explored the impact of the presence of siblings on the influence exerted by children in family decisions (Skinner, 1985).

**Table 6.** Impact of alpha Kids' Sibling(s) on their Influence in General Buying Decisions: ANOVA

Influence Source	Mean (Standard Deviation)		Type III Sum of squares	df	Mean Square	F-value	Sig.	Sig.
	Single child	Sibling (s)						
In suggesting products to buy	3.47 (0.996)	3.02 (1.048)	7.416	2	3.708	3.560	.029*	.799
In suggesting the timings to buy products	2.66 (1.093)	2.42 (1.214)	6.055	2	3.027	2.282	.039*	.814
In suggesting stores to shop	3.05 (1.322)	3.02 (1.241)	4.825	2	2.412	1.468	.232	.217
In suggesting brand to buy	3.79 (1.299)	3.48 (1.225)	16.419	2	8.210	5.152	.006**	.277
In suggesting products' sizes/quantities	3.03 (1.226)	2.98 (1.361)	4.733	2	2.367	1.416	.244	.248
In suggesting type/style of products	3.87 (1.174)	3.72 (1.168)	12.655	2	6.328	4.622	.009**	.040*
In suggesting colour of the products	3.72 (1.233)	3.60 (1.309)	4.010	2	2.005	1.244	.289	.000***
Co-shopping with parents to buy products	3.50 (1.216)	3.39 (1.260)	1.510	2	.755	.492	.612	.418
In suggesting price range for the products	2.67 (1.338)	2.55 (1.302)	2.004	2	1.002	.574	.564	.110
In noticing new products	4.01 (1.193)	3.90 (1.093)	5.418	2	2.709	2.068	.128	.280
In finding out the best deals about products	3.52 (1.313)	3.38 (1.306)	9.448	2	4.724	2.759	.045*	.040*

## 5 CONCLUSIONS AND IMPLICATIONS

The notable findings that emerged from this study suggest that (i) Indian parents perceive their alpha kids to exert considerable influence in general buying decisions during the Covid -19 pandemic, (ii) this influence varies across various decision aspects, and (iii) children tend to have more influence in those decision aspects that are comparatively more expressive, less risky in terms of monetary investment, and need information support for participation such as noticing the new products, finding out about the available style, color, brands, etc., and (iv) the impact of child's demographics (age,

gender, and siblings) on the influence exerted by him/her in general family buying decisions is restricted to some of the decision aspects only.

Although most of the results of this study are parallel to the findings of past studies indicating that even in a traditional Indian society children are assuming important positions in family buying decisions from a very young age, some of the results are different from the findings of past studies as well in the area of examination of the impact of child demographics' on the influence exerted by these children in family buying decisions. The possible reasons for the restricted impact of demographics on children's influence are: (i) the existence of cultural differences in Indian society having a bearing on children's upbringing; (ii) the greater number of parents opting for a fewer number of children for various reasons such as late marriages, increased participation of women/mothers in work outside the home, the emergence of nuclear and single-parent families, enhanced exposure to better lifestyles and medical facilities; and (iii) the impact of the Covid – 19 pandemic leading to the digitalization of alpha kids at a very young age. All these factors may have worked jointly in the same direction in increasing the influence of each child in the family buying decisions irrespective of his/her age, gender, and presence/absence of sibling(s).

The findings of this study have important practical implications for the marketers to develop and modify the marketing strategies to include the requirements, liking, disliking, and tastes of young children along with their parents to survive in the post-pandemic period. The pandemic has no doubt amplified the power of children in buying decisions of Indian families, hence, following the study findings, the marketers producing or wishing to produce the goods and services for family/child consumption must take care of these changing paradigms to manage the demand side of the products more effectively.

As the alpha kids are widely exposed to multiple digital platforms from a seemingly very young age, the businesses targeting these children and their families must adopt new ways of interacting and communicating with these children, one of the suggested ways may be the phygitalization (a combination of digital and physical efforts) of the marketing mix. Another important implication for the marketers could be the re-routing of products from specific stores to grocery stores and chemist/medical shops which remains open even in the complete lockdown of all economic activities. The result of this study reiterates the need for the marketers to focus on the use of local resources which will provide them an edge over the global marketers catering to the needs of Indian Families.

## 6 LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

Even though this study validates most of the findings of past literature and provides much-needed insights about the emerging roles of alpha children in general buying decisions in Indian families in the times of the Covid-19 pandemic, certain limitations need to be noted. Firstly, the scope of this study is limited to the sample size (400) and urban and rural areas of India (Delhi), hence, the researchers need to extend the findings of this study to newer settings with bigger sample sizes; secondly, the questionnaire method used for primary data collection method in this study may lead to the respondent bias in collected data, accordingly, in future studies an inclusive approach consisting of observation methods, and field interaction methods may be used for required data/information collection; and finally, to get even more comprehensive understanding about the children's influence in family purchase decisions, parents as well children may constitute the survey sample.

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## **Internet Usage by Young Kids in India**

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India is one of the countries with the highest number of kids under the age of 18 years. This paper adds value in understanding the usage in the current covid scenario. The research objectives for the current study are to examine how young kids in India use their time on internet for varied purposes, to study how young kids find the websites that are of interest to them and to examine how young kids obtain information about sensitive issues. A cross-sectional web survey was conducted to examine the various aspects of the use of the Internet and traditional media (television/radio/magazines/newspapers/billboards) among kids in India. Data was collected through a structured questionnaire. The sampling method used in the study was purposive sample (522 kids). Internet emerged as the first choice of media for kids for all the nine selected activities that include homework, shopping, restaurant/food-ordering, travel and tour, information search, health related information, weather forecast, entertainment, and news/current events. Girl respondents as compared to boys have consumed Internet at a higher rate for learning about the fashion (trends) and health related issues such as seeking preventative health care and specific information about medical issues .

**Keywords:** kids, communication, India, Internet, Media, Radio, TV

As of January 2021, there were 59.5 percent of the global population is active internet users. This also means that more than half of the global population is connected to the internet at any given point of time. Of this total, 92.6 percent (4.32 billion) accessed the internet via mobile devices (Statistica, 2021). There are studies that found that the use of internet globally would be fuelled by new updated information technologies trends like, blog writing, audio/video podcasts, Wi Fi connectivity and RSS feeds (Burns& Polman, 2006). It is a known fact now that communication technologies including the Internet have substantial impact on young children than all other technological innovations (Roberts & Foehr, 2004). A study of how the young kids use traditional and internet is important to understand and analyse as it enables advertisers and social marketers to develop effective and responsible marketing messages to these future consumers.

India is poised to be the youngest country in the world by 2022. As per the recent data, India in 2020 have over 560 million internet users. By 2023, there would be over 650 million internet users the country (Statista, 2020). There has been a consistent increase in internet

accessibility compared to 2015; the internet penetration rate was around 27 percent in 2015 and 50% in 2020. The introduction of the Indian government's Digital India initiative along with the increasing internet penetration resulted in the country's digital population amounting to approximately 688 million active users as of January 2020.

Kids' socialization agents are parent, friends, television, and internet (Chaudhary & Gupta, 2014; Ghouse et al., 2019). Mass media messages are considered as equally important socializing agents as parents and schools for young kids (Strasburger & Wilson, 2002; Chaudhary & Gupta, 2012). Media contents and media usage make strong influences on young kids' belief, attitudes, and behaviours (Roberts & Foehr, 2004). The amount of time spent by kids and teenagers on various media is correlated to the social and demographic variables (Roberts et al., 2003; Comstock & Scharrer, 1999). For example, young distribute spend more time on computers and video games (Gómez-Gonzalvo et al., 2020). Studies show that young kids increasingly watch television till they are 12 years of age, while they start listening to music at approximately 9 years of age and increased throughout adolescence (Psychosocial Paediatrics Committee, 2003). Mass media such as newspapers, radio, and television are deployed for the purpose of creating a more favourable climate for modern communication (Riaz & Pasha, 2012).

Studies found that young kids make active choices for the type and usage of media according to their personalities, socialization needs, and personal identification needs (Arnett, 1995). Katz and Blumler (1974) explains the same by their gratification theory. According to this theory, young kids will select and use the media to best fulfil their individual needs. With more internet availability and access in India, there is a need to update and validate the knowledge about internet usage on various media; and, how the Internet can be used to fulfil their varied communication needs. The current study is attempting to not just replicate the study by Chan and Fang (2007) but also extending this to present time of more internet access and Covid-19 environment in a developing country like India. The impact of the Covid-19 pandemic felt by the community is the inner turmoil of parents who initially chose to entrust their children's education to schools (Mahmudah et al., 2021).

The research objectives for the current study are the following:

1. To examine how young kids in India use traditional media and Internet.
2. To examine how kid's choice of the media choices varies by different activities.
3. To study how young kids search for online sites that interests them.
4. To examine how young kids acquire valuable information about health-related issues such as seeking preventative health care and specific information about medical issues.

### **Literature Review**

Communication is elementary for any society. Communication tasks in a society is about knowledge sharing, socialization, entertainment and about gaining consensus through persuasion or control (Schramm, 1977). All communication needs a medium to connect. Mass media has been an active agent for socialization at all levels. Adults get information about society from mass media channels. Kids also get influenced by mass media and their consumer socialization.

As new forms of media emerge and the convergence of media technology, the pattern s of media usage is undergoing rapid changes. Substantial attention and apprehensions related to internet are lately focused on how the young consumers make use of the Internet as these young people are the 'digital generation,' at the vanguard of new skills and technologies, yet also vulnerable and at risk (Livingstone 2003). In a study of 12 European countries and Israel

involving survey of 11,368 young people in the age group of 6 to 16 years, it was found that there are four major media user styles that are labelled as low media users, traditional media user, specialists, and screen entertainment fans (Bovill & Livingstone, 2001).

Studies on internet are still less as compared to its wider reach and exponential growth (Kim & Weaver, 2002). The study of young people's Internet use is undeveloped, although key questions of academic and policy significance have focused on the dangers of such use (Livingstone, 2003). Technologically mediated communication is being incorporated into various aspects of our daily lives (Mann & Stewart, 2000; Whitty, 2004). The distinction between online and offline worlds is therefore becoming less relevant. While there exists a huge body of research on the Internet and computer-mediated communication, hardly there are any focussing on young kids.

### ***The digital divide***

Digital divide is casually defined as the gap between people who do and do not have access to forms of information and communication technology (Van Dijk, 2017). In a plainer language, digital divide is defined as the gap between people who have and do not have access to computers and the Internet. As accessibility to internet is growing at a faster rate, both parents and kids are spending more time on internet. Parents found it difficult to mediate the use of Internet. Parents can execute mediation and control confidently and smoothly on kids while they watch television; but quite challenging to supervise the Internet usage (Chan & Fang, 2007). Low income and no internet in the homes have led children towards significantly lower scores on all dimensions of digital literacy, academic performance, aspirations, perceived efficacy, self-esteem, family, and peer relationships (Wong et al., 2015).

### ***Uses and gratifications theory (UAGT)***

According to the UAGT proposed by Katz and Blumler (1974), the media users are goal oriented. These users play an active role in selecting and using the media that best fulfils their individual needs. This way, this theory shifts the focus of media communication from an effect viewpoint to an audience viewpoint. As per this theory, users select media to fulfil their specific needs which leads to ultimate gratification (Lin, 1999). UAGT has provided valuable insight for varied media including newspaper daily, radio (Albarran et al., 2007), television (Ruggiero, 2000), cable TV (Perse & Courtright, 1993), VCRs (Lin, 1993), MP3 players (Ferguson et al., 2007), internet (Ko et al., 2005), mobile phones (Mittal et al., 2017) and also social media (Whiting & Williams, 2013). Children select electronic games and other media contents in accord with the uses and gratifications they expect; this helps in their developmental tasks (Salisch, 2006)

Despite being popular, there is some criticism for UAGT; it is being said that it relies too heavily on self-declared reports (Katz, 1987). As a fallout, this theory is unsophisticated related to the social origin of individuals meet related to media. This theory was also criticised for the possible dysfunction of self and society. Despite these limitations majority of the scholars still believe that this theory provides considerable beast to understand the media choices and the purpose is behind it. UAGT deemed appropriate for the current study as well as the study is about the use of various media by kids.

### ***Internet Usage***

The Internet is a legitimate subject of mass communication and social science research. Newhagen and Rafaeli (1996) also attempted to theoretically position the same. Contemporary

researchers also trust upon considering Internet as a subject of research based on treating Internet as a bridge between mass communication and interpersonal communication (Ruggiero, 2000).

Researchers also show the kids use Internet for variety of off objectives; for example, watching videos, playing online games, searching for some information, socialising with friends and family and doing their homework (Holloway et al., 2013). There is another research that examines the relationship between Childs media usage and motivations; kids engage with media for six different motivations, for their learning, for passing time slash habit, companionship, to escape or to forget something, for arousal and for relaxation (Hargittai & Kim, 2010).

Male respondents used the Internet more frequently for games, music, shopping while girl respondents used the Internet more frequently for fashion and information about colleges/universities. Respondents found out websites by using search engines and asking friends. Respondents considered the Internet the most preferred sources of communication about sensitive issues when they need information fast (La Ferle et al., 2000).

### ***The youth market***

The global youth market is vital to international marketers and advertisers because of its size and its homogeneity (Chan & Fang, 2007). As of 2019, More than 25% of the world population is of kids that is under the age of 18 years (World bank, 2019), The global population aged 65+ surpassed the number of kids aged 0-4 in 2019, as birth rates declined, and lifespans rise (Euromonitor-International, 2020).

India is the country with the highest number of kids under the age of 18 years. Twenty-six percent of the India's population is of kids, so this study becomes pedal vital to understand how kids use traditional media and the internet. This will help the marketers and advertisers to make effective marketing strategies to cater to these kids responsibly (Chaudhary, 2018). India as a country it is transforming from a mere third world country do a remarkably high growth developing country. The continuous increase in the GDP and the per capita income has led to improvement in the education level. In this way India along with other Asian market is becoming like western countries in terms of personal inspirations and consumption patterns (Chan & Fang, 2007). As Indian market grew, multinationals need to gain a better understanding of this market before making any advertising strategy. Also, with the changing dynamics, kids have more and better access to Internet add mobile phones. Such a scenario will make targeting kids quite challenging by using only television as the major marketing medium. Therefore, there is a need for more research to better understand the media usage behaviour of young kids to establish a connexion with them. Information about how they get information about websites and sensitive issues is also needed for commercial and non-profit marketers to reach them in a cost-effective manner.

## **Method**

### ***Procedure***

A cross-sectional web survey was executed to examine the media usage habits of kids in India across the Internet and traditional media (television/radio/magazines/newspapers/billboards). The sampling population was kids aged 13 to 20 years. Kids of this age group were selected for the study for four reasons: (i) during Covid-19, the online classes were made compulsory in India for kids of class VII (13 years and above) onwards; (ii) kids begin to imitate and project behaviour much similar to an adult (Piaget, 1970); (iii) can contingently make use of different media options as per the requirements (Roedddar-John, 1999); (iv) most active Internet users amongst kids belong

to this age group, e.g., as per an IAMAI (2019) report, of the 451 million monthly active Internet users, 385 million were over 12 years of age.

