ISSN 2322-0767
VOLUME 12 (ISSUE 1)
JANUARY - JUNE 2025
(UGC CARE LISTED JOURNAL)

DEPARTMENT OF COMMERCE
FACULTY OF COMMERCE AND BUSINESS
DELHI SCHOOL OF ECONOMICS
UNIVERSITY OF DELHI

JOURNAL OF COMMERCE AND BUSINESS STUDIES

Editorial Board

Editorial Advisory Board

ISSN 2322-0767
VOLUME 12 (ISSUE 1)
JANUARY – JUNE 2025
(UGC CARE Listed Journal)

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Exploring Augmented Reality in Online Food Delivery: An Extended TAM Approach

Ms. Yashika Verma
Research Scholar
SSBS, Sharda University,
Greater Noida, India
yashika.verma.delhi@gmail.com

Dr. K. R. Gola
Associate Professor
SSBS, Sharda University,
Greater Noida, India
Kr.gola@sharda.ac.in

Abstract

The current research explores Augmented Reality's effect on consumer behaviour intents within framework of OFD services, using TAM as a foundation. Information was gathered with convenient sampling from 315 respondents in the city of Delhi/NCR using Google Forms throughout March-April 2024, aimed at evaluating their interactions with augmented reality in online food delivery services. The answers were examined using PLS to validate the SEM by assessing both measurement and structural model. The study's conclusions exhibit that perceived utility, perceived usability, perceived novelty, and perceived food image are positively and significantly influenced, & Attitude has direct influence on desire to use AR in Online food Delivery (AROFD) app. However, perceived enjoyment (PENJ) was not determined to have a major impact on the Attitude of using AR-based OFD app. This study provides insightful information about businesses by exploring features of Augmented Reality in OFD service on user behavior. Businesses can make informed choices when developing and integrating new features. Consequently, this improves the user experience in general and cultivates customer loyalty in competitive markets.

Keywords: Augmented Reality, Online Food Delivery App, Technology Acceptance Model, Novelty, Online Food Image

Introduction

Augmented Reality represents advanced technology that combines 3D virtual components into actual environment, offering various sectors the capacity to communicate with Three-Dimensional elements promptly. This technology facilitates real-time interactions with virtual objects and has been recommended by researchers and professionals for improving marketing strategies and enhancing customer engagement "(El-Seoud et al., 2019)". Furthermore, AR has proven beneficial for online commerce, contributing to increased sales "(Kazmi et al., 2021)". The prevalence of AR applications and smart phones witnessed substantial growth, making it accessible for users to leverage AR capabilities through their smartphones. This technology is not limited to specific industries and has found applications in the food industry as well. Previous studies have utilized Augmented Reality to enhance serving

precision and uniformity in food, allowing users to accurately assess the size of the food and providing an interactive experience to promote culinary offerings ("Rollo et al., 2017; Weking et al., 2020"). Recently, the demand for OFD offerings has grown due to changes in lifestyle and shift towards convenience-oriented behaviour (Shukla & Deshpande, 2025). The internet's global reach has significantly helped make OFD services more popular, with a reported 5.35 billion Internet subscribers worldwide in 2023 (Internet World Statistics, 2024). The competitive landscape in this sector has led platforms to adopt advanced tools, including AI-generated recommendations, chatbots for customer support, and AR and virtual reality interfaces for an immersive user experience (Arora & Manchanda, 2023). Technology's incorporation into the OFD apps ensures an overall flow experience, which leads to better user satisfaction and a guarantee of future continuation (Nguyen et al., 2025).

Tier 1 cities, such as Delhi, have witnessed a surge in food delivery services, with popular applications like Zomato experiencing over 47 million downloads on the Google Play Store (Statista, 2024). This trend indicates a growing acceptance of food delivery applications as people increasingly turn to convenient and efficient solutions.

The increasing reliance on mobile applications is evident in the download statistics, with over 257 billion online food delivery apps downloaded in 2023 and an anticipated growth to $300 billion by 2025, marking a 66.2% increase from previous years (Statista, 2023). This technological progress has made ordering food more accessible, contributing to the forecasted market value of the OFD industry, expected to reach US$1.22 trillion in 2024 (C. Hong, 2021). Customer preferences in OFD are influenced by visual and informational design, emphasizing the importance of appealing visuals & accurate information in applications (A. P. Kapoor and M. Vij, 2018). However, difficulties, including the incapacity to physically assess food goods prior to buying, persist in online food shopping (H. Amir and W. Rizvi, 2017). Current OFD services often rely on 2D pictures, limiting customers' ability to make informed decisions based on physical assessments. Companies are increasingly incorporating 3D graphics to aid users in the process of selecting options (H. Qin, V. Prybutok, and D. A. Peak, 2020). Embracing emerging technologies, including AR, has allowed online food delivery services to enhance their value proposition and stay competitive in the market. Innovations allow clients to visualize food goods prior to making a buy, adding a fresh perspective on the selection procedure (W. Batat et al., 2021). To explore user acceptance of these technologies, Davis's TAM serves as fundamental structure. However, this research acknowledges limitations of the original "TAM", particularly in the online food delivery sector and with emerging technologies like Augmented Reality. To overcome that, the study proposes the formation of a modified TAM due to its simplicity and usage across various studies, which can help in predicting the user's intention towards OFD (Elysia et al., 2025). The extended TAM, incorporating factors like perceived enjoyment, perceived augmented food image, and perceived novelty, will be employed to assess users' usage intention of AR in OFD activities "(Agarwal & Karahanna, 2000; Li et al., 2021)". This research attempts to investigate a conceptual framework comprising six determinant factors: perceived utility, perceived usability, perceived pleasure, perceived improved food appearance, perceived novelty, & attitude towards internet services for meal delivery. The research focuses on usage intention in OFD applications in the city of Delhi/NCR. Additionally, the study seeks to propose methods on how to raise efficiency of services in OFD for companies and scholars by evaluating the variables impacting users' desire to utilize these apps.

Theoretical Framework

The "Technology Acceptance Model" has emerged as an extensively used structure in studies of technologies, with notable contributions from scholars such as Kim et al. (2019) and

Chuah (2016). Built upon Fishbein's (1975) & Ajzen's Theory of Reasoned Action from Psychology of society, it was first introduced in 1986 by Davis to explore information systems. This model includes three major constructs: "Attitude", "perceived ease of use", & "perceived utility", aiming to clarify users' motivations for utilizing novel technologies. (Davis et al. 1989) further advanced framework by integrating a new variable, "Behavioral intention", which is significantly impacted by "attitude" & "perceived utility".

Despite its widespread application in information systems research, TAM is not without its limitations. It has been critiqued for its inability to handle novel solutions or services (Wu, 2011), limited predictive and explanatory capabilities, and perceived lack of practical value (Garaca, 2011). Empirical studies utilizing TAM have sometimes yielded inconclusive or unclear results, prompting researchers to call for the identification and inclusion of additional constructs (Fishbein, 1975). Recognizing the need for an extended model that incorporates context-specific constructs, the TAM concept is expanded upon in this study by introducing additional factors: "perceived enjoyment", "perceived augmented food image", and "perceived novelty". This study's framework aims to address complexity of behaviours of customers within the OFD domain, a facet overlooked by the initial version of TAM due to its omission of factors such as perceived enjoyment, perceived augmented food image, and perceived novelty. By broadening the TAM application, research aims to provide light on crucial issues for companies in the online food delivery industry. These insights aim to enhance their understanding of customer preferences and expectations, empowering them to adapt their operations accordingly. Despite the exponential increase of the virtual food delivery market and incorporation of innovative features like Augmented Reality interfaces, there exists a dearth of empirical research delving into the elements affecting consumer attitudes and intentions to use these technologies. This research addresses this gap by utilizing TAM to explore both the direct and indirect association between AR and BI. Figure 1 illustrates the proposed study framework visually represents the study's approach to unravelling the complex relationships between AR technology & users' behavioral intentions. This study strives to not only expand the application of the TAM framework but also contribute valuable insights to the changing landscape of consumer technology adoption within the realm of online food delivery.

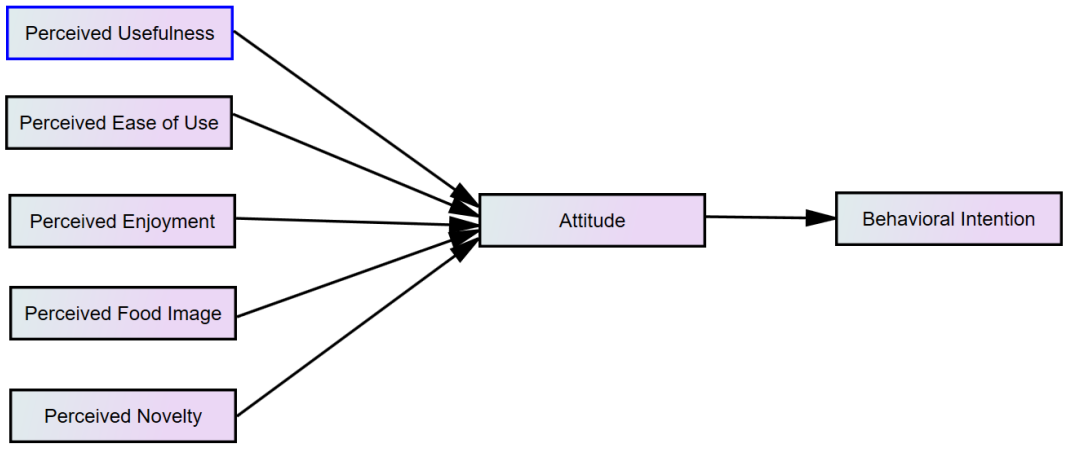

Figure 1: Conceptual Model

Augmented Reality

Augmented Reality represents distinctive collection of engaging technical innovations that integrate virtual objects seamlessly into the real scenario, thereby enhancing user

engagement with these virtual elements (Poushneh and Vasquez-Parraga, 2017). Despite its contemporary popularity, augmented reality is not a recent invention; it traces its origins back to Morton Heilig's 1950 creation, known as the "Sensorama," initially utilized in the field of filmography (Carmigniani et al., 2011; Uruthiralingam and Rea, 2020; Srivastava and Agnihotri, 2019). Today, AR technologies are increasingly adopted by retail sectors worldwide, facilitating immersive consumer experiences (Alam et al., 2021; Fan et al., 2020).