A structured questionnaire consisted of close-ended questions was administered on a purposive sample of 522 kids from different areas of Delhi (India). Delhi being an epicentre of political activities and prime decisions, hub of business activities, adorned with historical monuments, habituated by people from every part of the country belonging to varied cultures, ethnicity, and economic background, is truly a specimen of India.

For sample selection, initially fifteen schools and five colleges were approached with the detailed survey plan via e-mail, out of which concerned authority of nine schools and three colleges sought further discussion in this regard, and finally five schools and two colleges agreed to participate in this study. Quotas were established for different age group students (class VII to undergraduates) and the questionnaire with a small introductory note was shared with the relevant students through e-mail. Response frequency was restricted to one-child-one-response, and the response gathering window was opened for one month, i.e., February 2021. Responses were received from 711 kids out of which 189 were rejected (incomplete), leading to the final sample size of 522 (response rate 73.4 percent).

### ***Measurement***

The questionnaire was inspired by Chan and Fang (2007). Questionnaire and was generated on Google Forms. A pilot study of forty respondents aged 15-18 was conducted to check the flow, language used, and continuity of the questions. The internal consistency of the four scales included in the pilot questionnaire was assured through Cronbach alpha coefficients ( $\alpha_1 = .61$ ;  $\alpha_2 = .64$ ;  $\alpha_3 = .79$ ;  $\alpha_4 = .84$ ). Pilot study results led to the incorporation of few modifications in the questionnaire.

The questionnaire comprised of three parts wherein Part I focused on the time distributed by the kids, in general, across various activities such as watching television, reading, studying (online/offline), and surfing internet. Kids were asked to identify their most preferred media choices for nine activities such as information search, homework, weather forecast, entertainment, and shopping. Questions related to the activities for which the internet can be used (twelve in total) were enlisted in part II of the questionnaire. Kids were asked to report the frequency with which they use the Internet for these purposes on a five-point scale ranging from always (5) to never (1). Further the respondents were asked to specify the ways (seven in total) they locate the useful and relevant web sites on a five-point scale (5 = always; 1 = never). The last question of this part inquired the kids about the listed sources which they may prefer the most to gather information about the sensitive issues under the conditions of confidentiality, speed, privacy, comfort, and ease. Demographic related questions were covered in Part III. The response rate was restricted to one child-one response.

### ***Sample profile***

The surveyed sample consisted of 522 kids, out of which, 234 were males and 288 were girls spread across two age groups, i.e., from 13 to 16 years ( $N = 289$ ), and 17 to 20 years ( $N = 233$ ). Majority of the kids (59 percent) were from nuclear families and the rest of them (41 percent) were from joint families. Sixty-three percent of the respondents had their own mobile phones.



## Results

### *Usage of type of media*

The first research objective of this study attempts to examine quantum of time allocation by Indian kids across traditional (television, books, radio, study, and mobile) and Internet. Seven such activities were identified where the kids can possibly spend their time on daily basis (Table 1). The results reveal that more than 60 per cent of the kids spend more than three hours on studies both offline (36 per cent) as well as online (32.3 per cent).

**Table 1**

#### *Time spent across activities*

Activity	0 to 1 hour %	1 to 2 hours %	2 to 3 hours %	More than 3 hours %	Mean hours
Studying (offline)	11.9	26.6	25.5	36.0	2.36
Studying (online)	15.7	23.6	28.4	32.3	2.27
Surfing Internet	39.1	30.7	14.9	15.3	1.57
Reading books etc.	44.8	33.5	13.8	7.8	1.35
Chatting/messaging on phone	59.4	23.9	9.8	6.8	1.14
Watching television	65.3	24.7	6.7	3.3	0.98
Listening to radio	76.4	17.4	4.6	1.6	0.81

The second research objective of this study aimed to find out the possible variations in kids' media choices across selected activities. In this regard, data pertaining to kids' most preferred choice of media across nine activities were obtained and summarized in Table 2. Out of the five selected media choices, Internet is the most preferred media option by majority of the respondents for most of the activities, e.g., homework (94.6 per cent), shopping (93.5 per cent), and search for restaurant/eating joints (87.5 per cent). The usage of radio for all the listed activities is the least preferred media by the surveyed sample.

**Table 2**

#### *Media choice for varied activities*

Activity	Internet %	Magazine %	Newspapers %	Radio %	Television %
Information Search	84.3	1.5	7.9	0.6	5.7
Homework	94.6	3.3	1.7	0.0	0.4
Weather forecast	61.9	1.3	7.3	1.5	28.0
Health related information	84.1	3.3	6.3	0.8	5.6
Entertainment	51.5	1.3	0.6	1.0	45.6
Shopping	93.5	4.0	0.8	0.0	1.7
News/current events	43.3	3.4	19.2	0.6	33.5
Restaurant/eating joints	87.5	6.9	2.7	0.6	2.3
Travel and tour	84.7	7.9	4.6	0.4	2.5

### *Internet usage*

The third research objective examines the purposes for which the kids in India can most frequently use the Internet. Kids' responses were contained for twelve such purposes and summarised in Table 3. The frequency of Internet usage, as reported by kids, is found to be

highest for gathering information for further education (M = 3.92), weather (M = 3.54), health (M = 3.51), homework (M = 3.47), address of a place (M = 3.27), listening music (M = 3.24), watching movies or shows (M = 3.00), and least for making friends (M = 2.09).

Male and female children were found to be significantly different only in five out of the twelve proposes for which they use the Internet. As compared to girls, higher Internet usage was reported by distributes for homework, games, and making friends. However, the Internet usage was comparatively higher for obtaining health related information, listening to music, and fashion in case of girls.

Significant age-wise differences were observed across majority (9 out of 12) of the twelve selected purposes. Younger kids (13-16 years) used the Internet comparatively less for all the activities except for playing games and making friends. Older kids (17-20 years) used the Internet for gathering information for various listed purposes.

**Table 3**  
*Internet usage by gender and age*

Usage	Mean <sup>a</sup>	Male	Girl	t-value	13-16	17-20	t-value
Further education information	3.92	3.83	3.99	-1.477	3.70	4.19	-4.828*
Weather information	3.54	3.44	3.61	-1.536	3.33	3.79	-4.153*
Health information	3.51	3.38	3.61	-1.968*	3.23	3.85	-5.592*
Help for homework	3.47	3.50	3.45	0.491	3.39	3.56	-1.728
Search of address/place	3.27	3.20	3.32	-0.997	3.08	3.51	-3.552*
Listening to music	3.24	3.07	3.37	-2.440*	2.90	3.55	-4.665*
Watching movies/shows	3.00	2.88	3.08	-1.779	2.79	3.24	-3.918*
Travel and tour information	2.86	2.74	2.96	-1.768	2.67	3.10	-3.507*
Shopping	2.51	2.54	2.48	0.641	2.42	2.61	-1.870
Games	2.50	2.90	2.18	5.793*	2.65	2.32	2.562*
Fashion	2.35	2.09	2.56	-4.090*	2.12	2.63	-4.379*
Making friends	2.09	2.24	1.96	2.411*	2.11	2.06	0.408

Note: <sup>a</sup>5-point scale (1 = never to 5 = almost every time); \*  $p < .05$

The fourth research objective focuses on the ways with which the kids locate the relevant web sites. Kids’ responses were obtained for seven possible options to locate the required web sites (Table 4). Analysis result indicate that majority of the kids find out about the relevant web sites through browsing the search engines (M = 3.88) followed by next most used option of asking friends (M = 2.82). Advertisements of all mediums are not an extremely popular way used by kids to know about the useful web sites. Sex-wise, no significant difference was observed in the ways kids locate the useful web sites. However, age-wise significant differences were observed across majority (4 out of seven ways) of the ways kids locate the relevant websites.

**Table 4**  
*Age-wise and sex-wise ways to locate web sites*

Way	Mean <sup>a</sup>	Male	Girl	t-value	13-16	17-20	t-value
Browsing search engines	3.88	3.94	3.83	1.022	3.74	4.05	-2.913*
Ask friends	2.82	2.82	2.81	0.010	2.78	2.88	-0.957
Newspapers advertising	2.23	2.24	2.23	0.052	2.06	2.45	-3.510*

Television advertising	2.21	2.26	2.20	0.552	2.17	2.30	-1.115
Billboards/posters	2.08	2.04	2.11	-0.638	1.96	2.23	-2.524*
Magazines advertising	1.97	2.03	1.92	1.025	1.88	2.08	-1.896
Radio advertising	1.73	1.76	1.70	0.528	1.61	1.88	-2.827*

Note: \* 5-point scale (1 = never to 5 = always); \*  $p < .05$

### ***Communication sources for sensitive personal issues***

The last objective of this study seeks to explore the sources from which the kids obtain the information under five conditions such as when the information is needed fast, or when the privacy is important. The respective results are summarized in Table 5. To make the results more readable, mean percentage was calculated for each source for the selected five conditions, and thereafter ranks were assigned to each source based on calculated mean scores. Results show that most of the surveyed kids relied on the Internet ( $M = 42.0$ ), followed by parents ( $M = 32.3$ ), friends ( $M = 16.78$ ), and teachers ( $M = 8.9$ ) for gathering information about sensitive issues. Kids perceived the speed of the Internet as the most important feature to choose this medium over other sources of information to gather information about sensitive issues. After Internet, and parents, kids preferred to consult friends rather than teachers to obtain information for the sensitive issues.

**Table 5**

### ***Communication sources for sensitive personal issues***

Conditions	Parents	Teachers	Friends	Internet
	%	%	%	%
Speed	25.2	6.1	5.9	62.8
The easiest way	17.4	8.0	19.5	55.1
Confidentiality	37.8	17.0	18.2	27.0
Comfort	31.6	8.8	23.6	36.0
Privacy	49.6	4.6	16.7	29.1
Mean (%)	32.3	8.9	16.78	42.0
Ranking	II	IV	III	I

## **Discussion and Conclusion**

This study aimed to examine the media usage habits of Indian kids in the age group of 13 to 20 years. The study focused on various media usage related aspects including the time spent by these kids across the traditional (television, radio, and print) and Internet, the purpose for which different media are preferred by kids, and finally the media most preferred by kids to gather information for sensitive issues. Further, the study aimed to gain deeper insight into the Internet consumption behaviour of Indian kids by examining two related dimensions, i.e., the frequency of usage of Internet for twelve listed activities (e.g., information gathering for further education, homework, shopping, watching movies), and the ways to locate the useful web sites. Aggregative results suggest that the Internet is emerging as a popular media form for the young generation in India for various activities around information gathering, studies, and entertainment.

Majority of the surveyed kids reported, in terms of an average time spent on these activities on a normal weekday, to spend their maximum time on studies (offline) followed by studies (online), surfing Internet, reading, chatting on phone, watching television, and listening

radio. The traditional media (television and radio) previously used for entertainment and information are becoming less popular amongst kids.

Internet emerged as the first choice of media for kids for all the nine selected activities that include homework, shopping, restaurant/food-ordering, travel and tour, information search (general), health related information, weather forecast, entertainment, and news/current events. Respondents reported television as the second obvious choice for entertainment, news/current events, and weather forecast. The third obvious choice of kids amongst the listed activities was newspapers for getting information for news and current events. The results suggest radio to be the least preferred media across all the activities.

The possible explanations for the phenomenal popularity of Internet amongst Indian kids could be (i) presently it is the most powerful medium of communication which connects people across different parts of the world free and fast; (ii) being a source of information, it has opened a new world for them by providing quick, inexpensive, and easy availability open access to the previously inaccessible things, facts and figures, and information worldwide; (iii) the Covid-19 induced restrictions on travelling movements outside homes, quarantines, closure of schools thereby forcing everyone including kids to work and study at home through the Internet; (iv) wide variety of study related services provided by Internet such as inter-linked hypertext documents, the World Wide Web, notifications, e-mail, e-classrooms, and file sharing networks; (v) easy access to government policies, rules, schemes through government run web sites; and (vi) source of enjoyment (online games) and entertainment (access to movies/shows/videos).

Gender-wise analysis of result indicates that as compared to girls, the usage of Internet for playing games is more prevalent amongst distributes. This finding is parallel to previous research findings (Gross, 2004). The online games, in general, are action-oriented containing too much violent and gender-role related content (Chan & Fang, 2007) that generates more rewarding feelings in men than women during video-game play, hence, male kids are two to three times more likely than girl kids to feel addicted to video games (Hoeft et al., 2008). Similarly, due to the safety concerns girls, as compared to males have used Internet less frequently to make friends online. Another probable reason for this difference may be the gender socialization of kids in a patriarchal Indian society which equates masculinity with aggression, power, authority, toughness, ambitious, and ruthless, and femininity with nurture, care, inferior and subservience, accordingly, girls are socialised as risk-aversers and distributes as risk-takers.

The Internet usage as a source to learn about fashion (trends) and health related issues is used more by girls than distributes. This finding is consistent with literature (Nam et al., 2006) in which girls are found to be more fashion and physical appearance conscious than distributes. The gender induced differences also exists in the shopping behaviour of males and girls such as compared to men, women tend to shop for leisure and enjoyment, spend more time browsing, research and evaluate more about the available options, make informed decisions, and buy more clothing (Hensen & Jensen, 2009). Girl respondents also used Internet more frequently for listening to music than male respondents. These findings are important for the advertisers to select the appropriate content and mode (web sites) to promote their products.

Age-wise analysis of results indicates the existence of significant differences in the motives for which kids use Internet across age groups. For instance, all the surveyed kids used Internet for fun and entertainment, younger kids (13-16 years) did this more via playing games, but older kids (17-20 years) did this more via listening to music and watching movies and shows. Compared to younger kids, older kids are found to be more interested in the informative content

available on Internet in terms of information for further education, weather, health, address, travel and tour, fashion, and homework.

Most of the kids surveyed located relevant web sites by browsing search engines followed by asking friends, advertising in newspaper, television, billboard, magazine, and radio, irrespective of their gender and age. Amongst all the available options to locate a useful web site, advertising on radio happened to be the least used way. These results indicate that in India, for advertising, both traditional media (television/radio/magazines/newspapers) and modern media (Internet) are needed to supplement each other.

Surveyed kids' most preferred option was Internet for gathering information about sensitive issues followed by parents, friends, and teachers. This information is important for policymakers and social marketers who deal with social issues: (i) which are not openly discussed in a society such as sex-education, contraceptives, AIDS; (ii) that need proper, adequate, authentic, and timely information such as ways to mitigate Covid-19, vaccination drives, availability of options for consumer grievance redressal, government schemes for social welfare; (iii) where mass awareness is needed such as risks associated with smoking and drink driving; and (iv) that pertains to the busting of prevailing myths and superstitions. Amongst all the listed options to congregate the information about sensitive personal issues, Internet stands out because of the qualities it entails as it is place where the information on almost every topic and issues is available in volumes across the globe that can quickly be searched and used without any hassle at no cost or very less cost, and that too with full confidentiality and privacy. Searching Internet for sensitive and personal issues can also save kids from troubles and embarrassments which may occur if such issues are discussed with known ones this is the reason kids preferred Internet over parents, friends, and teachers.

Government organisations can make effective use of Internet in spreading important messages to families through targeting kids by making web sites more useful, attractive, and interactive. Marketers can also tap this huge opportunity to reach out to young consumers through Internet.

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# ROLE OF MICRO FINANCE INSTITUTIONS IN INDIA DURING THE C.O.V.I.D.-19 PANDEMIC

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**Abstract-** Micro Financial Institutions refer to the institutions engaged in the task of disbursal of micro credit to the poor and marginalized sections of society. M.F.I.'s at institutional level and the Self Help Groups at non-institutional level have been playing a pivotal role in financial inclusion of the poor and rural India. An emergent situation like the C.O.V.I.D.-19 which created havoc in realms of life, property and business all over the world, the micro finance sector sustained not only themselves but also kept small business afloat through timely disbursal of small loans i.e. the micro credit, thereby ensuring economic stability in a huge nation like India. The research is based upon literature collected from various secondary sources like reports of committees on micro finance etc. The paper focuses on the regional extension, employee retention and returns during the period covering 2020-21 and 2021-22 that was marked by two deadly waves of the corona virus and massive lockdowns across the country. The data shows huge resilience in the micro finance sector as a whole during the pandemic with existence of intra institutional differences in returns. The paper further suggests suitable measures that can be adopted to strengthen and revitalize the position of micro finance institutions in India to ensure greater financial inclusion of the economically deprived sectors.

**Keywords:** Micro Finance Institutions, Financial Inclusion, Marginalized Sectors, Self Help Groups, Sustenance

## INTRODUCTION:

Micro Finance as a synonym for micro credit refers to a loan of extremely low nominal value which is mainly granted to the low income groups. It is an age old concept in India, but during the last decade of the 20<sup>th</sup> century, the concept gained much acceptance as it meant integration of the financial needs of the poor in our country with the main financial system. With increasing unemployment and rising inflation, it became imperative for developing countries like ours to generate self employment opportunities for which availability of easy and cheap finance was inevitable. With efforts to institutionalize the micro finance, the first Micro Financial Institution (M.F.I.) was established in the year 1996 in India. Since then the M.F.I.'s have played an important role in channelizing the small finance of the rural sector and the urban poor. These aimed at providing financial services to the poor in the form of mobilizing their savings and providing short term small scale credit to the poor, Johnson and Rogaly, (1997). Since their inception M.F.I.'s like the Bandhan Bank, Aadhar etc. have been playing a pioneering role in facilitating micro credit to the needy for setting up and running their micro businesses.

However, the year 2020-21 has been exceptional for all of us alive on this planet due to the onslaught of COVID-19 that took a massive toll on life and property. Imposition of lockdowns closed the businesses with people rendered job less and penniless with rising medical and household expenditure. Lack of open markets discouraged those desirous of re opening of their small businesses. Though the beginning of 2021 saw some respite from the deadly virus with small entrepreneurs hopeful of returning back to normal livelihoods, the re outbreak of the virus during April –May 2021 brought massive losses of both lives and work. The growing uncertainty caused due to it made people realize the economic importance of savings. Many households and people who did not work previously, wished to enter the main stream economy by opening up of self owned micro enterprises, so that they could augment their family incomes with many women and the elderly starting home run ventures like supplying home knitted and weaved clothes, book binding, home cooked food etc. All this required the Micro Financial Institutions to come forward and lead by increasing the frequency and quantum of micro credit. The pandemic also saw closure or downsizing of many industries, rendering many people out of formal employment sector. The employment scenario was so uncertain that many people moved from formal employment sector to starting up their own small businesses further pushing up the demand for micro finance, making the role of micro financial institutions all the more challenging. M.F.I.'s played an important role during the pandemic and after it in re stabilizing the economy. Majorly dependent on the grants supported by the center and state governments, M.F.I.'s were able to pump in much needed micro capital into the economy.

## REVIEW OF LITERATURE:

According to Nikita (2014), there has been a reduction in number of self help groups which had their savings linked with banks. The study also stated that there was an increase in the amount of outstanding loans with S.H.G's that lead to the building up of their non performing assets, and suggested that measures should be initiated at governmental level so that these organizations could sustain. This can be seen in the increased government support to M.F.I.'s in the form of grants.

Mahanta et. Al.(2012) studied that channelizing micro credit to the poor will not mean just a solution to the problem of poverty, but actually act as a boon to the economy by alleviating poverty. It suggested government intervention through launch of capacity

building programmes through the M.F.I.'s, the capital so generated will be better utilized. Hence, it is extremely important to impart skills to people like sheep rearing, fishing, stitching, knitting, weaving and other handicrafts, masonry etc. so that sustenance of the start up can be ensured.

Maruthi R. et. Al, (2011) conducted survey on emergency situation and its impact on micro finance in India. It suggested formation of multi party work group and alliance with leaders of micro finance to develop strategies to unleash the entrepreneurial talent of the poor. It would go a long way in transforming our country.

Idowu F. Christopher (2010) in his study found the impact of availability of micro finance on M.S.M.E. sector in Nigeria. The sample size comprised of 100 S.M.E.'s that were collected on the basis of simple random sampling, and data was collected through structured interviews. The study revealed that though the number of S.M.E.'s that were able to secure finance through the M.F.I.'s was less, but all those who did secure money used it well to promote their market share, product innovation etc. and gained competitive advantage.

The Asian Development Bank (2000) defines microfinance as "the provision of broad range of services such as savings, deposits, loans, payment services, money transfers and insurance to poor and low income households and their micro-enterprises". The scope of this definition extends to low income households also and is not limited to the people lying below the poverty line. The taskforce on Supportive Policy and Regulatory Framework for Microfinance constituted by N.A.B.A.R.D. defined microfinance as "the provision of thrift, saving, credit and financial services and products of very small amount to the poor's in rural, semi urban and urban areas for enabling them to raise their income level and improve their standard of living."

As per research conducted by Ledgerwood (1999), the M.F.I.'s also play a role of social intermediation along with financial intermediation. It is done through formation of groups, imparting skill based knowledge and training of members in field of financial literacy, management etc.

## METHODOLOGY:

The study is descriptive in nature and the data has been collected from various secondary sources. Literature available on the subject was studied at length and latest reports compiled by Bharat Finance were considered. Micro finance has been playing an important role in poverty alleviation for over three decades in our country, but the emergency situation created globally due to the C.O.V.I.D. -19 is different as many businesses collapsed and were not able to recover till long. Many M.F.I.'s tried to increase their outreach, both personal and geographical.

## DATA ANALYSIS AND INTERPRETATION:

As per the data collected from various sources it was observed that the clients outreach of various M.F.I.'s during the pandemic reduced from 423 lakhs in year 2020 to 422 lakhs in year 2021, signifying that the micro finance required for start ups and expansion programmes was thwarted. Similar declining numbers are shown in rural clients of these institutions during this period, which show that the major loss of clientele happened in the rural sector. However, the number of female clients remain unchanged which further explains that though many working women got rendered unemployed, yet women new to economic sector increased by an equivalent proportion further explaining the fact that many people especially women home makers who were not working initially entered the formal economic sector to support their families economically. However, as per the data collected, the number of women employed with the M.F.I.'s declined which may be attributed to downsizing by the M.F.I.'s as is revealed from the dwindling R.O.E. of these enterprises. The figures show that the return on equity reduced from round 5.9% to 2.8% Y.O.Y. 2020-21 and 2021-22. This implies that economic slowdown during the pandemic affected the micro credit sector adversely. Due to close down of many business and declining revenues due to less customers due to the lockdown, the amount of bad debts with the M.F.I.'s piled up increasing the percentage of non performing assets from 0.69% to almost a triple figure of 1.83%. Surmounting outstanding loan amounts explain the reduced R.O.E. figures of these enterprises. This further highlights the grim fact that the pandemic not only affected the industrial sector but also, its ripple effect was witnessed in micro financial sector which themselves are engaged in tackling poverty furthered by the virus.

**Table 1: Table showing various M.F.I. model indicators**

Indicators	2020	2021
Client Outreach	423 lakhs	422 lakhs
Women Client Outreach	98%	98%
Rural Clients	77%	75%
Return on Equity (R.O.E.)	5.94%	2.83%
Non Performing Assets (N.P.A.)	0.69%	1.83%

**Source: The Bharat Micro Finance Report 2021**

As per the data revealed by the Bharat Finance Report 2021, the R.B.I. had extended funds amounting to Rs. 25,000 Cr. to N.A.B.A.R.D. (Rs. 15,000 Cr.) and S.I.D.B.I. (Rs. 10,000 Cr.) especially for strengthening their refinancing capabilities. These funds were further extended to numerous micro financial institutions in view of their contribution to livelihood of around 50,000 marginalized families. In order to re vitalize our economy, it became important to safeguard the functioning of M.F.I.'s. With this in view, the R.B.I. came up with policy changes regarding M.F.I.'s according to which many charges/ fees for loan application from M.F.I.'s etc. and other fines were either reduced or done away with. This enabled the poor clients to reach the credit. It was also proposed that the institutions show a detailed fact sheet of the loan the clients disclosing clearly the interest rates etc. which ensured greater transparency. In order to strengthen the financial position of M.F.I.'s and to mitigate their losses, the institutions have been allowed to design and introduce new and diverse products that would ensure their sustainable returns and performance rate.

As per the data collected on geographical expanse of M.F.I.'s in 2020-21, they are spread in 28 States, 5 Union Territories, and around 595 Districts across India that signifies the massive reach of these institutes.

**Table 2: Number of M.F.I.'s across the country**

Number of States/ Union Territories	Number of M.F.I.'s	
	2020-21	2019-20
Upto 5	161	164
6 to 10	31	22
11 to 15	3	4
More than 15	13	12

*Source: The Bharat Micro Finance Report 2021*

**Table 3: List of Top 10 M.F.I.'s operational in various States/ Union Territories (U.T.'s)**

S. No.	Name of the M.F.I.	No. of States/ U.T.'s where operational
1	Asirwad	24
2	Satin Creditcare	23
3	Satya Micro Capital	21
4	Spandan, R.M.L., Fusion, Belstar, Annapurna	18
5	Swatantra, Muthoot Microfin, I.I.F.L. Samasta	17
6	N.A.B.F.I.N.S. Ltd., Arohan	16
7	Credit Access	14
8	Village Financial	13
9	N.O.C.P.L.	12
10	Capital Trust	10

*Source: The Bharat Micro Finance Report 2021*

The data reveals that the number of M.F.I.'s operational in less than 5 States/ U.T. declined marginal during 2020-21, which explains the increase in number of M.F.I.'s which had become operational in 6-8 States/ U.T. which implies their increased regional expanse, which further implies increasing role of M.F.I.'s across the nation. This also highlights the fact that micro credit is reaching out to the poor in areas of lack of finance, which is an good indicator for our poverty alleviation and growth, especially post pandemic. Though the number of M.F.I.'s operational in more than 10 and 15 States and Union Territories has increased only marginally, it is still a respite as it indicates that M.F.I.'s were able to recover from their high N.P.A.'s and were moving towards their financial sustainability. It also highlights the fact that funds diverted from the R.B.I. for disbursement to the marginalized families through the M.F.I.'s and other policy initiatives taken by the head banker for survival and sustenance of micro credit sector have been successful.

## RECOMMENDATIONS:

Micro Finance Institutions are indispensable for not just alleviation of poverty in our country but also our economic growth. M.F.I.'s channelize short term micro credit to the poor and marginalized sections of our society thereby generating human capital, which contributes towards financial development of our country. On the basis of analysis of data studied under the literature that was reviewed, it is understood that M.F.I.'s being pillars of our growth are here to stay and need to be strengthened further to empower them to contribute towards financial development of our country. Thus, it is recommended that the cooperatives and linkages of S.H.G.'s with banks need to be reinforced, so that more liquidity and finance flows to and through the M.F.I.'s. The financial turmoil caused declining returns for the micro finance sector, so it becomes necessary to safeguard their interests. Hence it is recommended that the credit limit should be revised regularly as per the inflation, so that the M.F.I.'s can sustain themselves financially. This also calls for increased grants to various Micro Financial Institutions by the R.B.I. as per the requirement so that they can continue the process of growth and expansion in various districts and rural areas. This will lead to financial inclusion of many poor who were not able to reap benefits of easy credit. To facilitate expansion it is further suggested that M.F.I.'s be granted greater autonomy in designing various financial products to maximize their reach and earn sustainable revenue. Based upon the findings of the Sa-Dhan's committee, this paper also suggests regulations of high ticket sized loans to the graduating low income segment matured borrowers so as to finance their entrepreneurial ventures, which are definitely more sound than others. It is strongly recommended that all charges hidden and otherwise related to funds borrowed in any contingent form must be communicated to the borrowers in layman's terms at the time of borrowing itself. This is important for borrowers to know so that they take realistic loans and are aware of all the charges they might be imposed. In today's digital world, the A.I. has reached the rural and backward sectors also, due to which it is good for the M.F.I.'s to connect with their clients electronically. Thus, it is recommended that these institutions opt for e-K.Y.C. of their customers and maximize their reach to deserving borrowers in areas where physical branching out of M.F.I.'s is not financially feasible. Last but not least, it is suggested that top management of the M.F.I.'s take initiatives to motivate and retain the staff, which has shown to decline especially during the pandemic. It has been observed that major attention of the management has always been centered towards procuring and disbursement of loans and they are lacking in human matters. If the employees which are the most important asset of any organization are happy and motivated, it goes a long way in ensuring superior financial performance.

## CONCLUSION:

The last two years have shown that there are millions of poor people across our country who need micro finance now more than ever to either earn or sustain their livelihoods. The M.F.I.'s have undoubtedly contributed a lot to expand the reach and quantum of micro finance, a lot more needs to be done in the sphere of management of their employees and customers. The micro finance industry has shown great resilience at the time of emergent situation like COVID-19, where many have seen tragic loss of life and business, which highlights that this sector can withstand many challenges. But, never the less, this sector needs more financial support from the R.B.I. with more adaptable regulations which is to be revised regularly as per the need. It is important since the top big M.F.I.'s were able to sustain and even flourish during the C.O.V.I.D.-19, the small micro financial institutions suffered a lot to keep themselves afloat and incurred down spiraled returns. Greater autonomy flexibility needs to be granted to the M.F.I.s in product designing so as to widen up their reach. The institutions also need to be monitored for irregularities and transparency of operations should be ensured. The main motive of the micro finance industry is to convert human beings into human capital through provision of micro credit, so it becomes imperative for them to take utmost care of their human assets i.e. their employee's job satisfaction and retention which will further ensure better and efficient financial performance. Thus, it can be said that the micro financial institution have always been a pillar of financial strength for our poor sector, and will always remain so, and it is but important to ensure adequate cash grant flows, autonomy in operations, regular monitoring and policy revision to keep in tune with the trying times such as the C.O.V.I.D.-19.