The essence of "AR" lies in integrating computer-generated imagery smoothly into the user's actual viewpoint (Sudharshan, 2020). This incorporation is achieved through handheld, wearable, or compact devices, allowing digital information to augment the user's perception of reality (Dieck & Jung, 2018; Jung & Dieck, 2017). By superimposing electronic information onto physical surroundings, AR adds layers of virtual enhancements to our environment, representing a significant technological leap wherein computer interfaces become virtually invisible, enabling direct interaction with the real world (Post, 2016). Through utilisation of AR technology, users can view & engage with virtual product characteristics in real-world settings, simulating in-store shopping experiences that increase conversions and decrease returns (Park and Yoo, 2020). In the evolving manufacturing landscape influenced by automation, data analytics, & computerisation, which are examples of Industry 4.0, AR emerges as a vital tool for digitally connecting manufacturing operations and food products throughout the supply chain. With expanding realm of "Industrial Internet of Things (IIoT)", implementation of "AR applications" within the meal industry is poised to escalate "(Sandeep et al., 2017)". While certain AR applications, such as interactive restaurant menus, are relatively straightforward to develop and deploy, the value of "AR" content lies not in its production speed but in information it conveys "(Sandeep et al., 2017)". Augmented reality leverages various forms of information, including text, visuals, and music, integrating them seamlessly with real-world elements in real-time. This improves the experience of shopping by lowering decision-making uncertainty, boosting intention to buy, cultivating brand loyalty, and nurturing relationships between consumers and brands "(Chen et al., 2021)".

Picture 1
Source: iboson.io, AR in Food Industry

Picture 2
Source: zealar.com.au,

The technical core of AR is its capacity to combine the real & digital worlds, allowing for in-the-moment interactions and facilitating Three-Dimensional (3D) registration (Billinghurst et al., 2015). Functioning as a conduit between the real & virtual worlds, AR technology gives us the ability to access data in real-time seamlessly "(Nayyar et al., 2018)". The burgeoning popularity of "AR" technology is expected to rise significantly in parallel with virtual reality (VR), with market forecasts predicting a combined worth of $80 billion by 2025 (Bellini et al., 2016).

In the realm of food applications, AR, particularly in the form of AR OFD (Online Food Delivery) apps featuring 3D images, exerts a significant influence on consumer perceptions, enhancing both utilitarian and hedonistic experiences while providing valuable information

(Vahdat et al., 2020). High-quality 3D images within AR OFD apps contribute positively to consumer satisfaction, adding utility and enjoyment while enriching the overall informational experience.

Hypothesis Development

Perceived Usefulness

In diverse research contexts, it has been consistently observed that "perceived usefulness" of new technologies significantly impacts "behavioral intentions" toward adoption. This influence has been substantiated across various technological domains, incorporating digital reality**,** mobile applications "(Hsu et al., 2015)", & mobile exergames "(Broom et al., 2019)". "(Sumak et al., 2011)" also examined these areas and further affirmed the significant favorable effect of "perceived usefulness" on "attitude". Notably, "perceived usefulness" emerged as a crucial predictor, extensively documented in research studies that aim to elucidate and anticipate the intentions of users to embrace and incorporate IT into their routines (Dutot et al., 2019; Kalantari et al., 2017). Recognition of information technology as beneficial to users' objectives fosters a positive perception, thereby motivating their inclination toward technology adoption. Hence, the following hypotheses are posited based on this rationale.

Hypothesis 1 (H1): Perceived usefulness positively influences attitude towards AR-based OFD apps.

Perceived Ease of Use

"Perceived ease of use" pertains to how users perceive new services or products as more convenient or superior compared to alternatives, as outlined by "(Rogers et al., 2003)". The adoption of novel technology depends on the perceived ease of use, as indicated by (Sevim et al., 2017). **"(Ha and Stoel, 2009)"** study corroborated these findings in the context of virtual education system usage intention. Numerous researchers, including (Ha 2009), (Lim, 2012), and (Yulihasri, 2010), have identified that attitude possesses a strongly favorable association with perceived usability. In addition, (Sevim, 2017) asserted that consumers' attitudes toward technology use directly impact how they perceive its ease of use. When users find technology seamless & usable, it is more likely to be viewed as user-friendly by them and use it regularly. Existing research shows that "perceived ease of use" significantly & positively impacts "usage intention", either directly or indirectly, as noted by (Hernandez, 2007), (Erikkson, 2005), and (Wang, 2003). The acceptance of any technology is contingent on users perceiving it as user-friendly, while complexity diminishes usage intention (Selamat, 2009). Therefore, the ensuing hypotheses are formulated based on these premises.

Hypothesis 2 (H2): Perceived Ease of Use positively influences attitude towards AR-based OFD apps.

Perceived Enjoyment

Enjoyment, as an individual emotional state, plays important part in forming purchase behavior. Defined as pleasure derived from shopping activities, perceived enjoyment is characterized by the positive emotions experienced by consumers, including excitement, enjoyment, relaxation, and inspiration "(Mohan et al., 2013)". "(Ingham et al., 2015)" highlight that "perceived enjoyment" can be cultivated using website interactions, motivating users to engage in online purchasing activities. Augmented reality interactive technology's unique

features are set to enhance product visual presentations, enabling consumers to perform shopping tasks with greater speed and efficiency "(Rese et al., 2017; McLean and Wilson, 2019)". Perceived enjoyment is recognised as a major component influencing consumer attitudes in the direction of mobile application augmented reality "(Haugstvedt and Krogstie, 2012; Kim et al., 2016; McLean and Wilson, 2019)". According to "(Kim et al., 2016)", the use of revised iterations of augmented reality apps can induce enjoyment, thereby positively impacting "consumer attitudes" toward their adoption. Creating rich contexts within augmented reality apps through elements such as clear images, vibrant colours, appropriate size, animations, humour, and other interactive features proves instrumental in facilitating users' online shopping experiences. Both (Kim et al., 2016) and (Balog and Pribeanu, 2010) affirm that perceived enjoyment significantly influences consumer attitudes in using augmented reality apps. In light of the study's findings, perceived enjoyment, crucial component of TAM, exerts more significant impact on usage intention than "perceived usefulness". This influence is further augmented by social engagements & the social power bonds, as revealed in the work of (Choi et al., 2019). In light of the conversation that was previously mentioned, the following hypothesis is put forth:

Hypothesis 3 (H3): Perceived Enjoyment positively influences attitude towards AR-based OFD apps.

Perceived Food Image

AR, as an advanced technology, presents numerous opportunities, establishing itself as a prominent research domain across various fields, from education "(Hincapie et al., 2021)" to marketing "(Cuomo et al., 2021; Rodrigues et al., 2019)". Despite extensive exploration, there were relatively fewer studies on AR in food & beverage market, although potential applications in this sector are substantial "(Wei et al., 2012)". Previous research delved into use of AR to enhance customer experiences, revealing its capacity to elicit positive post-consumption behaviours and have a major impact on customers' overall food well-being (Batat et al., 2021). Moreover, AR has proven effective in enhancing precision and realism, thereby supporting precision in food service (Rollo et al., 2017). Additionally, AR is essential to improving the graphic representation of food, functioning as an electronic format menu item. This application aids users in visualizing various cuisine options offered on the menu, streamlining the food selection process, and saving time (Rane et al., 2021). The integration of 3D models enables customers to easily imagine the appearance of the dishes, addressing potential discrepancies between expectations and reality that can occur after the meal is prepared (Koui et al., 2017). Studies emphasize that excellent visual effects and graphics add to a heightened perception of augmentation "(Rahman et al., 2018; Zhang et al., 2020)". Furthermore, mobile AR has a positive impact on the user's decision-making process "(Qin et al., 2021)".

To sum up, multifaceted applications of AR in meal industry, ranging from enhancing customer experiences to improving serving accuracy and visualizing menus, highlight the technology's capacity to revolutionize shaping future of the culinary landscape. Considering, aforementioned discussion, the following hypothesis is formulated.

Hypothesis 4 (H4): Perceived Food Image positively influences attitude towards AR-based OFD apps.

Perceived Novelty

Augmented reality stands as a cutting-edge technology, and individuals' receptiveness to novelty plays a vital role in influencing their attitudes toward its use. Augmented reality mobile apps introduce unique characteristics that provide users with new and diverse stimuli "(Tsai et

al., 2020)". In this instance, uniqueness goes beyond the simple "distinctiveness" of augmented reality functionalities to include the provision of customized, distinctive, dynamic, & creative material by this innovation "(Wilson et al., 2019)". According to (Massetti, 1996), novelty in augmented reality occurs when people engage with something that is new, unique, dynamic, and different. Digital goods presentations using augmented reality can manifest novelty through various formats, including pictures, videos, or written content (Javornik, 2016). Augmented reality apps facilitate improved visualization of food in real-time environments. The dynamic presentation of virtual content within augmented reality apps enables users to visualize food with a highly personalized and novel experience, particularly through 3D models, impacting the way they make decisions "(Rese et al., 2017; Huang and Liao, 2015)". "Augmented reality" interactive technology's unique features are expected to improve visual food presentations, potentially enabling consumers to make more informed food choices (Rese et al., 2017). The notion of novelty, characterized by novelty or uniqueness of the invention in the eyes of adopters, is a pivotal characteristic of any technological advancement. According to findings, a significant emotional aspect influencing the adoption of IT advances is the perception of the degree of novelty associated with the innovation "(Wells et al., 2010)".