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# Indian Railways and Economic Development

Loveleen Gupta

## Abstract

The Indian Railways (IR), more than 150 years old, is among one of the largest and oldest railway systems in the world. It has an extensive network, and played an integrating role in the social and economic development of the country. Indian Railways is the third largest rail network in the world with a track length of 114,500 kilometers, 7500 stations, 9549 locomotives, 55339 passenger coaches, 239,321 freight cars, 64600 route kilometers. It is fully owned by the government.

The direct effect of rail transportation on economic development is its contribution to Gross Domestic Product (GDP) by granting easier access to inputs by economizing their cost. The indirect effect of rail transportation works through additional inputs to other sectors. It contributes to economic development by increasing productivity and by providing amenities that enhance the quality of life, and the life wire of any society. On the other hand, it contributes to the concentration of production which results in economies of scale and access to specialized inputs. It also has a strong complementarity with physical and human capital.

**JEL Classification:** L92,O1

**Keywords:** Indian Railways, Economic Development and Passenger Transportation

## Introduction

The Indian Railways (IR), more than 150 years old, is among one of the largest and oldest railway systems in the world. It has an extensive network, and played an integrating role in the social and economic development of the country. Indian Railways is the third largest rail network in the world with a track length of 114,500 kilometers, 7500 stations, 9549 locomotives, 55339 passenger coaches, 239,321 freight cars, 64600 route kilometers. It is fully owned by the government.

The Indian railway network carries an average of 23 million passengers a day and over a billion tonnes of freight a year. During 2015-16, IR carried 720.17 million tonnes of revenue earning freight traffic, as against a budget target of 775.77 million tonnes. This was up from the 711.19 million tonnes of freight carried during 2014-15 by 8.98 million tonnes or 1.26 percent. In the last 64 years, while route kilometers has grown by 24.44%, goods carried 1386.62%, passenger kilometers 1618.80% and passenger earnings by 44995.01%.

The direct effect of rail transportation on economic development is its contribution to Gross Domestic Product (GDP) by granting easier access to inputs by economizing their cost. The indirect effect of rail transportation works through additional inputs to other sectors. It contributes to economic development by increasing productivity and by providing amenities that enhance the quality of life, and the life wire of any society (Ellis et al, 2012; Somuyiwa, et al, 2011; Olukoju, 1996; Olanrewaju and Falola, 1986). On the other hand, it contributes to the concentration of production which results in economies of scale and access to specialized inputs. It also has a strong complementarity with physical and human capital.

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# Internet Of Things In Blockchain Ecosystem From Organizational And Business Management Perspectives

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## **INTERNET OF THINGS IN BLOCKCHAIN ECOSYSTEM FROM ORGANIZATIONAL AND BUSINESS MANAGEMENT PERSPECTIVES**

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- 

### **Abstract**

Various facets of organization and business management might be transformed by the Internet of Things (IoT) and the technology of blockchain come together. This piece examines the implications of merging blockchain with IoT, highlighting the benefits as well as challenges it offers from both administrative and business management perspectives. IoT and blockchain integration enables the creation of distributed, trustless systems that manage interoperability, data security, and concerns about privacy. The use of distributed ledger technology and smart contracts increases transparency and immutability, ensuring the reliability and honesty of data created by the Internet of Things. In addition, the combination of IoT with blockchain offers possibilities for better asset tracking, supply chain management, and company procedure automating. For companies to reap all of the advantages of IoT and blockchain integration, companies have to carefully evaluate their use cases, solve technical problems, and create efficient oversight frameworks. For efforts to advance uniformity, promote innovation, and address the ethical implications of this detrimental technological shift, interaction among industry stakeholders, policymakers, and academics is necessary.

IoT and blockchain integration has tremendous potential for improving business operations and management. This confluence has the ability to change industries, develop new business models, and provide new possibilities for value generation through increasing trust, transparency, and efficiency. However, for adoption and execution to be effective, thorough consideration must be given to the associated challenges, as well as proactive attempts. Challenges with IoT and blockchain integration also arise. The main problems still center around scalability, interoperability, and energy efficiency. Furthermore, to safeguard against future

attacks, the increasing reliance on distributed systems calls for effective cybersecurity solutions. .

## Keyword

Blockchain ecosystem, blockchain technology, blockchain integration, blockchain possibilities, Event study, technology management

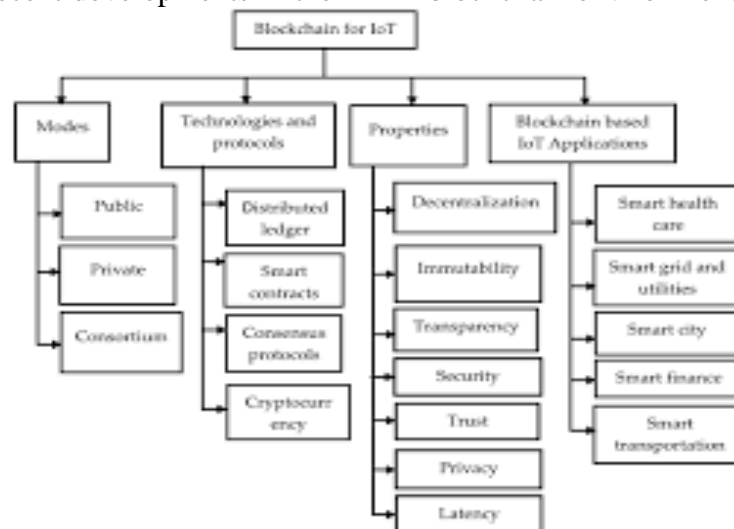
## 1. Introduction

The marriage of IoT with the blockchain technology has come to be as a revolutionary force in every aspect of business and corporate management. As a result of this convergence, an innovative model described as the "Internet of Things in Blockchain Ecosystem" has grown up. This synergy has the capacity to alter multiple industries and transform how businesses operate from an organization and business management standpoint. The term "IoT" implies a network of physical items that are interconnected that come with sensors, software, and connection to collect and transmit data. However, blockchain technology offers a distributed and immutable ledger that guarantees the security, honesty, and authenticity of data moves. Organizations may achieve new levels of efficiency, security, and reliability by combining these two powerful technologies.

## 2. Review of Literature

Author Hacıoglu *et al.* 2020, In the last few years, the most recent developments in the

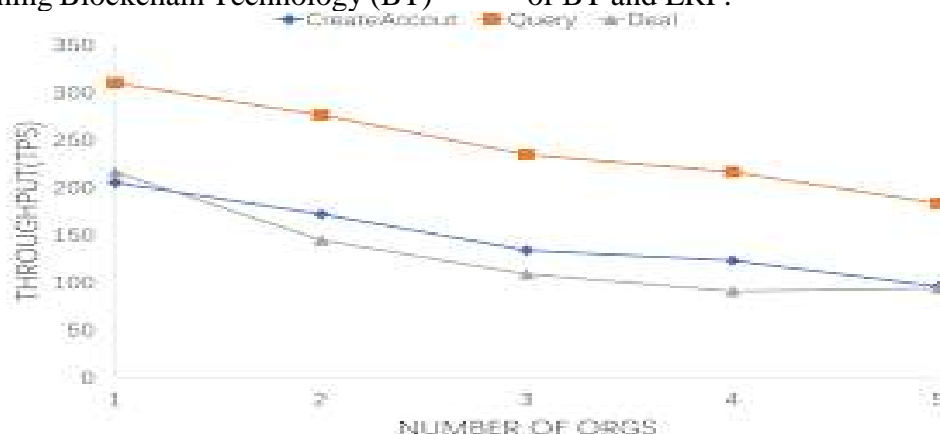
field of blockchain technology have significantly altered the way that usual business activities are carried out. The term "blockchain technologies" refers to the anarchic integration of computers and dispersed networks that securely connect to one another based on a current, increasing set of data, or "blocks," connecting all over to the future of commerce without borders the oversight of a single governing body. It is also apparent that leadership action must reflect new company strategies and philosophies so as to contend with this new digital revolutionary shift (Hacıoglu *et al.* 2020). Managing this innovative change in the workplace is a key pattern of nervousness for strategic thinking in front of several prominent companies in different sectors, from telecommunications to aviation. Quantum encryption for data security, smart contracts for value transfer, improved efficiency, long-term, highest efficiency, and developing a smart solution are some of the key participants driving business strategy-based studies on the blockchain environment.



**Figure 1: Blockchain for IoT applications**  
(Source: www.image.com)

According to Kitsantaset al. 2022, A business organization's an advanced, highly integrated software programme is the enterprise resource management (ERP) system. Since the ERP business model concentrates on particular companies, an ERP system nevertheless has its drawbacks. Around the world, there is enormous demand for tighter business connections today, a need that ERP systems fail to meet and they turn into an integrated ecosystem. They are entering a new era of separation by combining Blockchain Technology (BT)

with ERP, allowing companies to function without disruption within an integrated system (Kitsantaset al.2022). This study discusses the key potential pillars of applying BT and ERP, as well as the importance of combining BT and ERP systems. By evaluating the key potential fields of implementing BT and ERP systems, this investigation tackles an absence in the academic literature resulting from a shortage of research proof about for the technical and for business with aspects of BT and ERP.



**Figure 2: Secure service trading ecosystem**

(Source: <https://encrypted-tbn0.gstatic.com>)

According to Lenget al. 2020, In modern times, sustainability is both an urgent need and an engineering problem. The development of innovative technologies is vital for ensuring the continued existence of manufacturing processes in the future. Blockchain is an innovative information technology development that allows for sustainability in businesses and industries. The investigation investigates how blockchain may potentially resolve hurdles to sustainability from the points of view of the management of the product lifecycle and the manufacture system. The study begins by considering the literature from these two viewpoints, and then it presents the current level of research the blockchain-enabled sustainable for manufacturing (Lenget al.2020), which radiates a new light in the urgent issues that are a part for Sustainable Development Goals established by the United Nations. The survey came to a close with a discussion of

issues with methods, social obstacles, standards, and laws in connection with blockchain-enabled applications in industry. The paper's examination of the difficulties and societal obstacles the blockchain technology and it must overcome in order for demonstrate its viability in the industrial and economic areas serves as the ending.

Author Chen et al.2022, All sizes of companies have launched blockchain efforts in an effort to make a profit from this technology. Although there has been growing scholarly interest in blockchain technology, the majority of the research to date has focused on technical or design issues and enhancements. As a result, little academic consideration has been given to the factors that impact how groups adopt blockchain technologies, which gives us the chance to carry out this based on theories of empirical investigation. Using the Technological-Organizational-



Environmental (TOE) framework and growing it to take into account the network of organizations which make up a company blockchain ecosystem (Chen *et al.*2022). By enabling an array of efficiency enhancements, innovations, and lock-in reductions feasible, blockchain technology harasses, permits, and sustains the development of new business models and business ecosystems. These outcomes add to the debate on how digital technologies, and blockchain in particular, are altering business ecosystems and company models.

### 3. Materials and Methodology

Materials:

#### 3.1. Research articles and academic papers

To understand the distinctive rules, features, and applications of block chain technology and the Internet of Things, the researchers read the latest scholarship in these fields. This gave the study's conceptual framework.

#### 3.2. Case studies

The researchers analyzed real case studies of companies that have integrated block chain and IoT technological advances into their operations. These case studies shed light on the reality of use and prospective benefits associated with using block chain in IoT.

Methodology:

#### 3.3. Literature Review

To get a solid understanding of the ideas and uses of IoT and block chain, the researchers examined an extensive amount of scholarly literature, study papers, and related publications. This helped in identifying significant issues, challenges, and opportunities in this sector.

#### 3.4. Qualitative analysis

Data from the chosen case studies has been gathered and evaluated applying qualitative methods of analysis (Joshi *et al.*2023). In order to deploy IoT and block chain, the researchers looked at corporate and business management perspectives, focusing on aspects like efficiency, security, openness, and affordability.

#### 3.5. Discussion and results

The study's conclusion contained a discussion of the implications of integrating block chain with IoT from an institutional and business management perspective (Haciogluet *al.*2020). The potential benefits, challenges, and future study opportunities in this emerging industry were highlighted by the researchers.

#### 3.6. Analysis and interpretation

Using qualitative analytical techniques like theme analysis, the collected substance was analyzed. To create inferences and recommendations that were essential, the researchers searched for common themes, patterns, and trends in the data.

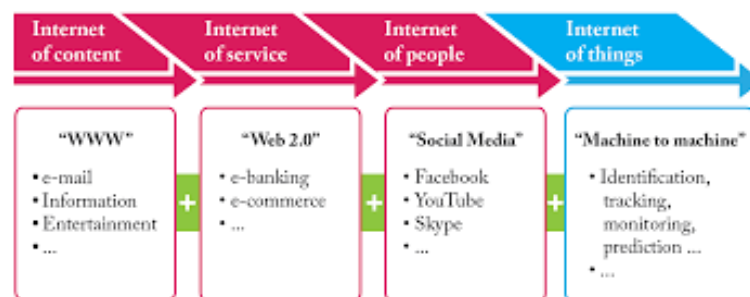


Figure 3: IoT based blockchain

(Source: data:image.com)

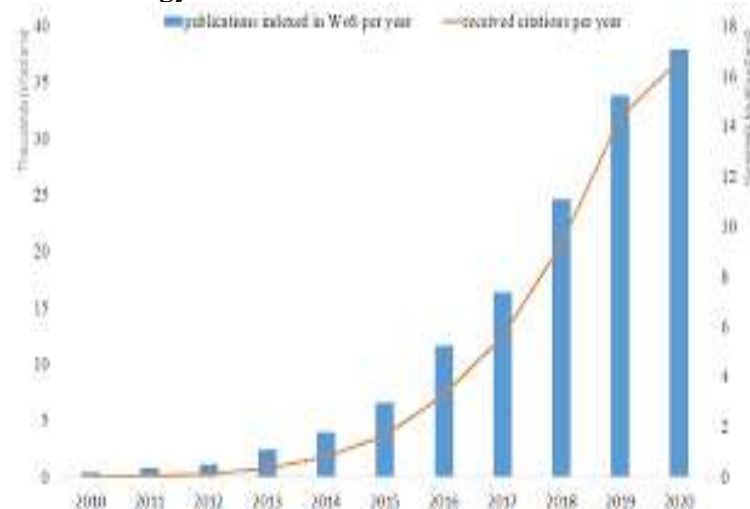
### 4. Results and Discussion

The investigation delves at the benefits, disadvantages, and consequences of this convergence for various companies and agencies. Many emerging technologies like blockchain and IoT are beginning to transform how blockchain is managed and

run, offering a method to make companies more creative and flexible. This article is doing an assessment of the IoT and blockchain technologies that can be integrated. (Bayanatiet *al.*2023). It should highlight the obstacles for these face integration methods, it is described and

discussed the integration of the technologies that are being explored is one of the crucial criteria for success. According to the report, combining IoT and blockchain could boost traceability, speed up supply chain operations, and enhance overall company procedures. Blockchain's distributed ledger technology makes it

possible to track and verify items in real-time, reducing the possibility of counterfeiting, fraud, and supply chain delays. This link additionally provides fresh possibilities for smart contracts and automated transactions, eliminating intermediaries and cutting costs.

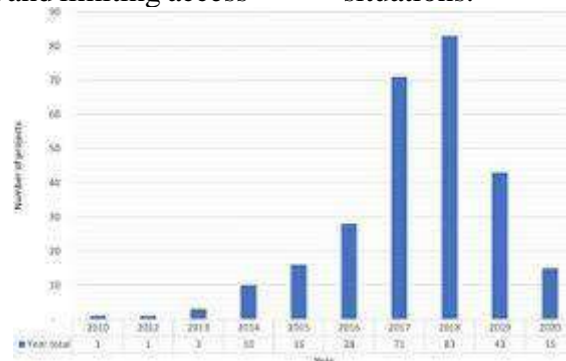


**Figure 4: Graph of IoT technology**

(Source: data:image.com)

The study stresses the significance of privacy and security of data in the IoT and blockchain surroundings. The importance for safeguarding privacy grows as more and more sensitive data is generated by IoT devices (Gurguet *al.*2019). Blockchain's decentralized layout and cryptographic procedures offer an effective structure for protecting sensitive data and limiting access

to only approved parties. Establishing confidence in clients and complying to data protection laws both rely on this integration element. IoT devices often have constrained processing and memory, consequently integrating them into the blockchain demands careful design and thinking about resource-constrained situations.



**Figure 5: Analysis of blockchain adoption**

(Source: www.image.com)

To minimize resource consumption and ensure smooth operations, successful protocols and consensus mechanisms developed especially for IoT devices must be developed. The study highlights the

advantages of IoT and blockchain connectivity from an administrative and business management perspective. These technologies can be integrated to improve efficiency, security, and openness

throughout a range of companies. To fully use the potential of this convergence, however, problems with scalability, interoperability, and resource limitations must be addressed. Overall, the integration of IoT and blockchain has significant promise for updating business structures and administrative processes.

### 5. Conclusion and Future Scope

Organizations and businesses could profit greatly from the combination of IoT and blockchain. The first advantage of using IoT devices is real-time data gathering, which allows businesses to acquire analytical data to make informed decisions. By ensuring this data's security, immutability, and transparency through blockchain technology, trust improves and the need for mediators is reduced. Companies can streamline methods, improve efficiency, and improve overall operational performance due to this combo. By improving efficiency, permitting new business models, and promoting trust, the integration of IoT and blockchain in organization and business management has the potential to transform several industries. The advance and broad acceptance of this disruptive innovation will be aided by additional studies and developments in this field, providing exciting possibilities for companies and business enterprises in the future. To establish an effective IoTblockchain ecosystem, business stakeholders, standardizing businesses, and regulatory companies must work jointly.

### 6. Recommendations

In this study, the Internet of Things (IoT) and the blockchain are merged, and the consequences are examined from the perspectives regarding organizational and business management. By allowing safe and transparent communication, exchange of information, and effortless transactions between IoT devices, the integration of IoT with blockchain has the potential to transform a number of sectors (Al-Rakhami *et al.* 2020). The study examines the advantages and challenges of this convergence, offering helpful details for

organizations and businesses thinking about adopting these kinds of technologies. The study looks at the effects of IoT and blockchain on an array of company administration-related topics, such as asset management, smart contracts, data analytics, and customer interactions. It draws emphasis to the opportunities for novel business strategies and sources of revenue that may be created by integrating blockchain and IoT technologies.

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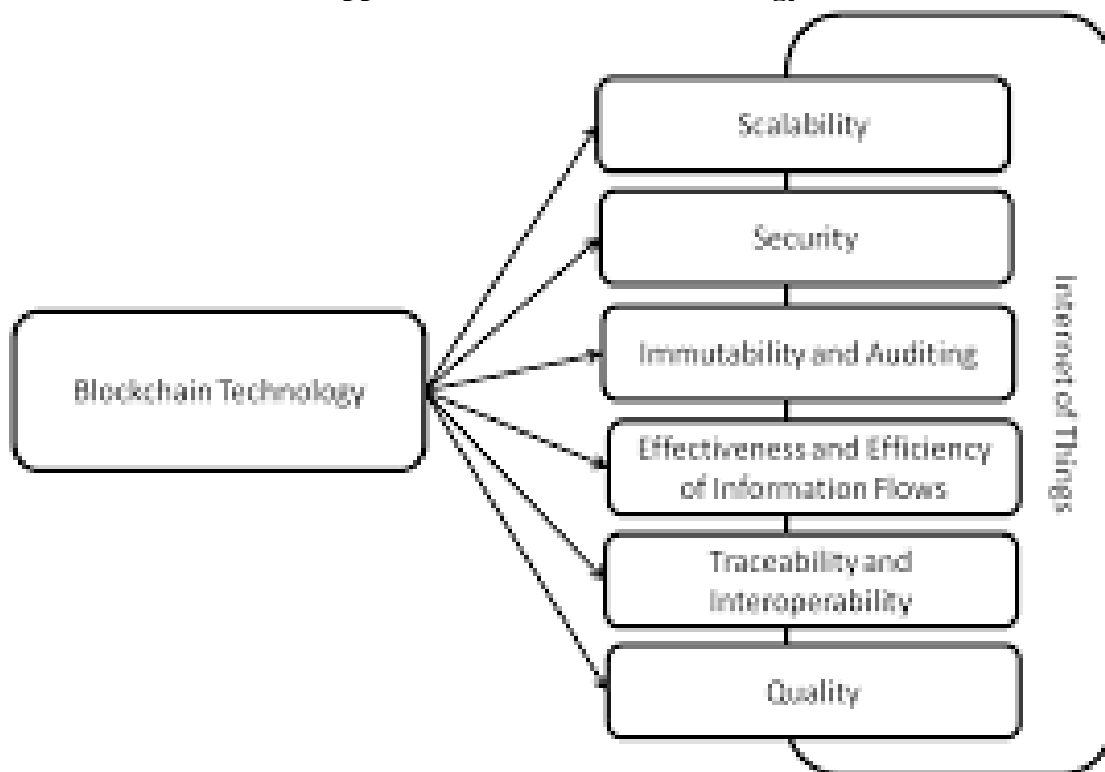
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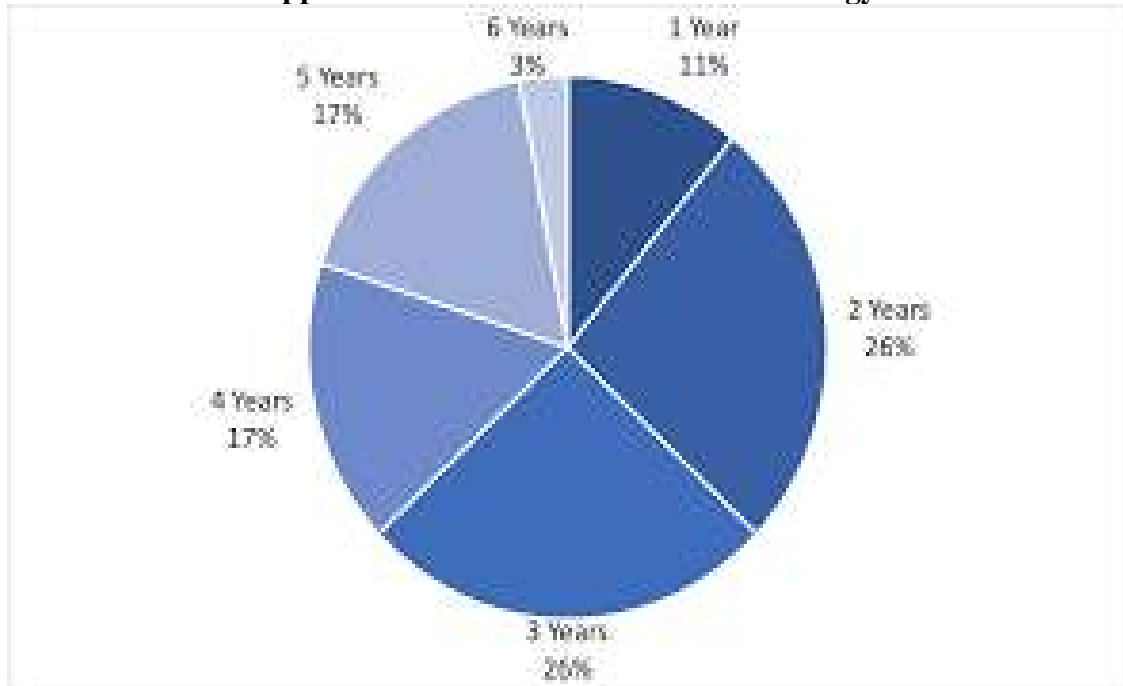
## 8. Appendices

### Appendix 1: Blockchain technology



(Source: data:image.com)

## Appendix 2: Future of blockchain technology



(Source:<https://encrypted-tbn0.gstatic.com>)



# On $\pi g s$ - $\lambda$ Closed Sets in Generalized Topological Spaces

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## Abstract

In this paper, a new class of generalized closed sets called  $\pi g s$ - $\lambda$  closed sets is introduced and some of its properties are studied. Alongwith, the notion of  $\pi g s \lambda$ -continuity and  $\pi g s \lambda$ - $T_{1/2}$  spaces are introduced.

**Keywords:** generalized topological spaces,  $g$ -closed set,  $\pi$ -open set,  $\pi g s$ - $\lambda$  closed set

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## 1. Introduction

After the introduction of semi open sets in 1963, Levine [16] also suggested another way of defining the generalized open sets. In 1970, he introduced the notion of  $g$ -closed sets [17]. This notion was extensively studied by many topologists. Some of them also suggested several new separation axioms such as  $T_{1/2}$ ,  $T_{gs}$ ,  $\pi gp$ - $T_{1/2}$  and  $T_{3/4}$  [8, 12]. Some of these axioms have found their use in quantum physics, computer science and digital topology [8, 14, 9, 19, 15, 10]. Due to its usefulness, the notion of  $g$ -closed sets was further investigated in detail. In 1996, Dontchev and Noiri introduced  $\pi g$ -closed sets [8] and used it to obtain a characterization and some preservation theorems for quasi normal spaces. Further, Aslim et. al. defined  $\pi g s$ -closed sets [11] for topological spaces. It was found that a regular open set can be decomposed into a  $\pi$ -open set and a  $\pi g s$ -closed set.

In the mean while, in 1997 Császàr [3] introduced a uniform approach to define generalized open sets in topology and accordingly defined *generalized topologies*, which are generalized form of topology. In recent years, there has been a significant increase in research exploring the properties of these structures through the lens of topology and generalized topological frameworks, as evidenced by multiple studies [18, 7, 2, 1, 13]. In this paper, we introduce and study  $\pi g s \lambda$ -closed sets for the generalized topological spaces. We also introduce  $\pi g s \lambda$ -continuity and  $\pi g s \lambda$ -irresoluteness in this process.

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## 2. Preliminaries

Császàr, using monotonic functions from the family of all subsets of a non empty set  $X$  to itself, defined a subfamily  $\lambda$  of  $P(X)$ , called the family of all  $\lambda$ -open sets and established that  $\lambda$  is a generalized topology [5], i.e.,  $\emptyset \in \lambda$  and  $\lambda$  is closed under arbitrary union. The complement of a  $\lambda$ -open set is called a  $\lambda$ -closed set. Given a generalized topology  $\lambda$  of subsets of  $X$ , the largest  $\lambda$ -open set contained in a subset  $A$  of  $X$  is called the  $\lambda$ -interior [4] of  $A$  and is denoted by  $int(A)$ . The smallest  $\lambda$ -closed set containing  $A$  is called the  $\lambda$ -closure of  $A$  and is denoted by  $cl(A)$ .

A subset  $A$  of a topological space  $(X, \tau)$  is  $g$ -closed if the closure of  $A$  is included in every open superset of  $A$ . Through out this paper, spaces  $(X, \lambda)$  and  $(Y, \mu)$  always mean generalized topological spaces on which no separation axioms are assumed unless explicitly stated.

A subset  $A$  is said to be  $\lambda$ -regular open (resp.  $\lambda$ -regular closed) if  $A = int(cl(A))$  (resp.  $A = cl(int(A))$ ). The finite union of  $\lambda$ -regular open sets is said to be  $\pi\lambda$ -open. The complement of a  $\pi\lambda$ -open is said to be  $\pi\lambda$ -closed. A subset  $A$  is said to be  $\lambda$ -semi open [3] if  $A \subseteq cl(int(A))$  and the complement of a  $\lambda$ -semi open set is  $\lambda$ -semi closed. The intersection of all  $\lambda$ -semi closed sets containing  $A$  is called  $\lambda$ -semi closure of  $A$  and is denoted by  $cl_{\sigma(\lambda)}(A)$ . Dually the semi interior of  $A$  is defined to be the union of all  $\lambda$ -semi open sets contained in  $A$  and is denoted by  $int_{\sigma(\lambda)}(A)$ . A subset  $A$  is said to be  $pre\lambda$ -open [3] if  $A \subseteq int(cl(A))$  and the complement of a  $pre\lambda$ -open set is  $pre\lambda$ -closed. The intersection of all  $pre\lambda$ -closed sets containing  $A$  is called  $pre\lambda$ -closure of  $A$  and is denoted by  $cl_{p(\lambda)}(A)$ . Dually the pre interior of  $A$  is defined to be the union of all  $pre\lambda$ -open sets contained in  $A$  and is denoted by  $int_{p(\lambda)}(A)$ .