Hypothesis 5 (H5): Perceived Novelty positively influences attitude towards AR-based OFD apps.

Attitude

Attitude encompasses predisposed behaviours, including concepts, emotions, sentiments, and thoughts (Hovland and Rosenberg, 1960). As stated by Setiyawati and Haryanto, 2016), the impact of attitude on behavior suggests that individuals may hold either positive or negative perceptions toward specific actions. In the Technology Acceptance Model (TAM), intentions dictate individuals' actions regarding technology usage, with personal attitudes shaping decisions to use or abstain from using specific technology (Davis, 1985). Attitude frequently emerges as a crucial indicator of usage intention in the realm of accepting mobile services "(Chen et al., 2018)". Users are inclined to develop favourable attitude toward technology when they perceive clear benefits from its use (Hwang et al., 2019). (Ajzen, 1991) argued that attitude significantly influences behavioral intention, and numerous studies indicate a favourable correlation between attitude and purchase intention (Karjaluoto, 2017). The link between a strong intention to use technology and a positive perception of system is well recorded "(Chang et al., 2008)". "(Gajanayake et al., 2016)" found that mindset plays role in facilitating association between intended use and perceived usefulness. (Krishnan et al., 2016) suggested, however, that attitude functions as a mediating factor between behavioral intention and PU & PEOU. Positive attitudes toward using technology are more likely when individuals perceive benefits from adopting new technology (Hwang et al., 2019).

In specific contexts, favorable outlook on smartphone banking apps significantly influences the intention to use, akin to findings in web-based retailing contexts "(Chen et al., 2018)". Earlier research has shown that customers' intentions to use, buy, and suggest augmented reality are greatly impacted by their attitudes toward its use "(Haugstvedt and Krogstie, 2012; Balog and Pribeanu, 2010; Vijayasarathy, 2004; Talantis et al., 2020; Vishwakarma et al., 2020)". Inclusion of digital functions found in augmented reality apps plays a vital part in improving attitude toward usage & purchase intentions (Park and Yoo, 2020). Consumers show a greater inclination to reuse augmented reality apps that provide unique experiences (Javornik, 2016).

In light of previous research, the following hypothesis is put forth in this study.

Hypothesis 6 (H6): Attitude positively influences intention towards AR-based OFD apps.

Method of Research

Sample & Data Collection

The objective behind the research is to investigate customers' wants to employ applications of augmented reality in OFD apps, specifically with reference to Delhi/NCR.

To fulfil the research objective, we incorporated a question aimed at identifying whether respondents have prior experience with AR applications. The majority of the data were collected from young students (graduate students) who fall into the category of Gen Z, the generation that contributes largely to the population of virtual shopping in various sectors and technologies (Sena et al.,2024). Also, Young students demonstrate a keen understanding of the significant impacts of evolving system features like websites and applications due to their strong computer literacy ("Margaryan et al., 2011; Smith et al., 2009"). Furthermore, they exhibit a propensity to explore and adopt new, distinctive attributes in technological innovations.

During the second phase, respondents were taken to a web-based survey to rate their perceptions of AR applications. Data were gathered from 316 respondents; their profiles are provided in Table 1. Established research studies provided the scales that have been verified for every construct. Each variable was assessed using a 5-point "Likert scale", where "5" indicates "strongly agree" and "1" denotes "strongly disagree." To examine "Augmented Reality" technology in OFD applications, we used "perceived usefulness", "perceived ease of use", "perceived enjoyment", "perceived food image", & "perceived novelty" as factors of attitude and customer intention. "Perceived usefulness" was measured using four scales adapted from ("Saleem et al., 2021"), and four items for "perceived ease of use" were adapted from "(Alam, 2018; Huang and Liao, 2015)". The example of item for PU is 'Using of this Augmented Reality Online food delivery app enable me to accomplish Ordering process more quickly' & 'I think using Augmented Reality Online food delivery app is easy' for PEOU. Three items measuring perceived enjoyment were adapted from (Khosasih, 2023). An Example of the construct is 'The actual process of using this Augmented Reality Online food delivery app is pleasant'. Three items for "perceived novelty" were adopted from ("Wells et al., 2010"), and example measurement is 'The Augmented Reality Online food delivery app represent a neat and novel way of placing order'. Perceived food image consisted of three items adopted from "(Mikhael et al., 2023)". The example of the item for the variable is 'Augmented food image in Online food delivery app is very attractive'. The "attitude toward the use of Augmented Reality" comprised four items, mainly adapted from "(Alam et al., 2018)". A sample construct of the variable is 'I have favourable attitude toward using Augmented Reality OFD app'. "Intention to utilize" was assessed using three items modified from "(Vahdat, 2020)" & "(Khosasih, 2023)". The example of the item is 'I will use the Augmented Reality Online food delivery app'.

However, in India, Augmented Reality in the food delivery sector is not widely used by customers. In this study, we gathered a convenience sample of 315 participants using Google Forms to collect data in March–April 2024. The survey comprised two sections. Every item of measurement was taken from previously published research to better suit specific focus of this study, particularly exploring Augmented Reality in online food delivery apps. "SmartPLS 4.0" was used to analyse the data. When appropriate, "partial least squares" analysis was employed to investigate structural & measurement models "(Hair et al., 2012)". The measurement model underwent "confirmatory factor analysis" to ensure sufficiency of measurements.

Measurement model

In current research, four variables from the TAM have been incorporated: "Perceived Ease Of Use", "Perceived Usefulness", "Attitude Toward Use", & "Behavioural Intention To Use".

"Perceived Food Image", "Perceived Enjoyment", & "Perceived Novelty" were added as further new structures to gauge their impact on "Technology Acceptance Model". All variables underwent reliability testing using "Cronbach's alpha" and "Composite Reliability (CR)"; results of the analysis are provided in Table 3. "Convergent validity" was assessed using the Average Variance Extracted (AVE), with all reflective item loadings exceeding the threshold value of 0.7. The Augmented Reality construct was treated as higher-order, with loadings for Perceived Usefulness (0.902) and Attitude (0.905). The reliability of variables was assessed by "Cronbach's alpha" & "composite reliability", with "AVE" values ranging from 0.768 to 0.814 & CR values ranging from 0.861 to 0.924. "Convergent validity" was further supported by "AVE" values exceeding 0.5 for all constructs. "Discriminant validity" was established by ensuring that square root of the "AVE" was greater than the construct correlations as displayed in the study's Table 4.

Data Analysis

In this research, responses were examined utilising SmartPLS (version 4.1.0.2), widely recognized software tool that utilises "Partial Least Squares Structural Equation Modelling (PLS-SEM)" method. SEM techniques are commonly employed by researchers to assess overall model fit ensure alignment between conceptual framework and the collected data ("Sarstedt, Henseler, and Ringle, 2011").

Table 1: Participants' Profile

Demographic	Frequency	Percent
Male	204	64.8
Female	111	35.2
Secondary School	15	4.8
Sr. Secondary School	39	12.4
Under-Graduate	193	61.3
Post-graduate	53	16.8
Ph.D.	8	2.5
Other	7	2.2
Below 10,000	217	68.9
10,000-50,000	41	13.0
50,000-1,00,000	31	9.8
1,00,000-1,50,000	14	4.4
1,50,000 and above	12	3.8

Note. Adapted from the original dataset.

Table 2: Descriptive Statistics (n = 316)

Construct	Mean	Std. Deviation
Perceived Usefulness	3.5525	1.169
Perceived Ease of Use	3.6675	1.371
Perceived Enjoyment	3.63	1.209
Perceived Novelty	3.646	1.172
Perceived Food Image	3.613	1.176
Attitude	3.70	1.202
Intention to Use	3.67	1.181

Note. Means and standard deviations of measured constructs.

Table 3: Validity and Reliability for all Constructs

Measurement Items	Loadings	α	CR	AVE
Perceived Usefulness	**.902**	**.924**	**.924**	**.814**
PU1: 'Using of this Augmented Reality OFD app enable me to accomplish Ordering process more quickly'.	.895			.
PU2: 'Using of this Augmented Reality Online food delivery app enhances my Ordering process performance'.	.901			
PU3: 'Using of this Augmented Reality Online food delivery app increase my Ordering process productivity'.	.914			
PU4: 'Using of this Augmented Reality Online food delivery app enhance my Ordering process effectiveness'.	.899			
Perceived Ease of Use	**.877**	**.899**	**.902**	**.768**
PEOU1: 'I think using Augmented Reality Online food delivery app is easy'.	.864			
PEOU2: 'I think it is very simple to learn how to use Augmented Reality Online food delivery app'.	.884			
PEOU3: 'I think it does not require much effort to use an Augmented Reality Online food delivery app'.	.866			
PEOU4: 'I think Augmented Reality Online food delivery app is clear and understandable'.	.892			
Perceived Enjoyment	**.892**	**.871**	**.872**	**.796**
PE1: 'The actual process of using this Augmented Reality Online food delivery app is pleasant'.	.901			
PE2: 'I find using Augmented Reality Online food delivery app is enjoyable.	.898			
PE3: I find using Augmented Reality Online food delivery app is fun'.	.876			
Perceived Novelty	**.887**	**.865**	**.870**	**.787**
PNOV1: 'The Augmented Reality Online food delivery app represent a neat and novel way of placing order'.	.875			
PNOV2: 'Using Augmented Reality Online food delivery app is new and refreshing'.	.889			
PNOV3: 'I found using Augmented Reality Online food delivery app to be a novel experience'.	.898			
Perceived Food Image	**.884**	**.861**	**.863**	**.782**
PFI1: 'Augmented food image in Online food delivery app is very attractive'.	.873			

PFI2: 'Augmented food image in Online food delivery app has good quality'. PF3: 'Augmented food image in Online food delivery app similar to the what we want'.	.910 .869			
Attitude	.905	.890	.890	.819
ATT1: 'I have favourable attitude toward using Augmented Reality Online food delivery app'. ATT2: 'The use of this Augmented Reality Online food delivery is a good idea'. ATT3: 'I like the idea of using Augmented Reality Online food delivery app'.	.903 .899 .913			
Intention to use	**.899**	**.881**	**.882**	**.808**
ITU1: 'I will use the Augmented Reality Online food delivery app'. ITU2: 'I will use the Augmented Reality Online food delivery app for purchase food next time'. ITU3: 'I will try using the Augmented Reality Online food delivery app'.	.896 .927 .874			

Note. α = Cronbach's alpha; CR = Composite Reliability; AVE = Average Variance Extracted.

Statistical data analysis is crucial for calculating the effects of latent variables in both direct and indirect ways, making it an ideal method for assessing the strength and confidence of model paths (Heuer and Lian, 2013; Hoyle and Kenny, 1999). The present study employed the "PLS-SEM" method due to its capability to elucidate complex relationships between constructs, provide evidence at theoretical levels, and determine the relative values of path coefficients "(Hair & Sarstedt, 2011; Fishbein & Ajzen, 1974)". For theory validation, the PLS-SEM approach ensures rigorous validation and precise reporting, making it a dominant method for predicting mediating and direct relationships among constructs "(Sarstedt, Henseler, and Ringle, 2011; Henseler, Ringle, and Sinkovics, 2009)".

The "PLS" technique estimates framework through 2 components: "measurement model (outer model)", which evaluates connections between indicators & latent components, & structural model (inner model), which maps the paths among "latent variables".

Table 4: Discriminant Validity

	ATT	ITU	PU	PE	PEOU	PFI	PNOV
ATT	**.905**						
ITU	.847	**.899**					
PE	.787	.780	**.892**				
PEOU	.775	.742	.839	**.876**			
PFI	.832	.786	.829	.788	**.884**		
PNOV	.806	.784	.854	.838	.823	**.887**	
PU	.800	.748	.787	.774	.788	.811	**.902**

Note. Correlations among constructs

Result

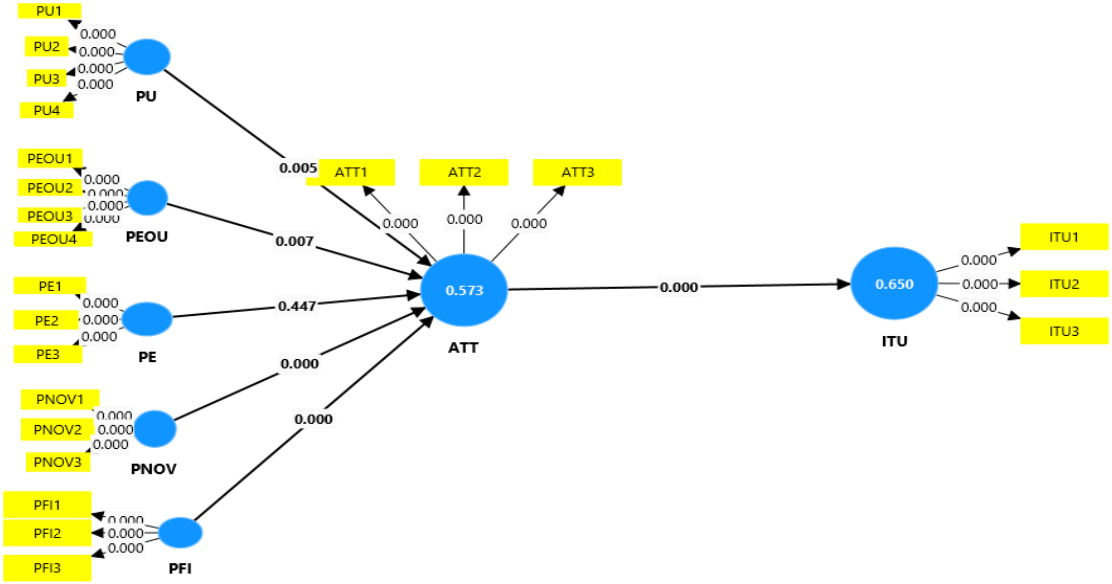

Figure 2: Model for Augmented Reality's Effect on Consumer Intention to Use Online Food Delivery Apps.

Note. PU = Perceived Usefulness; PEOU = Perceived Ease of Use; PE = Perceived Enjoyment; PNOV = Perceived Novelty; PFI = Perceived Food Image; ATT = Attitude; ITU = Intention to Use. Path coefficients and p-values are reported on arrows.

Structural model

Following the measuring model's confirmation, "PLS-SEM" was used in the present investigation to evaluate hypothetical framework fit. Using 5000 subsamples, bootstrapping was carried out, and the relationships were assessed using the t-statistic. Table 5 and Figure 2 display coefficients of determination (R2) and "path coefficients".

Hypothesis testing

The "Smart-PLS" analysis yielded values for relationships, the model's variance explained (R^2), and the significance levels.

Bootstrapping analysis with 5,000 sub-samples was carried out to investigate the connections among the "TAM" components ("Perceived Usefulness", "Perceived Ease of Use", & "Attitude Toward Use") & extended variables ("Perceived Enjoyment", "Perceived Novelty", "Perceived Food Image", And Users' "Behavioral Intention to Use"). Both important and insignificant findings are presented in Fig. 3 and Table 5. The relationships for H1, H2, H4, H5, and H6 are significant, while the result for H3 is not supported.

Table 5: Path Coefficient and Results

Hypothesis	Relationship	β value	T-value	P-Value	Hypothesis
H1	PU-> ATT	0.187	2.816	0.005	Supported
H2	PEOU -> ATT	0.168	2.686	0.007	Supported
H3	PE -> ATT	-0.039	0.745	0.447	Not Supported
H4	PNOV-> ATT	0.263	3.952	0.000	Supported
H5	PFI -> ATT	0.333	5.310	0.000	Supported
H6	ATT -> ITU	0.806	23.503	0.000	Supported

Discussion

The current research endeavours to investigate the effects of "AR-based" OFD services on users' BI, employing Davis' (1991) "Technology Acceptance Model" as its conceptual model. The principal aim is to clarify how various factors associated with AR-based OFD platforms affect the views of customers & intentions to utilise them. Employing evaluation of the body of available literature and the integration of extended constructs such as "Perceived Enjoyment", "Perceived Food Image", & "Perceived Novelty" alongside key "TAM" variables like "Perceived Usefulness" and "Perceived Ease of Use", the purpose of this study is to offer insightful information about the dynamics of consumer acceptance of AR-based OFD apps. As a result, investigation underscore significance of "augmented reality" in forming consumers' intentions and behaviours regarding online food delivery services. It is observed that AR facilitates the acquisition of comprehensive product information, thereby positively influencing consumers' attitudes and intentions. Table 5 exhibits the summary, highlighting AR's considerable impact on a range of making decisions of consumer. Early studies investigating AR mobiles' application impact on behaviour, as referenced by 'Saleem (2021)', 'Javornik (2016)', 'Rese et al. (2017)', & "Lin and Chang (2011)", have laid the groundwork for this research. Building upon this foundation, results show that "Perceived Usefulness" & "Perceived Ease Of Use" are major variables affecting "consumers' attitudes" & "intentions to use" AR-based OFD apps. Additionally, other constructs except (PE) of AR smartphone apps are found to be contingent on various factors, including app developers' strategies for presenting product details and incorporating features. This underscores significance of taking into consumer preferences & user experience in development of AR apps (Chung, Han, and Joun 2015; McLean and Wilson 2019). However, contrary to some prior research, study finds no significant relationship between "perceived enjoyment" and "consumer attitudes", indicating a deviation from established findings "(Saleem 2021; McLean & Wilson 2019; Ingham 2015; Zhang 2020)". Furthermore, the study identifies Perceived Food Image as a strong determinant of consumer attitudes toward using AR food delivery apps, aligning with previous research "(Paul 2005; Khosasih 2023; W. Batat 2021)". Similarly, Perceived Novelty demonstrates favourable & noteworthy impact on the views of consumers, consistent with prior studies "(Wells 2010; McLean 2019)". However, it is noted that some previous research contradicts these findings, suggesting that novelty may not always be an important indicator of the desire to use "(Talukdar 2021; Huang & Liao 2015; Massetti 1996)". Augmented reality-based online food delivery apps offer novel opportunities for restaurant owners to effectively present product information to consumers. By allowing users to evaluate real-environment data or experience digital product demonstrations, these apps enhance the overall dining experience. However, developers must tailor AR apps to align with consumer preferences, thereby maximizing their potential for widespread adoption. The present study concludes the it contributes valuable insights into the factors influencing "consumers' intentions" to adopt AR-based food delivery apps. Examining the interplay between various constructs within the TAM framework provides insight into nuanced dynamics of how customers make decisions in context of emerging technologies. Moreover, the findings offer practical implications for app developers, restaurant owners, and policymakers seeking to leverage augmented reality technologies to raise client satisfaction levels in meal delivery market.