Note that for a generalized topological space [6],

$$cl_{\sigma(\lambda)}(A) = A \cup int(cl(A))$$

and

$$\begin{aligned} int_{\sigma(\lambda)}(A) &= A \cap cl(int(A)); \\ cl(int(A)) &\subseteq cl_{p(\lambda)}(A) \subseteq cl(A) \end{aligned}$$

and

$$int(A) \subseteq int_{p(\lambda)}(A) \subseteq int(cl(A)).$$

## 3. $\pi g s \lambda$ -Closed Sets

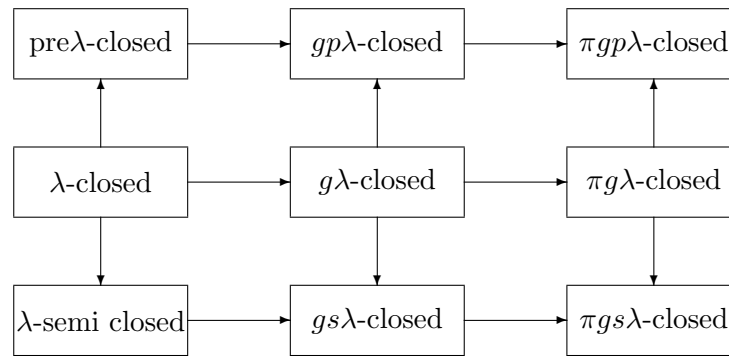
**Definition 3.1.** A subset  $A$  of a generalized topological space  $(X, \lambda)$  is called

- (i)  $g\lambda$ -closed if  $cl(A) \subseteq U$  whenever  $A \subseteq U$  and  $U$  is  $\lambda$ -open in  $X$ .
- (ii)  $\pi g\lambda$ -closed if  $cl(A) \subseteq U$  whenever  $A \subseteq U$  and  $U$  is  $\pi\lambda$ -open in  $X$ .
- (iii)  $gp\lambda$ -closed if  $cl_{p(\lambda)}(A) \subseteq U$  whenever  $A \subseteq U$  and  $U$  is  $\lambda$ -open in  $X$ .
- (iv)  $\pi gp\lambda$ -closed if  $cl_{p(\lambda)}(A) \subseteq U$  whenever  $A \subseteq U$  and  $U$  is  $\pi\lambda$ -open in  $X$ .
- (v)  $gs\lambda$ -closed if  $cl_{\sigma(\lambda)}(A) \subseteq U$  whenever  $A \subseteq U$  and  $U$  is  $\lambda$ -open in  $X$ .
- (vi)  $\pi gs\lambda$ -closed if  $cl_{\sigma(\lambda)}(A) \subseteq U$  whenever  $A \subseteq U$  and  $U$  is  $\pi\lambda$ -open in  $X$ .
- (vii)  $\pi gs\lambda$ -open (resp.  $g\lambda$ -open,  $\pi g\lambda$ -open,  $gp\lambda$ -open,  $\pi gp\lambda$ -open,  $gs\lambda$ -open) if the complement of  $A$  is  $\pi gs\lambda$ -closed (resp.  $g\lambda$ -closed,  $\pi g\lambda$ -closed,  $gp\lambda$ -closed,  $\pi gp\lambda$ -closed,  $gs\lambda$ -closed).

**Remark 3.2.** Let  $M = \bigcup \{U_i : U_i \in \lambda\}$ . Then for  $A \subseteq X$ , if  $M \subsetneq A$ , then  $A$  is vacuously  $g\lambda$ -closed.

Now we have the following relationship:

**Theorem 3.3.** Let  $(X, \lambda)$  be a generalized topological space, then the relationships amongst various generalized closed sets defined above for a generalized topology can be depicted as follows:



*Proof.* Obvious. □

Here none of these implications is reversible, as is shown by the following example:

**Example 3.4.** Let  $X = \{a, b, c, d\}$  with  $\lambda = \{\emptyset, X, \{a\}, \{b, c\}, \{a, c\}, \{a, b, c\}\}$ . Here  $\lambda$  is a generalized topology. We have the following:

- (i)  $A = \{c, d\}$  is  $g\lambda$ -closed set but not  $\lambda$ -closed as  $\{a, b\}$  is not  $\lambda$ -open in  $(X, \lambda)$ .
- (ii)  $A = \{b, c\}$  is  $\lambda$ -semi closed but not  $\lambda$ -closed in  $X$ .
- (iii)  $A = \{a, d\}$  is  $pre\lambda$ -closed but not  $\lambda$ -closed in  $X$ .
- (iv)  $A = \{a, c, d\}$  is  $gp\lambda$ -closed and  $gs\lambda$ -closed but not  $pre\lambda$ -closed and not  $\lambda$ -semi closed.
- (v)  $A = \{c\}$  is  $gp\lambda$ -closed set but not  $g\lambda$ -closed as  $A \subseteq \{b, c\}$ , an  $\lambda$ -open set in  $X$ .
- (vi)  $A = \{b\}$  is  $gs\lambda$ -closed set but not  $g\lambda$ -closed as  $A \subseteq \{b, c\}$ , an  $\lambda$ -open set in  $X$ .
- (vii)  $A = \{a\}$  is  $gs\lambda$ -closed set but not  $gp\lambda$ -closed.
- (viii)  $A = \{c\}$  is  $gp\lambda$ -closed set but not  $gs\lambda$ -closed.
- (ix)  $A = \{b\}$  is  $\pi gp\lambda$ -closed set but not  $g\lambda$ -closed.
- (x)  $A = \{c\}$  is  $\pi gs\lambda$ -closed set but not  $gs\lambda$ -closed.
- (xi)  $A = \{b, c\}$  is  $\pi gs\lambda$ -closed set but not  $\pi gp\lambda$ -closed nor  $\pi g\lambda$ -closed.

Finally,  $\{c\}$  is  $\pi gp\lambda$ -closed but not  $\pi g\lambda$ -closed.

**Example 3.5.** Let  $X = \{a, b, c, d\}$  with  $\lambda = \{\emptyset, X, \{b, c\}, \{b, d\}, \{b, c, d\}, \{a, c, d\}\}$ . Here  $\lambda$  is a generalized topology. We have the following:

- (i)  $A = \{c\}$  is  $\pi g\lambda$ -closed set but not  $g\lambda$ -closed.
- (ii)  $A = \{b, c\}$  is  $\pi gp\lambda$ -closed set but not  $gp\lambda$ -closed.

**Theorem 3.6.** For a subset  $A \subseteq X$ , the following conditions are equivalent:

- (i)  $A$  is  $\pi\lambda$ -open and  $\pi gs\lambda$ -closed.

(ii)  $A$  is  $\lambda$ -regular open.

*Proof.* (i)  $\implies$  (ii):  $A$  is  $\pi\lambda$ -open and  $A \subseteq A$ . Therefore  $cl_{\sigma(\lambda)}(A) \subseteq A$  as  $A$  is  $\pi g\lambda$ -closed. Therefore  $int(cl(A)) \subseteq A$ . Also  $A$  is  $\lambda$ -open. Hence  $A$  is pre $\lambda$ -open also, that is  $A \subseteq int(cl(A))$ . Thus  $A = int(cl(A))$ , that is,  $A$  is  $\lambda$ -regular open.

(ii)  $\implies$  (i): Let  $A$  is  $\lambda$ -regular open then  $A$  is  $\pi\lambda$ -open. Also,  $cl_{\sigma(\lambda)}(A) = A \cup int(cl(A)) = A$  and hence  $A$  is  $\pi g\lambda$ -closed as well.  $\square$

**Theorem 3.7.** If  $A$  is  $\pi\lambda$ -open and  $\pi g\lambda$ -closed, then  $A$  is  $\lambda$ -semi closed and hence  $g\lambda$ -closed.

*Proof.* By the Theorem 3.6, we have  $A$  is  $\lambda$ -regular open. Therefore  $A$  is  $\lambda$ -semi closed. Hence  $int(cl(A)) \subseteq A$ . Since every  $\lambda$ -semi closed set is  $g\lambda$ -closed. Hence  $A$  is  $g\lambda$ -closed.  $\square$

**Corollary 3.8.** If  $A$  is  $\pi\lambda$ -open and  $\pi gp\lambda$ -closed then  $A$  is  $\lambda$ -regular closed. Hence  $A$  is  $\pi\lambda$ -closed.

*Proof.* Let  $A$  be  $\pi\lambda$ -open and  $\pi gp\lambda$ -closed. Thus  $cl_{p(\lambda)}(A) \subseteq A$ , therefore  $cl(int(A)) \subseteq A$ . As  $A$  is  $\lambda$ -open, it is  $\lambda$ -semi open in  $X$  also. Thus  $A \subseteq cl(int(A))$ . Hence  $A = cl(int(A))$ ,  $A$  is  $\lambda$ -regular closed, thus  $\pi\lambda$ -closed.  $\square$

**Remark 3.9.** We can conclude that if  $A$  is  $\pi\lambda$ -open, then the following are equivalent:

1.  $A$  is  $\pi\lambda$ -closed;
2.  $A$  is  $\lambda$ -closed;
3.  $A$  is pre  $\lambda$ -closed;
4.  $A$  is  $gp\lambda$ -closed;
5.  $A$  is  $\pi gp\lambda$ -closed;
6.  $A$  is  $g\lambda$ -closed;
7.  $A$  is  $\pi g\lambda$ -closed;

**Remark 3.10.** Union of two  $\pi g\lambda$ -closed (resp.  $\pi gp\lambda$ -closed) sets need not be  $\pi g\lambda$ -closed (resp.  $\pi gp\lambda$ -closed) set.

**Example 3.11.** Let  $X = \{a, b, c, d\}$  with  $\lambda = \{\emptyset, X, \{a\}, \{b, c\}, \{a, c\}, \{a, b, c\}\}$ . Here  $\lambda$  is a generalized topology. The sets  $A = \{a\}$ , and  $B = \{b, c\}$  both are  $\pi g\lambda$ -closed but  $A \cup B = \{a, b, c\}$  is not  $\pi g\lambda$ -closed. Similarly,  $C = \{b\}$ , and  $D = \{c\}$  both are  $\pi gp\lambda$ -closed but  $C \cup D = \{b, c\}$  is not a  $\pi gp\lambda$ -closed set.

**Remark 3.12.** Intersection of two  $\pi g\lambda$ -closed sets need not be  $\pi g\lambda$ -closed.

**Example 3.13.** Let  $X = \{a, b, c, d\}$  with  $\lambda = \{\emptyset, X, \{c\}, \{d\}, \{c, d\}, \{a, c, d\}, \{b, c, d\}\}$ . Then  $A = \{b, c, d\}$  and  $B = \{a, c, d\}$  both are  $\pi g\lambda$ -closed. But  $A \cap B = \{c, d\}$  is not  $\pi g\lambda$ -closed.

In the following we derive a sufficient condition for the union of two  $\pi g\lambda$ -closed sets to be  $\pi g\lambda$ -closed. Here a  $\lambda$ -semi limit point refers to a semi limit point with respect to the generalized topology  $\lambda$  on  $X$ .

**Definition 3.14.** Let  $(X, \lambda)$  be a generalized topological space and  $A \subseteq X$ . Then the set of all  $\lambda$ -semi limit points of  $A$  is called the  $\lambda$ -semi derived set of  $A$  and is denoted by  $D_{\sigma(\lambda)}[A]$ .

Similarly  $x \in D_{\lambda}[A]$  if and only if any  $\lambda$ -open set  $U$  such that  $x \in U$  meets  $A \setminus \{x\}$ .

**Theorem 3.15.** Let  $A$  and  $B$  be  $\pi g\lambda$ -closed sets in  $(X, \lambda)$  such that  $D_{\lambda}[A] \subseteq D_{\sigma(\lambda)}[A]$  and  $D_{\lambda}[B] \subseteq D_{\sigma(\lambda)}[B]$ , then  $A \cup B$  is  $\pi g\lambda$ -closed.

*Proof.* For any set  $E \subseteq X$ ,  $D_{\sigma(\lambda)}[E] \subseteq D_{\lambda}[E]$ , as every  $\lambda$ -open set is  $\lambda$ -semi open set. Therefore  $D[A] = D_{\sigma(\lambda)}[A]$ ,  $D[B] = D_{\sigma(\lambda)}[B]$ , that is  $cl_{\sigma(\lambda)}(A) = cl(A)$  and  $cl(B) = cl_{\sigma(\lambda)}(B)$ .

Let  $A \cup B \subseteq U$ , where  $U$  be a  $\pi\lambda$ -open set in  $X$ . Then  $A \subseteq U, B \subseteq U$ . Thus we get  $cl_{\sigma(\lambda)}(A \cup B) \subseteq cl(A \cup B) = cl(A) \cup cl(B) = cl_{\sigma(\lambda)}(A) \cup cl_{\sigma(\lambda)}(B) \subseteq U$ , as  $A, B$  are  $\pi g\lambda$ -closed. Hence  $cl_{\sigma(\lambda)}(A \cup B) \subseteq U$ . Thus  $A \cup B$  is  $\pi g\lambda$ -closed.  $\square$

**Remark 3.16.** As in above theorem, we can also show that if  $A$  and  $B$  are  $\pi gp\lambda$ -closed (resp.  $gp\lambda$ -closed) sets in  $(X, \lambda)$  such that  $D_\lambda[A] = D_{p(\lambda)}[A]$  and  $D_\lambda[B] = D_{p(\lambda)}[B]$ , then  $A \cup B$  is  $\pi gp\lambda$ -closed (resp.  $gp\lambda$ -closed).

**Theorem 3.17.** Let  $A$  is  $\pi gs\lambda$ -closed and  $A \subseteq B \subseteq cl_{\sigma(\lambda)}(A)$ , then  $B$  is  $\pi gs\lambda$ -closed.

*Proof.* Let  $U$  be any  $\pi\lambda$ -open set in  $X$  such that  $B \subseteq U$ , then  $A \subseteq B \subseteq U$ . Since  $A$  is  $\pi gs\lambda$ -closed set, we have,  $cl_{\sigma(\lambda)}(A) \subseteq U$  so that  $B \subseteq cl_{\sigma(\lambda)}(A)$ . This implies  $cl_{\sigma(\lambda)}(B) \subseteq cl_{\sigma(\lambda)}(A)$ . Hence  $cl_{\sigma(\lambda)}(B) \subseteq U$  as well. Hence  $B$  is  $\pi gs\lambda$ -closed.  $\square$

**Theorem 3.18.** Let  $A$  be a  $\pi gs\lambda$ -closed set in  $X$ , then there is no non empty  $\pi\lambda$ -closed set contained in  $cl_{\sigma(\lambda)}(A) \setminus A$ .

*Proof.* Let if possible,  $F$  be a non empty  $\pi\lambda$ -closed set such that  $F \subseteq cl_{\sigma(\lambda)}(A) \setminus A \subseteq X \setminus A$ . This implies that  $A \subseteq X \setminus F$ . Now  $A$  is a  $\pi gs\lambda$ -closed set in  $X$  and  $X \setminus F$  is  $\pi\lambda$ -open set containing  $A$ . Thus  $cl_{\sigma(\lambda)}(A) \subseteq X \setminus F$  and hence  $F \subseteq X \setminus cl_{\sigma(\lambda)}(A)$ . Therefore  $F \subseteq (X \setminus cl_{\sigma(\lambda)}(A)) \cap cl_{\sigma(\lambda)}(A) = \emptyset$ . This shows that our assumption was wrong.  $\square$

#### 4. $\pi gs\lambda$ -Continuity and $\pi gs\lambda$ -Irresoluteness

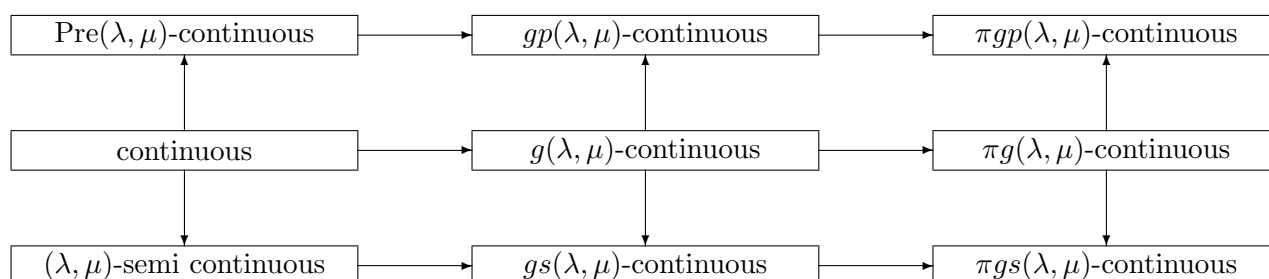
**Definition 4.1.** Let  $(X, \lambda)$ ,  $(Y, \mu)$  be two generalized topological space. A function  $f : (X, \lambda) \rightarrow (Y, \mu)$  is called  $\pi gs(\lambda, \mu)$  continuous if  $f^{-1}(V)$  is  $\pi gs\lambda$ -closed in  $(X, \lambda)$ , for every  $\mu$ -closed set  $V$  in  $(Y, \mu)$ .