Practical and Theoretical Implications

The current research exhibited which users show favourable outlook regarding the AR-based OFD apps, which opens the gates for incorporating more new technologies, facilitating the ease of usage for the customers in the applications. Thus, developers of the apps should ought to maintain the current environment of the app and ensure that their services provide satisfaction to

their users with the help of engaging and creative advertisements, offers and discounts, user-friendly interface, etc. Perceived Enjoyment was discovered to have no substantial influence on consumers' usage behaviour of Augmented Reality (AR)-based OFD apps. While it may be necessary factor, it is not enough to drive consumers' adoption of these services. Unlike gaming or entertainment apps, where enjoyment is a key factor, OFD services are more functional. Concern among users is higher with "ease of use", food presentation accuracy, and order efficiency rather than entertainment value. Consumers prioritize convenience, efficiency, and reliability when ordering food online. While AR may enhance engagement, it does not directly impact their core motivation to use OFD services, which is receiving food quickly and accurately. Overall, AR based OFD is an innovative technology that will cater to needs of its users by providing more personalised content with the help of clear images, vibrant colours, appropriate size, animations, humour, 3-D modelling of the meals, and other interactive features. OFD mobile apps should provide recommendations tailored to individual customers and restaurants in order to further improve personalization. In conclusion, our study will help regulators and policymakers acquire a deeper comprehension of AR-driven technology in the virtual meal industry.

Conclusion

Mobile applications for Augmented reality are emerging as significant part of consumer market, offering realistic images and detailed data about products and services. This technology represents considerable promise as a novel tendency in e-commerce. However, retailers face challenges in keeping pace with consumers' preferences for new modern technological advances. The current research provides a novel insight into utilizing AR mobile apps in OFD services to improve customers' intent to use and purchase. The respondents of the study demonstrated favourable outlook on AR mobile applications and strong BI to make use of them later. Based on these outcomes, retailers and developers can create AR-based online food delivery (OFD) mobile apps that effectively showcase product attributes, whether through existing or new platforms. This approach can help boost sales and enhance consumer satisfaction by providing realistic images of the food.

Retailers should understand that buyers find AR technology practical and simple to use, which significantly impacts their mindset and desire to utilize these apps. Establishing practical approaches that allow consumers to test the usability of AR apps is crucial. This approach will assist retailers in developing intuitive mobile apps that showcase food features via AR, thereby meeting consumer expectations. Amid the COVID-19 pandemic, leveraging AR apps for retailing can provide a competitive edge across various fields, including education, tourism, telecommunication, and cosmetics.

However, there are some limitations to this study. First, it focuses solely about the application of AR in OFD apps within the Delhi/NCR region. As technical innovations continue to advance conventional AR, it would be beneficial to explore its impact on various attributes and domains beyond OFD. Additionally, this study did not consider moderating factors; Future studies may take into account factors like age, gender, and education. Moreover, incorporating other constructs into the conceptual framework could enhance the explanatory potential of this current study for scholars. Additionally, the research could not overcome the limitations of cross-sectional study and recommends further to employ a longitudinal approach in the same research area. Replicating this study in other states could provide a broader understanding of consumer intentions regarding augmented reality in OFD apps.

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The Development of The Banking Sector in SAARC Countries in The Context of Financial Inclusion and Competitiveness: The Mediating Role of Financial Regulation

Ms. Shalu
Assistant Professor
Sri Aurobindo College (Morning)
University of Delhi
Email- shaluchauhan@commerce.du.ac.in

Dr. Anshika Agarwal (Corresponding Author)
Assistant Professor
Faculty of Management Studies
University of Delhi
Email Id- anshikaagarwal@fms.edu

Abstract

Enhancing household living standards and promoting equitable economic growth are two popular financial inclusion goals. One of the key goals of policy in emerging nations is hence, financial inclusion. In addition, one policy tool used to guarantee financial stability is capital adequacy requirements or financial regulation. This study is aimed at the relationship between financial regulation and competitiveness, and financial inclusion in eight SAARC (South Asian Association for Regional Cooperation) countries between 2014 and 2023. The banking industry of the SAARC countries faces financial regulation that impedes financial inclusion and reduces competitiveness, according to results of feasible generalized least squares (FGLS) estimates. Moreover, we observe that financial stability lessens the negative impacts of financial regulation on competitiveness.The findings of this study suggest that strategic measures should be implemented to maintain the financial stability of banks while not compromising competitiveness in the banking sector and promoting financial inclusion. From a practical and social perspective this study emphasizes the importance of adaptable financial regulations that enable banks to support financial inclusion alongside the necessity of adopting strong corporate governance practices and integrating financial literacy to guarantee financial stability.

Keywords: financial regulation; financial stability; competitiveness; financial inclusion; feasible generalized least squares model

Introduction

Banks have a significant role in financial inclusion initiatives and in reducing poverty (Ouechtati, 2020; Sikarwar et al. 2020). However, banks need to be stable financially to perform the roles of conventional financial intermediaries. The 2008 financial crisis served as an alert for policymakers, who realized that several measures, including capital adequacy, could strengthen banks resilience by enhancing asset quality and implementing prudent risk management to prevent negative consequences from building up and potentially triggering a crisis that would affect banks as well as the economy ("Anarfo and Abor 2020; Gudmundsson et al. 2013; Gupta & Kashiramka 2020; Igan and Mirzaei 2020). Financial regulation, particularly capital adequacy

is a policy instrument employed to ensure the stability of banks and safeguard deposits. This has been underscored by Gupta and Kashiramka (2020) and Ugwuanyi (2023). Furthermore, as highlighted by Damjanovic et al. (2020), the process of bank recovery imposes a higher economic burden. Globally, a sizeable percentage of banks fail despite the significance of minimum regulatory capital requirements for banking supervision in both industrialized and developing nations. Consequently, as suggested by Anarfo and Abor (2020), international financial institutions like the World Bank and the International Monetary" Fund (IMF) suggest that every nation adopt and implement the regulatory supervisory procedures that are best suited for its financial system.

This document aims to analyze the advancements in the banking industry within South Asia. Afghanistan, Bhutan, Bangladesh, Maldives, Pakistan, India, Sri Lanka, and Nepal are the eight economies that make up this sub-region; they are all SAARC members. However, this study will specifically concentrate on four primary SAARC countries: India, Pakistan, Sri Lanka, and Bangladesh. India stands as the largest economy within the SAARC, with Pakistan and Bangladesh following as the second and third largest economies, as shown in Table 1. Sri Lanka is also a significant emerging economy. These four economies are vital for any successful sub-regional integration and cooperation plan. India and Pakistan would play dominant roles in any formal regional integration agreement.In this study the data was collected on the basis of different variables in the context of financial inclusion.

A single metric, like "the number of bank branches and ATMs per thousand adults, the total amount of credit allotted to small-scale agriculture, or the possession of a bank account, is insufficient to adequately capture the complex nature of financial inclusion, as the investigation by Grohmann et al. (2018) and Kodongo (2018) demonstrates. Financial inclusion encompasses both the supply as well as demand sides of financial goods and services. Anarfo et al. (2019b) and Anarfo and Abor (2020) state that the results of studies employing single financial inclusion measures could be deceptive and irrelevant to policy decisions.

Albaity et al. (2019) and Goetz (2018) utilize various measures, including as the Panzar-Rosse H Statistics, the Boone Index, the Lerner Index, and the concentration of the five largest banks (C5), to calculate the level of competitiveness in the banking sector. We utilized the Boone and Lerner indices in our inquiry to evaluate the competitiveness of the banking business due to the extensive data set at our disposal. The Boone indicator's absolute value indicates the level of competition, while its negative values indicate the existence of competition. By examining the elasticity of profits in relation to marginal costs, this indicator assesses the efficiency channel of competition (Boone 2008).

The level of competition is shown by the Lerner index, which measures the difference between an item's cost and its marginal cost. More powerful banks in the market have the ability to raise prices above costs (Lerner 1934). This index links profit maximization with the relationship between elasticity and price margin. The range of values for Lerner's index is 0 to 1. In a perfectly competitive market, prices and marginal costs are equal (P = MC), resulting in a Lerner index of zero. A value of one represents a monopoly, while a Lerner index between 0 and 1 signifies monopolistic competition (Lerner 1934).

The Basel Agreement highlights the constituent elements of financial stability for banks, comprising capital sufficiency, efficient management, profitability, asset quality, liquidity, performance, as well as susceptibility to market risks ("Albaity et al. 2019; Musau et al. 2018a). The z-score is a quantitative measure used to assess financial soundness and forecast the likelihood of a bank's collapse. Bank fragility is quantified as the magnitude of profit drop measured in standard deviations before a bank reaches failure (Albaity et al. 2019; Anarfo and Abor 2020; Berger et al. 2009; Goetz 2018; Klapper and Lusardi 2020; Machdar 2020). Credit risk is assessed by comparing the unproductive credit within a bank's entire credit portfolio. This

assessment methodology has also been utilized in research conducted by Albaity et al. (2019), Anarfo and Abor (2020), and Klapper and Lusardi (2020).

The bank spread is a metric that reveals the disparity between deposit and lending rates in the banking sector. It serves as an indicator of the banks' profitability and has the potential to impact their decisions regarding credit provision (Anarfo and Abor 2020; Ugwuanyi 2015). Return on equity (ROE) is a variable we have included in our research to investigate how a bank's capacity to generate value from its own and shareholders resources can affect both financial inclusion and competitiveness in the banking industry.

Literature Review

The research indicates a notable positive correlation between financial innovation and banking performance. Furthermore, bank regulation plays a moderating role in the link between financial innovation and bank performance throughout the sample period. This suggests that both financial innovation and regulation contribute to enhancing the quality and efficiency of banking services (Hussain Abbas, Geu Fei, Shah Abbas and Farhan Hussain, 2024). Financial stability reduces the negative impact of financial regulation on competitiveness and financial inclusion, which means that financially sound banks can compete and provide financial goods and services even if strict regulations are implemented to ensure capital adequacy standards. Furthermore, we discover that in nations in the SADC area, competition fosters financial inclusion (Joao Jungo, Mara Madaleno and Anabela Botelho, 2022)

When drafting financial regulations, legislators almost never consider other crucial policy goals like reducing poverty and promoting financial inclusion, enhancing the banking industry's competitiveness, or fostering inclusive economic expansion (Musau et al., 2018a; Jones and Knaack, 2019). The regulations that apply to banks can have an impact on how they operate and their capacity to offer services (Demirguc-Kunt et al. 2003; Alemu 2016; Anarfo and Abor 2020). However, when banks must keep their capital ratios high, they typically exercise caution. giving credit and unintentionally rejecting some clients because of a lack of sufficient credit supply as well as hefty interest rates. Therefore, lower bank lending practices as a result of greater capital requirements may promote unintentional financial exclusion (Musau et al. 2018a). Using a sample of UK banks, Bridges et al. (2014) and Anarfo and Abor (2020) subsequently apply a similar methodology to their study in Sub-Saharan African nations. They both demonstrated how regulations, particularly those pertaining to the capital requirement, limit banks capacity to extend bank credit, which diminishes the efficacy of financial inclusion initiatives. Strict financial regulation dramatically lowers risk appetite, according to Ugwuanyi's (2015) research. Conversely, the implementation of macroprudential regulation increased Chinese banks stability, as shown by Gao and Fan (2020).

If access to banking services is extended to the underprivileged and rural communities, they will be able to deposit their money in banks ensuring that their funds are utilized rather than left unused. It is clear that increasing financial inclusion enhances the efficacy of monetary policy (Mehrotra and Yetman, 2015). However, research indicates that operating and transaction expenses in rural regions are significantly elevated and this issue can be addressed by utilizing modern banking services that offer reduced operating and transaction costs, such as internet banking, mobile banking and ATMs (Ratti, 2012). Financial inclusion makes financial services accessible to every segment of society including the most disadvantaged individuals by granting them access to bank accounts. In this context, those who are financially included tend to invest more in education and entrepreneurship rather than in consumption (Ellis et al.,2010). Financial inclusion plays a crucial role in maintaining the monetary stability of an economy by broadening the range of savings, investment and consumption choices available to individuals. It is widely

recognized that enhancing financial inclusion decreases the expenses associated with cash management and protects the integrity of the local currency while also fostering a robust financial system within the economy (Mbutor and Uba,2013). Faster financial inclusion, some argue, could be achieved if banks prioritized modern banking services like internet and mobile banking, and ATMs (Kumar,2013).

Contribution of the study

There are number of studies on the relationship between financial regulation and financial inclusion but only few studies have focused on measuring part of financial inclusion and how it relates to banking sector growth.

The majority of the researchers extensively employed many aspects of financial variabl es, such as the number of ATMs in 1,000 km2, the number of commercial bank branches per 10 0,000 adults, credits, and deposits but only few have used index of financial inclusion using different financial variables. In this study all possible variables were included (lerner index, boone index, bank spread and bank size) so the research will be more accurate and indicative. Furthermore, we expanded our study to investigate how financial inclusion affects the regularity of banking sector in SAARC countries.

Methodology

The study aims to investigate the association among financial regulation and competitiveness as well as financial inclusion in the SAARC regions. Comparing how these factors behave amongst member nations is our aim. We collected annual data for this study from a number of popular databases used in empirical research, like the Financial Access Survey database from the IMF, the World Bank, World Development Indicator (WDI) and the Global Financial Development (GFD) database. We concentrated on the eight SAARC nations. The investigation period was limited to 2014–2023 based on the data available for our primary variables (See Table 1) and another reason no research found during this period on this topic. As such, the study employed unbalanced panel data. Furthermore, the variables chosen for the study were chosen based on the body of empirical literature that already existed.

Table 1: Definition of variables

Description	Acronym
Financial inclusion indicator	fi
Electronic box per 1000 adults	ebpa
Bank account holder for every 1000 adult	bankah
Borrower in commercial banks	bcb
Bank deposit (%) of GDP	bdg
Credit granted by the financial sector in % of GDP	cgf
Bank per 10000 adults	bpa
Depositors in commercial banks	dcb
Financial regulation (regulatory banking capital for risk-weighted assets)	rbcw
Financial stability	fsb

Non-performing loans/Total loans granted (Credit Risk)	npl
Return on Equity	roe
Bank size	size
Banking spread	spread
Boon Index	Iboone
Lerner Index	Ilerner
GDP growth	GDP
Inflation	Inflation

Description of the Data

For our analysis, we extract data from the WDI and Financial Access Statistics (IMF-FAS Financial Access Survey) databases. The African and Asian regions extensively utilize these data sources in numerous scientific studies ("Anarfo et al. 2019a, 2019b; Anarfo and Abor 2020; Batuo et al. 2018; Oino 2015). Our analysis encompasses 8 SAARC countries from 2014 to 2023, Afghanistan, Bangladesh, Bhutan, India, Pakistan, Maldives, Nepal and Sri Lanka utilizing yearly data.

The primary areas of interest for our research include financial stability, regulation, and competitiveness and inclusion measures in the banking industry, like the Boone and Lerner index. In our analysis, we utilized various factors such as financial stability (measured by the z-score), credit risk, return on equity, financial autonomy, asset origin, bank spread, and macroeconomic indicators like economic growth rate and inflation.

Hypothesis H1: Financial regulation may affix financial inclusion programs in the SAARC countries.

Hypothesis H2: Financial regulation reduces competitiveness in the banking sector of the SAARC countries.

Model Specification

We investigated the effects of financial regulations on financial inclusion as well as competitiveness within the banking industry using the FGLS model, which is well-known for producing results independent of autocorrelation as well as heteroscedasticity problems (Umoru and Osemwegie 2016). In line with Anarfo and Abor's (2020) methodology, we used linear models with mixed effects in our investigation. We consider that the FGLS estimation is appropriate for the sample data given the current situation. We corrected for variations in the time and space of the data and considered the fact that our panel data is unbalanced, resulting in heterogeneity in the number of observations across the variables. Second, the FGLS model manages autocorrelation and heteroskedasticity to create consistent estimates.

For additional information regarding the model's suitability for the particular data set, kindly refer to Parks (1967). Equation (1) specifies our FGLS model.

$$Yit = Xit\beta it + u$$

Yit represents the vector of the k dependent variables, which include competitiveness in the banking industry (measured by the Boone and Lerner indices) and financial inclusion. The matrix of the model's explanatory variables, or Xit, is composed of the following: bank size, GDP growth rate, inflation rate, bank spread, credit risk, financial regulation, and return on equity. The vector of explanatory variables has parameters denoted by the β its, while the vector of random errors is represented by u.

Equation (2) outlines the methodology for constructing the financial inclusion index in accordance with the conclusions drawn by Anarfo and Abor (2020) and Anarfo et al. (2019b).

f ip = Wp1ebpa1 + Wp2bankah2 + Wp3bcb3+ Wp4bdg4 +Wp5cgf5 + Wp6bpa6 + Wp7dcb7

where fi is the financial inclusion index and Wp is the weight of the appropriate factors for the country p. The variables that make up each index are explained in Table 1.

Result and Discussion

Descriptive Statistics

Table 2 show the descriptive statistics for the study groups of SAARC nations and represents the outcome of the descriptive statistics for the sample. In comparison to other SAARC nations, Afghanistan has the lowest average adult population (8.34), while Sri Lanka has the highest average (82.737) in the same data for bank account ownership (bankah).

Table 2: Country wise average data of the South Asian Association for regional cooperation (SAARC)

Country name / Variable	Afghanistan	Bangladesh	Bhutan	India	Pakistan	Maldives	Nepal	Sri Lanka
GDP	-1.683	6.478	3.652	5.927	3.799	6.402	4.373	1.413
bankah	8.250	36.540	22.180	60.710	15.397	67.140	35.663	82.737
ebpa	1.198	8.696	39.260	20.760	9.839	30.741	13.871	17.045
bcb	3.085	82.209	40.260	21.760	22.664	156.929	14.871	18.045
bdg	11.064	5.289	14.759	7.161	6.015	18.235	9.645	8.286
bpa	2.073	8.795	18.189	14.180	10.059	12.498	14.723	17.689
dcb	176.635	762.420	120.543	764.432	361.018	147.211	210.545	125.654
Inflation	2.717	6.435	4.929	5.162	10.310	0.887	6.225	10.370
cgf	45.765	81.658	90.206	95.543	82.655	79.480	65.658	54.566
Spread	1.765	2.765	10.970	11.970	3.613	7.353	5.353	2.085
rbcw	9.854	10.854	18.240	13.369	16.488	42.810	13.608	15.450

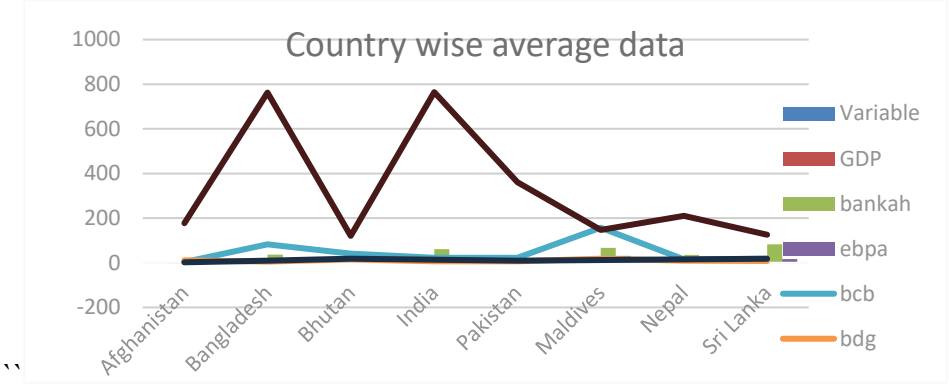
Source: WDI

In terms of bank branch expansion (bpa), Sri Lanka has a higher average as compared to the other member countries, suggesting that there are 17.689 bank branches for every 1000 km2 in Sri Lanka, followed by Nepal and Bhutan. This demonstrates the necessity for other members to commit more funds in order to open additional bank branches and, in doing so, reduce the physical distance between institutions, which is the main barrier to the success of financial inclusion efforts. Similar trends can be seen in the mean number of ATMs (ebpa) available per 1000 km^2. For instance, Bhutan provides an average of 39.260 ATMs per 1000 km2 during the analyzed period, whereas in the case of Afghanistan, this figure decreases to 1.198 ATMs per 1000km^2.