**Definition 4.2.** Let  $(X, \lambda)$ ,  $(Y, \mu)$  be two generalized topological space, A function  $f : (X, \lambda) \rightarrow (Y, \mu)$  is said to be

- (i)  $\pi(\lambda, \mu)$  continuous ( respectively  $\pi g(\lambda, \mu)$  continuous,  $\pi gp(\lambda, \mu)$  continuous) if  $f^{-1}(V)$  is  $\pi\lambda$ -closed ( respectively  $\pi g\lambda$ -closed,  $\pi gp\lambda$ -closed) in  $(X, \lambda)$  for every  $\mu$ -closed set  $V$  in  $(Y, \mu)$ .
- (ii)  $(\lambda, \mu)$  semi continuous ( respectively  $g(\lambda, \mu)$  continuous,  $gs(\lambda, \mu)$  continuous) if  $f^{-1}(V)$  is  $\lambda$ -semi closed ( respectively  $g\lambda$ -closed,  $gs\lambda$ -closed) in  $(X, \lambda)$  for every  $\mu$ -closed set  $V$  in  $(Y, \mu)$ .
- (iii)  $\pi(\lambda, \mu)$  irresolute if  $f^{-1}(V)$  is  $\pi\lambda$ -closed in  $(X, \lambda)$  for every  $\pi\mu$ -closed set  $V$  in  $(Y, \mu)$ .
- (iv)  $(\lambda, \mu)$  regular open if  $f^{-1}(V)$  is  $\lambda$ -regular open in  $(X, \lambda)$  for every  $\mu$ -open set  $V$  in  $(Y, \mu)$ .
- (v)  $(\lambda, \mu)$  irresolute if  $f^{-1}(V)$  is  $\lambda$ -semi closed in  $(X, \lambda)$  for every  $\mu$ -semi closed set  $V$  in  $(Y, \mu)$ .

**Definition 4.3.** Let  $(X, \lambda)$ ,  $(Y, \mu)$  be two generalized topological space, then a function  $f : (X, \lambda) \rightarrow (Y, \mu)$  is called  $\pi gs(\lambda, \mu)$  irresolute if  $f^{-1}(V)$  is  $\pi gs\lambda$ -closed in  $(X, \lambda)$ , for every  $\pi gs\mu$ -closed set  $V$  in  $(Y, \mu)$ .

**Theorem 4.4.** For a map  $f : (X, \lambda) \rightarrow (Y, \mu)$ , the following implications hold:



*Proof.* The results are immediate, in view of Theorem 3.3  $\square$

**Remark 4.5.** The following examples show that

- (i)  $\pi gs(\lambda, \mu)$  continuity need not imply  $gs(\lambda, \mu)$  or  $\pi g(\lambda, \mu)$  continuity.
- (ii)  $\pi gs(\lambda, \mu)$  continuity is independent of  $\pi gp(\lambda, \mu)$  continuity

**Example 4.6.** Let  $(X, \lambda)$  be the same  $GT$  as in Example 3.5. Let  $Y = \{x, y\}$  and  $\mu = \{\emptyset, \{x\}\}$ . Define a function  $f : (X, \lambda) \rightarrow (Y, \mu)$  as follows:  $f(a) = f(d) = x$ ,  $f(b) = f(c) = y$ . Then  $f$  is  $\pi gs(\lambda, \mu)$  continuous which is neither  $\pi gp(\lambda, \mu)$  continuous nor  $\pi g(\lambda, \mu)$  continuous.

**Theorem 4.7.** If  $f : (X, \lambda) \rightarrow (Y, \mu)$  is an  $(\lambda, \mu)$ -irresolute regular open bijection, then  $f$  is  $\pi gs(\lambda, \mu)$  irresolute.

*Proof.* Let  $F$  be any  $\pi gs\mu$ -closed set in  $Y$  and  $U$  be a  $\pi\lambda$ -open set in  $X$  containing  $f^{-1}(F)$ . Since  $f$  is regular open, therefore  $f(U)$  is  $\pi\mu$ -open in  $Y$  and  $F \subseteq f(U)$ . Since  $F$  is  $\pi gs\mu$ -closed set and  $f(U)$  is  $\pi\mu$ -open. Therefore  $cl_{\sigma(\mu)}(F) \subseteq f(U)$ , and hence  $f^{-1}(cl_{\sigma(\mu)}(F)) \subseteq U$ . Since  $f$  is  $(\lambda, \mu)$  irresolute, therefore  $f^{-1}(cl_{\sigma(\mu)}(F))$  is  $\lambda$ -semi closed. Hence  $cl_{\sigma(\lambda)}(f^{-1}(F)) \subseteq cl_{\sigma(\lambda)}[f^{-1}(cl_{\sigma(\mu)}(F))] = f^{-1}(cl_{\sigma(\mu)}(F)) \subseteq U$ . Therefore  $f^{-1}(F)$  is  $\pi gs\lambda$ -closed in  $X$ , hence  $f$  is  $(\lambda, \mu)\pi gs$  irresolute.  $\square$

**Definition 4.8.** A space  $(X, \lambda)$  is called  $\pi gs\lambda$ - $T_{1/2}$  space if every  $\pi gs\lambda$ -closed set is  $\lambda$ -semi closed.

**Theorem 4.9.** A space  $(X, \lambda)$  is a  $\pi gs\lambda$ - $T_{1/2}$  space if and only if every singleton is either  $\pi\lambda$ -closed or  $\lambda$ -semi open.

*Proof.* Let  $x \in X$  and assume that  $\{x\}$  is not  $\pi\lambda$ -closed. Then clearly  $X \setminus \{x\}$  is not  $\pi\lambda$ -open. Hence  $X \setminus \{x\}$  is trivially  $\pi gs\lambda$ -closed. Since  $(X, \lambda)$  is  $\pi gs\lambda$ - $T_{1/2}$  space,  $X \setminus \{x\}$  is  $\lambda$ -semi closed. Therefore  $\{x\}$  is  $\lambda$ -semi open.

Conversely, Let  $A \subseteq X$  be  $\pi gs\lambda$ -closed and  $x \in cl_{\sigma(\lambda)}(A)$ . We will show that  $cl_{\sigma(\lambda)}(A) \subseteq A$ .

Consider the following cases:

- Case 1. The set  $\{x\}$  is  $\pi\lambda$ -closed, then if  $x \notin A$ , then  $A \subseteq X \setminus \{x\}$ , which is  $\pi\lambda$ -open, Since  $A$  is  $\pi gs\lambda$ -closed, therefore  $cl_{\sigma(\lambda)}(A) \subseteq X \setminus \{x\}$ , that is,  $x \notin cl_{\sigma(\lambda)}(A)$ , which leads to a contradiction. Hence  $x \in A$ .
- Case 2. If the set  $\{x\}$  is  $\lambda$ -semi open,  $x \in cl_{\sigma(\lambda)}(A)$ . Then  $\{x\} \cap A \neq \emptyset$ . Thus  $x \in A$ .

Therefore, in both cases,  $x \in A$ , that is,  $cl_{\sigma(\lambda)}(A) \subseteq A$ . This proves that  $A$  is  $\lambda$ -semi closed.  $\square$

The notion of  $\pi gs\lambda$ - $T_{1/2}$  spaces are different from  $T_{1/2}$  spaces.

**Example 4.10.** Let  $X = \{a, b, c\}$  with  $GT$   $\lambda = \{\emptyset, \{a\}, \{a\}, \{a, b\}\}$ . Then  $(X, \lambda)$  is a  $\pi gs\lambda$ - $T_{1/2}$  space. But it is not a  $T_{1/2}$  space as  $A = \{a\}$  is a  $g\lambda$ -closed set not a closed set.

*Remark 4.11.* For a map  $f : (X, \lambda) \rightarrow (Y, \mu)$ , where  $X$  is  $\pi gs\lambda$ - $T_{1/2}$  space, then  $\pi gs(\lambda, \mu)$  continuity,  $gs(\lambda, \mu)$  continuity and  $(\lambda, \mu)$  semi continuity all coincide. This follows in the view of Theorem 4.9.

**Theorem 4.12.** Let  $f : (X, \lambda) \rightarrow (Y, \mu)$  and  $g : (Y, \mu) \rightarrow (Z, \eta)$  be any two functions, then

- (i)  $gof$  is  $\pi gs$ -continuous if  $g$  is continuous and  $f$  is  $\pi gs$ -continuous.
- (ii)  $gof$  is  $\pi gs$ -irresolute if  $g$  and  $f$  both are  $\pi gs$ -irresolute.
- (iii)  $gof$  is  $\pi gs$ -continuous if  $g$  is  $\pi gs$ -continuous and  $f$  is  $\pi gs$ -irresolute.

*Proof.* (i) Let  $V$  be any  $\eta$ -closed set in  $Z$ , then  $g^{-1}(V)$  is closed in  $Y$  as  $g$  is continuous, and  $\pi gs$ -continuity of  $f$  implies that  $f^{-1}(g^{-1}(V))$  is  $\pi gs$ -closed in  $X$ . Thus  $gof$  is  $\pi gs$ -continuous.

(ii) Let  $V$  be  $\pi gs$ -closed in  $(Z, \eta)$ , then  $g^{-1}(V)$  is again  $\pi gs$ -closed in  $(Y, \mu)$  as  $g$  is  $\pi gs$ -irresolute, and  $f$  is also  $\pi gs$ -irresolute, therefore  $f^{-1}(g^{-1}(V)) = (gof)^{-1}(V)$  is  $\pi gs$ -closed in  $(X, \lambda)$ . Hence  $gof$  is  $\pi gs$ -irresolute.

(iii) Let  $V$  be  $\eta$ -closed in  $(Z, \eta)$ ,  $g$  is  $\pi gs$ -continuous then  $g^{-1}(V)$  is  $\pi gs$ -closed in  $(Y, \mu)$ .  $f$  is  $\pi gs$ -irresolute,  $f^{-1}(g^{-1}(V))$  is  $\pi gs$ -closed in  $(X, \lambda)$ . Hence  $gof$  is  $\pi gs$ -continuous.  $\square$

**Theorem 4.13.** Let  $f : (X, \lambda) \longrightarrow (Y, \mu)$  and  $f : (Y, \eta) \longrightarrow (Z, \eta)$  be any two maps, and  $Y$  is  $\pi g s \mu$ - $T_{1/2}$  space, then  $gof$  is semi continuous, if  $f$  is irresolute and  $g$  is  $\pi g s$ -continuous.

*Proof.* Let  $V$  be  $\eta$ -closed set in  $(Z, \eta)$ , then  $g^{-1}(V)$  is  $\pi g s$ -closed in  $Y$ , Since  $g$  is  $\pi g s$ -continuous.  $(Y, \mu)$  is  $\pi g s \mu$ - $T_{1/2}$  space, then  $g^{-1}(V)$  is semi closed. Therefore the irresoluteness of  $f$  implies that  $f^{-1}(g^{-1}(V))$  is semi closed in  $X$ . Hence  $gof$  is semi continuous.  $\square$

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## Dalit Marginalisation in *Swades*

Khushee Chaudhary

### Abstract

Through a close analysis of Ashutosh Gowariker's film *Swades*, this paper attempts to establish that upper-caste normativity has always been dominant in Bollywood. Hindi cinema deftly avoids complying to crude problems of socioeconomic reality, instead imposing a scripted narrative designed to address the emotional and psychological interests of Hindu social elites. Bollywood films are written, produced, and directed by a set of people who believe in promoting the upper class/caste population's preferences and ideals. Bollywood cinema is studied by film critics, historians, and researchers as a separate art form from the instability of current society. Unfortunately, in Indian film tales, like in society, experiences of caste prejudice and segregation play a marginal role.

**Keywords:** Bollywood; Caste; Dalit; Marginalised.

### Introduction

"Hesitating to act because the whole vision might not be achieved, or because others do not yet share it, is an attitude that only hinders progress" (*Swades* 00:30:00).

The above quotation by Mahatma Gandhi, which has been used as an epigraph to Ashutosh Gowariker's 2004 film *Swades: We the People*, undoubtedly places the film within the purview of societal progress. The film attempts to highlight the age-old caste, gender and religious barriers that have been rendering our nation incapable of fighting off the other, more discernible social issues, such as poverty, hunger, unemployment, and lack of basic necessities such as electricity and clean drinking water. The claim that cinema can perform a reformist role in society is not ill-founded. The film in discussion belongs to the Hindi film industry, more commonly known as Bollywood, a term formed by blending the colonial name

of Mumbai, i.e., Bombay; and Hollywood. Naturally, it was difficult to choose a single language as the language of cinema in a multilingual country, let alone in the polyglot metropolis of Bombay. However, after considerable deliberation and hesitation, the filmmakers decided on Hindustani, a blend of Urdu and Hindi that served as the lingua franca in North and Central India and provided the largest market. Instead of assigning a regional character to Bollywood through the use of a regional tongue, this act of picking a language that a large portion of India's population spoke in some form or another resulted in ascribing a national character to Hindi cinema (Ganti 187). As a result of this qualification, Bollywood films became productive propaganda tools. Between 1931 and 1987, for example, more than six thousand Hindi films had been produced. And since 1971, India has been producing the maximum number of films the world over, averaging 800 per year (Chakravarty 9). But needless to argue, apart from being India's most popular form of entertainment, Hindi film is also the country's most important medium for mass communication and opinion formation, a nation comprising 551 million Hindi speakers and only 74.04% literacy rate, according to the 2011 census (Sawee; "*Literacy Rate -7+ Years(%)*"). This makes cinema extremely instrumental in changing and improving people's psyche towards age-old customs that are detrimental to the development of our society.

### **Historical Review of Bollywood**

For a quick recap, if one is to look back to the 1950s, it becomes clear that Hindi film in the first decade following Independence reacted powerfully to the socialist concerns. The 1960s, on the other hand, saw cinema restricting its interests to the upper-middle-class. Then came the Amitabh era in the 1970s, which transformed Indian film into a very innovative zone with the 'angry young man' cliché at its heart. This cinema largely debated concerns of economic inadequacy, corruption, and anarchy, but showed little interest in social ills such as caste prejudice or women's empowerment. No director ever considered portraying a Dalit protagonist confronting social problems. The concept of imperative metanarratives was critically examined in Bollywood beginning in the 1980s. This was done to see whether there was a way to give historically marginalised ideals and ideas equal and visible space. Women, black males, LGBT topics, and physically challenged individuals had gained enough prominence in Hollywood cinema by this time to emerge as separate and independent subjects in film storylines, assisting in the democratisation of filmmaking to a significant degree. However, in popular Hindi cinema, such democratic features were not yet visible.

The widespread cliché that film is an accurate mirror of contemporary society that represents the major changes in the socioeconomic milieu is not an entirely true claim. Upper-caste normativity has always been dominant in Indian cinema. Socially marginalised groups' socio-political attempts to express their legal rights in public spaces, which peaked in the 1970s and 1980s, have yet to be made into a major film. Indian films are only flimsy attempts to obscure socio-political truths. The remarkable fictional storylines are clearly distinguished from a commoner's routine entanglements. In most situations, Bollywood deftly avoids complying with crude problems of socioeconomic reality, instead of imposing a scripted narrative designed to cater to Hindu social elites' emotional and psychological needs. Indian films are written, directed, and produced by a set of people who believe in promoting the upper class/caste population's tastes and beliefs. Film reviewers, historians, and researchers all study cinema as an art form separate from the tumultuous social reality. Experiences of caste prejudice and segregation, unfortunately, play a rather marginal role in Indian cinematic storylines, much like in society.

The parallel or art cinema that came about in the 1970s, on the other hand, did attempt to include Dalit subjectivity in motion films. Social issues such as caste-based violence and feudal exploitation gained a lot of traction. In this field as well, realism took off when storytelling ended up displaying popular preconceptions of marginalised lives rather than delving into the underlying discussion of social realities. These ostensibly "realist" stories, however, fall short of presenting the audience with the naked societal truth. They portray Dalits as inert, obedient people who have no hope for a better future. The cinematic landscape of India changed dramatically during the 1990s. There was a clear need for elements of entertainment and sensationalism to reach the audience. As a result, filmmakers separated themselves from their artistic responsibilities to society at large, creating a cinema genre with a broader worldwide appeal. Films began to be developed expressly for upper-middle-class audiences, who could afford to spend significantly more in the new multiplexes than the average moviegoer. This viewpoint has shifted since the year 2000. Films about social issues began to appear again, though in fewer numbers. Even if the audience did not embrace films that devoted an episode or two to societal issues such as caste, the audience at least, began to tolerate films that did. This could be due to a growing Dalit young population obtaining an education and becoming active members of the film audience, or to people becoming more sensitive and welcoming of Dalits with time.

It is during this wave of cinema, that Ashutosh Gowariker launched his

film *Swades*. Despite not doing well at the box office, the film received critical acclamation both nationally and internationally since “the failure of a film commercially may also have little to do with how many people actually consume it” (Delacy). Heralded as “entertainment with purpose,” *Swades* spoke fluently about the social and political handicaps that mofussil India faces in the twenty-first century (“Ashutosh Gowariker”). One of the biggest societal issues that fails to find a representation in popular commercial films is the awful truth that haunts India’s Dalits. Whatever meagre depiction of a Dalit exists, it is inaccurate, stereotyped, and bears the stamp of Gandhi’s ‘Harijan’ imagery. The Dalit character is either meek, as in Franz Osten’s *Achhut Kanya* (1936), or dependent, as in Bimal Roy’s *Sujata* (1959), or appropriate to Brahmanical socio-cultural ideals, as in the position of Kachhra in Ashutosh Gowariker’s *Lagaan* (2001). The Dalit movement, which had a significant impact on the nation’s socio-political position and generated an athletic, autonomous ‘political Dalit,’ has almost little or no representation in mainstream Indian films. This paper emphasizes the portrayal of caste discrimination that has been done vis-à-vis an upper-caste gaze in the film.

## Analysis

The film *Swades* opens at National Aeronautics and Space Administration (NASA) headquarters in Washington D.C. where the film’s protagonist, Mohan Bhargava, played by Shahrukh Khan, is a manager working on NASA’s Global Precipitation Measurement project. This upper-caste, foreign-educated and privileged Indian, “is a fully assimilated, literally globalized scientist who skillfully handles a press conference in high-tech, jargon-laden English” (Chatterji). This film is ostensibly about his journey to rural India which he undertakes to retrieve his former nanny, Kaveri Amma, who brought him up from infancy to adulthood with motherly affection and whom he had shamelessly forgotten and “lost touch” with, post his academic journey to America (*Swades* 00:09:09). However, the film turns into a bildungsroman tale of an NRI scientist who steadily metamorphoses from being a person who goes around drinking bottled water in his fully equipped caravan (recreational vehicle), to someone who embraces his “Indianness” entirely (Chatterji). Mohan finds himself in a village named Charanpur, a few hundred kilometers away from the capital of India, in pursuit of Kaveri Amma, who lives there with Gita and her little brother, Chiku; who have been recently orphaned.

The disparities between urban and rural societies are portrayed in popular culture in a very skewed manner. The majority of the authors associate

village life with the biblical Garden of Eden. From Premchand's "Deliverance" through R K Narayan's *Swami and Friends* and U.R. Ananthamurthy's *Samskara*, the concept of a unified village has been explored. In general, metropolitan life is critiqued for being wicked, tainted, unethical, and a place in need of regeneration, whereas the rural population is considered to consist of people who prefer noble simplicity to corrupt luxury and who bring new energy and beauty to moral squalor and degradation. In comparison to the loudness and bustle of the city, many authors agree that village life gives tranquility and quiet of mind.

In popular consciousness, rural areas or the village metaphor, have long represented a non-political space that proudly symbolises India's rich cultural heritage. And popular cinema has reflected this romanticised, predetermined, and mythical vision of the village as utopian and the villager as a guileless and untainted human. However, it appears that Bollywood's social model of a village is quite unclear, because caste and gender violence are certainly rampant in villages. Without a doubt, such deceptive portrayal is the result of characters being depicted without a thorough knowledge of caste hierarchy, which is an unavoidable and more relevant element of rural India than urban India. The village Charanpur, "as the repository of the ideal community in opposition to the city... is very much the village of Gandhi" (Delacy). In fact, one of the inspirations for the film was Rajni Bakshi's book *BapuKuti: Journeys in Rediscovery of Gandhi* (1998), which tells the story of twelve people who left lucrative jobs in metropolitan India to work in the rural countryside and devote themselves to the Gandhian ideal of the independent village community (Delacy). Gowariker, in a genius move, provides the audience with a peek of this book, during a scene in a Delhi Bookstore where Mohan and Gita meet for the first time (*Swades*00:21:17).

Rural development being the driving force of the film when Mohan is compelled to confront this mofussil world "that is plagued with seemingly insurmountable problems of underdevelopment and poverty, as well as by age-old issues of caste and gender discrimination, illiteracy, and child marriage," he resolves to get involved in order to enhance the villagers' quality of life (Delacy). This transformative journey of Mohan begins with a debate that ensues between Kaveri Amma, Gita (who works as a dedicated teacher at the school she has set up in the village) and Mohan, about the state of affairs in the country where he passionately notes how "we are plagued with problems... illiteracy is rampant... we have administrative problems... we are yet under-developed... caste discrimination, overpopulation, unemployment, corruption. Our state of affairs is dismal.

It's pathetic" (*Swades*01:09:06). While he rants about the Government's inability to bring about any positive change, Gita reminds him that "the Government is a system, of which public is also a part" and therefore, it is the responsibility of every citizen to eliminate weaknesses within this system (01:10:16). Post this debate, albeit, for an ulterior motive, Mohan goes around the village convincing people to send their children to Gita's school. She has been given three months' notice by the Village Council, to either increase the number of students in her school or to let go of the current school building for a smaller space on the outskirts of the village. It is during this enterprise that Mohan comes face to face with caste-based discrimination. When he tries to rope in Mela Ram, a lower-caste villager to convince children from his community to also join the school, the shocked members of the village council object, stating how "lions and sheep never drink water from the same pool" (01:15:52). When Mohan responds to their query about his caste with "I am a Brahmin," they urge him to behave like one, by acknowledging the lower caste status of Mela Ram and to, therefore, avoid food cooked by him (01:16:12).

Mohan dismisses these ideas as outdated and orthodox, angering one of the Village Council members who retorts back, "don't you dare downgrade our piety! You have been corrupted. Why drag us down as well?" (01:16:34). While this caste-laden discourse is being wrought, Mela Ram coyly stands outside the temple compound, given his caste-based restriction on temple entry. Having found no support from the Village Council members, Mohan along with Mela Ram visits the Dalit settlement on the outskirts of the village and asks one of the Dalits named Bisra, if he would like to send his children to school. Living in a dilapidated hut with two malnourished and scantily clad kids, Bisra is shown to be deeply conscious of his caste, who questions Mohan about "how a village which doesn't allow us to work within its boundary to feed our empty stomachs, be accepting of educating our children" (01:17:23). Despite Mohan's insistence, Bisra, out of his meekness, refuses to comply with his offer as he has internalised caste oppression deeply and accepted the fact that the upper-caste villagers are hostile to their community and that to be deprived of education is his children's destiny.

In the next scene, a film screening of a 1973 Hindi film *Yaadon Ki Baraat* is organized by the village council in the village compound. This multi-star film is "identified as the first masala film, combining elements of the action, drama, romance, musical, crime and thriller genres" making it quintessentially Bollywood (Wikipedia Contributors). Gowariker employs this component to not only juxtapose his film seething in social issues with



the usual Bollywood content but also to raise a reformatory voice against caste rigidity. The curtain that has been suspended in the middle of the compound forms the metaphorical as well as literal divide within the rural community, with upper-castes seated on one side of the screen and the Dalits on the other; while the untouchables (the lowest rung of Dalits) also look on from the margins. While there is an apparent division in society, they all enjoy the film with the same enthusiasm. Through this film screening scene, “popular cinema’s unifying potential is emphasized, and reaction shots of the crowd depict the responses of different audience segments to a given song sequence” from the film *Yaadon Ki Baraat* (Chatterji). However, much to the chagrin of all present, an electricity failure, that has been pitted as one of the major developmental issues plaguing the village from the beginning of the film, cuts short their cinematic experience. This is when Mohan steps in, and to cheer up the disappointed children, starts teaching them about stars and constellations. In order to keep the audience engaged, he breaks into a philosophical song about unity which is picturised “tellingly with the large shadow of Mohan falling across on the screen as he dances with gay abandon” (Chatterji).

Singing of the rainbow, he implores the audience “to think if each of these colours were alone, there wouldn’t have been any rainbow at all. Likewise, if we don’t unite, there would be none to fight injustice” (*Swades* 01:31:00). This scene is performed as a song and dance interlude that figuratively “compares individuals to night sky stars, drops of water, and colours of the rainbow which only attain their full potential in composition with others” (Reynolds). Halfway into the song, the curtain dividing the crowd is brought down while Mohan encourages children from erstwhile divided segments of society to mingle, to sing and to dance in unison to the song “*ek tara, nau tara, sau tara*”, meaning “one star, nine stars, hundred stars” stressing on the strength of unity (*Swades* 01:35:35). Through this song sequence, it has been aesthetically emphasized that just like beautifully shaped constellations can only be formed when stars are seen together and in unison, people can also achieve their true potential only when they work as a united community and shed off divisive forces of society such as caste discrimination. The lyricist, Javed Akhtar won the prestigious Filmfare award for this song in 2005. Every element of this song, be it direction, singing, or cinematography has been done brilliantly.

Another key scene that locates this film within the scope of caste is the school admittance ceremony of new students who have been enticed by Mohan’s propaganda. The ceremony is held on the day of Dussehra, the Hindu festival celebrated to mark the triumph of good over evil. While the

ceremony takes place with each student being felicitated on stage with a vermilion mark on forehead and a stack of books, the untouchable Bisrais again shown as standing outside the school courtyard dressed in humble clothing ecstatically revelling at his daughter Lajwa's stage stint. The fact that Lajwa will get to study in the same school as the village council head's granddaughter Kusum is pointed out in a subtle fashion by the filmmaker Gowariker. After the completion of this ceremony, when a discussion ensues on America's greatness in terms of infrastructural developments, the village elders point out the significance of "*sanskar and parampara*" ("culture and tradition") that America can never possess and what makes India the greatest country in the world (02:16:01). However, Mohan outrightly disagrees with this decree with what forms the most crucial string of dialogues in the film, "I don't agree that India is the greatest country in the world...but I do believe that we have the potential and the strength to make it great" (02:16:38). When Mohan expresses his displeasure at the discrimination that is inherent in Indian society based on caste, the ancient character of caste hierarchy is thrown in his face, stressing on the immortality of caste, "*Jo kabhinaijati, usi ko jatikehte hain*" (caste identity can never be shed)(02:08:07). Mohan takes them to task by rejecting the notion of acknowledging whatever is ancient as correct. He points out that "we keep fighting amongst ourselves, when we should be fighting against illiteracy, the growing population and corruption" (02:18:30). In the evening when a skit on *Ramayana*, one of the prominent epics within Hinduism, is being performed, Mohan, who has been meandering through emotional perturbation since morning, affixes to the imagery of Rama, his claim that "Rama is in compassion, Rama is in peace, Rama is in unity, Rama is in progress...whoever erases Ravana [symbol of evil] from the mind will find Rama in his heart" (02:24:47). Thereafter, shockingly enough, the main focus of the film shifts onto solving the recurrent electricity outage problem in the village and Mohan's migration back to India.

## Conclusion

The stumbling block factor of the film if viewed from a caste lens is two-fold. The total running time of the film is three hours fourteen minutes, and the driving force of the film does appear to be caste-annihilation within what can be seen as 'real India' initially, but after several caste-based discourses in the first forty-five minutes of the film as discussed in this paper; the focus of the narrative shifts entirely from sociological progress to technological progress with Mohan busying himself in the building of a Hydroelectric plant to light a bulb in the village and make it self-sufficient in terms of electricity. By changing the narrative stance of the film

midway, *Swades* runs the risk of being read as an escapist Bollywood film. And secondly, the film is being told through an upper-caste gaze with an NRI belonging to the Brahmin caste petitioning against caste discrimination while the Dalit (be it Mela Ram or Bisra) are shown as complacent to their societal position. The victimization of Dalits, therefore, is not only taking place in reality but also, on the cinema screen; where no thought is invested into portraying Dalit assertion. As the Marathi Dalit filmmaker Somnath Waghmare indicates in an interview, "even if there aren't enough Dalit stories being told on screen, no one is doing charity by making these films. If you don't have the skill, capacity or understanding to deal with such issues, it is better to pass the mike to people who do" (Joshi). This statement might come across as bold, but it speaks of an aspect that cannot be ignored. And this silencing or marginalisation of Dalit within the annals of Bollywood has to stop, especially keeping in mind the marked impact Hindi cinema tends to have on India's masses.

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