On average, the banking sector in Maldives gathered a higher deposit equivalent to 18.235% of the gross domestic product (GDP), followed by Bhutan and Afghanistan at 14.759% and 11.604% respectively. Maldives has a higher number of borrowers, with approximately 156.929 out of 100,000 adults benefiting from loans, while Afghanistan and Nepal have the lowest number of beneficiaries at only 3.08 and 14.87 respectively. The analysis of the primary

financial inclusion indicators shows that Afghanistan, Pakistan, and Nepal have comparatively lower levels of financial inclusion when compared to other SAARC nations.

Table 1 lists variable acronyms. fi measures financial inclusion.BPA bank per 100,000 persons, electronic box per 1000 adults Financial sector credit/GDP Bank deposits as a percentage of GDP, commercial bank borrowers per 100,000 people. Bank account holders per 100,000 individuals, commercial bank depositors per 100,000 adults Credit risk, financial stability, and financial regulation.The banking spread, GDP growth, inflation, Iboone, Lerner indexes.



Source: WDI

Table 3: Statistical analysis of data pertaining to the countries in the South Asian Association for Regional Cooperation (SAARC).

VARIABLES	MEAN	S.D	MIN	MAX
ebpa	18.370	12.767	0.75	50.04
bankah	41.248	25.819	7.45	86.4
bcb	27.745	24.048	2.92	83.98
bdg	25.697	23.186	5.248	97.848
cgf	81.267	21.004	58.266	125.929
bpa	12.567	5.584	1.87	22.27
dcb	614.166	350.799	166.17	1228.79
rbcw	19.046	10.669	9.450	46.820
fsb	15.075	6.724	4.162	33.407
npl	6.478	3.836	1.100	25.836
roe	29.511	18.457	-31.280	137.250
size	9.828	4.385	4.742	20.813
spread	5.859	3.448	0.970	12
Iboone	-0.078	0.084	-0.411	0.208
Ilearner	0.289	0.091	0.135	0.474
GDP	3.694	7.627	-32.908	37.687
Inflation	5.876	6.625	-1.369	49.721

The banking sector in SAARC countries, on average, received deposits amounting to 25.69% of the gross domestic product. On average, 456.80 and 41.248 out of every 1000 adults from SAARC member nations deposited money at bank branches for financial services and

merchandise. With only 27.745 out of 100,000 persons in SAARC countries having access to loans, the number of borrowers in the area is still comparatively low. Using risk-weighted assets as an indicator of financial regulation, the average Bank Regulatory Capital (rbcw) for SAARC countries is 19.046%, whereas the average figure for credit risk (npl) is 6.478%. This suggests that there is a lot of regulation governing the nations in the SAARC area.

A possible reason could be the significant credit risk associated with the SAARC area. SAARC countries exhibit greater levels of financial inclusion, according to the examination of the major financial inclusion criteria. Indicators of financial stability (fsb), such as the z-score of banks, are 15.07% in SAARC nations. The average bank spread, or the gap between the interest rates on bank deposits and loans, is 5.859% for the SAARC region.

The competitiveness of the banking market structure in the regions can be measured using the Boone indicator (iboone), which indicates an average of -0.070 for SAARC. This shows that regional differences in the competitiveness of the banking markets are minimal. However, the SAARC countries' average score on the Lerner indicator (ilerner) is 0.23, suggesting that monopolistic competition governs the banking industry in the area.

Unit Root Tests

Ensuring that the data is stationary is necessary for panel data analysis. To avoid spurious regressions, a stationarity test must be performed (Anarfo and Abor, 2020). Because they are useful for predicting unit roots for imbalanced panels, the Fisher-Phillip Perron (F-PP) and Fisher-Dickey Fuller Augmented (F-ADF) panel data tests are employed to evaluate stationarity. Table 4 presents the findings for the primary variables that were the subject of the investigation, and Table 5 shows the results for the other control variables that were part of the "research.

Table 4: Panel unit root test for the main variables of the study (endogenous and exogenous).

	Sample of SAARC countries				
	Fi	rbcw	fsb	i boone	i learner
F-ADF	-2149	-0.013	4865**	0 .714	0 .367
F-PP	0.123	0.002	1172	-0.323	0.602
First diff					
F-ADF	-1072	2243**		-0.462	-0.024
F-PP	3853***	6650***	18740***	5645**	3320***

***, ** denotes 1% and 5% significance. For variable acronyms, refer to Table 1. Financial indicators include financial inclusion (fi), financial regulation (rbcw), financial stability (fsb), Boone index (iboone), and Lerner index (ilerner). Principal component analysis calculated ifi after Equation (2).

Table 5: Panel unit root test for the control variables of the study Sample of SAARC countries

	npl	size	spread	GDP	inflation
F-ADF	3.762	1.201	13.753	4.675	0.235
F-PP	20.409	0.760	0.268	10.842	3.102
First diff					
F-ADF		4.735** *			13.515***
F-PP		12.541***			

***, **, * denotes significance levels of 1%, 5%, and 10%. Table 1 describes variable acronyms: To assess credit risk, consider non-performing loans/total loans provided, size, banking spread, GDP growth rate, and inflation.

The unit root test results show that the variables related to financial regulation (rbcw), financial stability (fsb), bank size (size), and inflation rate are I (1) integrated, while the variables related to financial inclusion (ifi), Boone index (iboone), and Lerner index (ilerner) are I (2) integrated for the SAARC country sample. In addition, it is noted that although the first differences were applied to the I (1) integrated variables, certain research variables do not follow a unit root "process.

Endogeneity (Robustness Check)

We use the IV-2SLS two-stage least squares regression approach with an instrumental variable to account for the possible existence of the endogeneity issue. We selected these variables as our instruments based on the hypothesis that financial regulation is an endogenous variable and that attributes such as the size, profitability, and stability of individual banks may have an impact on their relationship with financial inclusion. We conduct the Durbin and Wu-Hausman tests to determine endogeneity and the Sargan and Basmann tests to evaluate the instrument reliability, using the technique outlined in Koomson et al. (2021), Lee et al. (2022) and Mróz (1987). Sensitivity analysis and optimal design with account for varying shape and support conditions. In Computer Aided Optimal Design: Structural and Mechanical Systems (pp. 407-438). Berlin, Heidelberg: Springer Berlin Heidelberg.). Better financial inclusion is a result of increasing competitiveness among banks, according to the findings of the OLS and 2SLS estimations. Consequently, these findings suggest that the high levels of banking sector regulation in SAARC countries inhibit the need for the underprivileged population to have easier and safer access to financial products as well as services; however, more bank competitiveness in "these economies can enhance the efficacy of financial inclusion programs.

Impact of Financial Regulation on Financial Inclusion

Tables 6 provide FGLS estimation results. Principal component analysis created the dependent variable, the financial inclusion index. We additionally incorporate individual financial inclusion indicators like the financial sector's credit grant percentage of GDP (cgf), the number of commercial banks per 100,000 adults (bpa), and bank deposits as a percentage of GDP (bdg) to ensure reliability. Our primary variable of interest is financial regulation, which we assessed using banks regulatory capital as a proxy for risk-weighted assets. We also use banking spread, industry competitiveness, credit risk, and banking stability and regulation as interaction variables in our research, adhering to Anarfo and Abor's technique (2020). According to our findings, financial regulation significantly and negatively affects financial inclusion in the SAARC countries (Table 6). The results demonstrate that the expansion of bank regulatory capital into risk-weighted assets, or an increase in financial regulation, substantially hinders banks' ability to offer financial goods and services. According to our findings, financial regulation and financial inclusion have a negative association. These findings are consistent with recent empirical studies conducted by Anarfo and Abor (2020), Gao and Fan (2020), and Gupta and Kashiramka (2020). Financial regulation, in particular the capital adequacy ratio, hinders bank ability to provide services, as Igan and Mirzaei (2020), and Schuknecht and Siegerink (2020) have discovered. When we extended our examination to include specific financial inclusion metrics like total deposits as a percentage of GDP, credit extended by the financial sector as a percentage of GDP (cgf), and the expansion of bank branches per 100,000 adults (bpa), we found a negative relationship for SAARC countries. Therefore, when making comparisons, it is unclear how financial regulation influences this financial inclusion metric.

Financial regulation, in particular capital adequacy criteria, has been shown to increase opportunity costs for banks' capital and decrease returns on net assets (Anarfo

and Abor, 2020). Because of this, banks are motivated to lower interest rates on deposits and raise lending rates, which discourages people from using banking services like loans and deposits and undermines national financial inclusion programs. Notably, this association was not statistically significant for SAARC nations (Table 7). This outcome confirms that financial regulation (capital adequacy criteria) has no appreciable effect on the ability of financially sound banks to provide financial services as well as products.

The outcome is consistent with Anarfo and Abor's (2020) research, mirroring Musau et al.'s (2018) discovery that highlighting banks' financial stability under regulatory pressure can enhance their profits and reduce credit risk, while also unintentionally leading to financial exclusion.

Table 6: SAARC countries sample

	fi	bdg	cgf	bpa
Rbcw	-0.00959	-0.0786	-0.0984	-0.190***
Spread	0.0286	0.0783	-0.702*	-0.506
I-boone	-0.176	9.844	-19.30	8.403
Npl	-0.00535	-0.703	-0.690***	-0.200
Cons	0.0193	-0.703	-0.690***	12.81
N	53	56	56	56
Wch2	40.37	34.86	30.22	72.0
Prob	0.000	0.000	0.000	0.000

***, * denotes significance levels of 1% and 10%. The acronyms for variables are listed in Table 1. FGLS model results (see Equation (1)) for SAARC countries.

The Impact of Financial Regulation on Banking Competitiveness

Banking sector rivalry affects financial service production, quality, and delivery (Claessens and Laeven 2003). Both theoretically and empirically, financial sector competition facilitates investment financing and allows businesses and households to obtain financial services, which boosts economic growth (Claessens and Laeven 2003; Oino 2015). Furthermore, because promoting competition in the financial industry is linked to sector stability, it is crucial (Claessens and Laeven 2003). Table 7 presents the results in detail.

Table 7: Impact of Financial Regulation on Competitiveness

	I boone	I learner
rbcw	-0.00985	-0.0283
fsb	-0.0136	-0.0334
npl	0.00189	0.00615
size	0.0865	0.143**
spread	-0.00269	0.00353
GDP	-0.00332	0.00323
Inflation	-0.00121	-0.00269
Cons	-0.0154	0.249**
N	36	34
wch2	64.19	118.08
prob	0.000	0.000

In our analysis, we account for the sensitivity of statistical inference to the measurement of competitiveness by looking at how financial regulation affects the Boone Index and Lerner Index, two separate measures of competitiveness. We also incorporate four additional control variables into the estimation: "bank size, the origin of bank capital, economic growth rate, and inflation rate. The literature has highlighted several elements as potential determinants of the banking sector's competitiveness (Albaity et al. 2019; Claessens and Laeven 2003). Additionally, Schuknecht and Siegerink (2020) have demonstrated that the size of the bank and the existence of globally significant institutions have a significant influence on banks' compliance with financial regulations.

Our findings indicate that the regulatory capital requirement for risk-weighted assets, a component of financial regulation, and the competitiveness of the banking sector have a statistically significant and negative association (iboone and ilearner). This outcome is in line with earlier research on financial regulation, which highlights the fact that rigid capital requirements restrict banks' ability to provide financial goods as well as services. Additionally, it leads to the closure or merger of financially unsound banks, creating obstacles for new entrants and hindering competitiveness in the banking sector (Alemu 2016; Bridges et al. 2014; Igan and Mirzaei 2020; Oduor et al. 2017).

Conclusion and Implication

Bank participation is very beneficial to initiatives aimed at achieving inclusive economic growth and financial inclusion. But in order for banks to carry out their essential functions as financial intermediaries, they must maintain their financial stability. Maintaining financial institution stability and promoting economic expansion should be the main goals of financial sector regulation. However, establishing a balance between these two objectives is difficult since prioritizing financial stability above other concerns could hinder financial inclusion initiatives and raise barriers for new banks to enter the market (Anarfo and Abor 2020; Musau et al. 2018a). One example of this contradiction is the application of capital adequacy rules, which significantly limits banks' capability to provide financial services and products, reduces their risk tolerance, and increases funding costs (Anarfo and Abor 2020; Gupta and Kashiramka 2020). Furthermore, financial stability cannot be ensured by simple financial regulation (Anarfo and Abor 2020; Igan and Mirzaei" 2020).

The World Bank, UN, and Group of 20 (G-20) emphasize financial inclusion as a crucial policy measure in light of its positive effects on people and the economy (Emara and El 2021 and Pham and Doan 2020). Furthermore, the SADC and SAARC areas consider financial inclusion to be crucial (Bara et al. 2016; Singh and Stakic 2021). An examination of data from eight SAARC nations between 2014 and 2023 shows that, on average, only 41.24 persons per 1000 adults in these nations had a bank account. The average number of bank branches per 1000km^2 is also examined in the study and the results show that the SARC countries have just 12.56 branches. This indicates that having a bank account is essential for financial inclusion (Demirguc-Kunt et al. 2018). Thus, it is apparent that the SAARC area has a major difficulty due to a lack of financial inclusion. The goal of this investigation was to analyse how financial regulation affects financial inclusion and competitiveness in the SAARC nations.

The findings of the FGLS estimation indicate that there is insufficient data to conclusively demonstrate how competitiveness affects financial inclusion in SAARC nations. Our results also revealed that" the negative consequences of regulation are mitigated by financial stability, suggesting that financial rules have no negative impact on the competitiveness or ability of financially stable organizations to provide financial services and products. Based on these research outcomes the following implications can be drawn: the study highlights how crucial it is to apply financial laws in a balanced manner in order to prevent having a negative impact on other crucial policy objectives like financial inclusion and competitiveness. This approach is crucial for significantly contributing to the sustainable growth of the economy, which remains a challenge in the regions under investigation.

Limitation of the Study

Currently, the analysis is limited to SAARC countries, but in the future, we plan to expand our scope to include a wider range of countries, including underdeveloped, developing, and developed nations, in order to thoroughly examine the relationship between financial inclusion, financial regulation and competitiveness.

We recommend that future research examine the ways in which financial regulations and financial literacy interact to impact financial inclusion as well as the competitiveness of the banking sector. Furthermore, we suggest extending the study time, adding more countries to the sample, and comparing other continents or areas to draw attention to any discrepancies that are found as more data become available.

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GST and the Third Sector: An Analysis of its Impact on Registered Societies in Tamil Nadu

Mr. V Lawrence Benadict*
Research Scholar
PG Research Department of Commerce
Vivekananda College
Madurai, Tamil Nadu &
Assistant Professor
St.Xavier's College
Palayamkottai

Dr. K. Chellapandian
Assistant Professor and Head
PG Research Department of Commerce
Vivekananda College
Madurai, Tamil Nadu

Dr. I. A. Ahamed Wasim Musthaq
Assistant Professor
Department of Commerce
VET Institute of Arts and Science (Co-education) College
Erode, Tamil Nadu

*Corresponding Author

Abstract

The implementation of the Goods and Services Tax (GST) has significantly impacted Registered Societies in Tamil Nadu, introducing new administrative and financial challenges. These non-profit organizations are now required to maintain detailed records and comply with frequent GST filings, leading to increased operational complexity. Financially, the inability to claim input tax credits has resulted in higher expenses, placing a strain on limited resources. This has also influenced donor perceptions, as contributors may be concerned that their donations are being used to meet tax obligations rather than directly supporting programmatic activities. These combined pressures threaten service delivery efficiency, organizational sustainability, and beneficiary satisfaction. Despite their vital role in socio-economic development, Registered Societies struggle with the intricacies of GST compliance and exemption procedures, which remain cumbersome and time-consuming. Using a descriptive research design and simple random sampling, data were collected from 100 Registered Societies. The analysis was carried out using exploratory factor analysis, ANOVA, correlation, and multiple regression analysis to understand the impact of GST on these organizations. The findings confirm that GST-related compliance burdens persistently affect operational performance and financial stability. The study also suggests that there is a need for policy reforms, simplified compliance mechanisms, and capacity-building initiatives to support these organizations in adapting to the GST regime without compromising their social objectives.

Keywords: *Goods and Services Tax, Non-Profit Organizations, Registered Societies, Satisfaction, Tax Compliance, Input Tax Credit, Operational Efficiency.*

JEL Classification: H2, L31, H41, D12, K34.

Introduction

The introduction of the Goods and Services Tax (GST) in India on July 1, 2017, heralded a paradigm shift in the nation's fiscal framework. Conceptualized as a unified taxation mechanism, GST subsumed a plethora of indirect taxes, including Value Added Tax (VAT), Service Tax, Excise Duty, and other levies, into a singular, cohesive system. This reform was envisioned to foster transparency, simplify compliance, and establish a seamless national market. While the GST regime has delivered substantial benefits across numerous sectors, its impact on the non-profit domain, particularly registered societies operating within Tamil Nadu, has elicited significant academic and policy interest. This study investigates the ramifications of GST on the satisfaction levels of non-profit organizations (NPOs), with a dedicated focus on select registered societies in Tamil Nadu, elucidating the multi-faceted challenges and opportunities brought forth by this landmark reform.

Non-profit organizations are integral to India's socio-economic fabric, addressing critical developmental concerns such as education, healthcare, poverty alleviation, and environmental sustainability. Functioning on a not-for-profit basis, these entities rely predominantly on grants, donations, and membership contributions to finance their initiatives. Unlike commercial enterprises, NPOs operate with constrained budgets, rendering them particularly susceptible to the financial challenges such as the inability of NPOs to claim Input Tax Credit (ITC) due to their revenue streams being largely exempt from GST, leading to increased operational costs and administrative challenges such as the need for comprehensive record-keeping, timely filing of multiple tax returns, and ensuring compliance with evolving tax regulations posed by GST. Registered societies, a subset of the non-profit ecosystem, occupy a pivotal role in Tamil Nadu, renowned for its progressive welfare-oriented policies and a robust network of civil society organizations. Against this backdrop, the current study explores how GST has influenced these entities, with specific emphasis on their administrative operations, financial health, and overall satisfaction.

Administrative Implications of GST on Non-Profit Organizations

One of the immediate and pervasive effects of GST on registered societies pertains to the heightened administrative complexity it entails. Under the pre-GST taxation regime, compliance requirements for NPOs were relatively straightforward, with sector-specific exemptions and simplified reporting mechanisms. However, the advent of GST has introduced an intricate web of regulatory obligations, including the need for detailed documentation, timely filing of multiple tax returns, and adherence to evolving compliance norms. Though GST is designed to foster transparency and simplify compliance for businesses, its implementation has resulted in increased complexity for NPOs due to additional compliance burdens. For resource-constrained non-profits, particularly smaller organizations, these requirements represent a formidable administrative burden.

To address this issue, the study recommends the adoption of advanced analytical tools and techniques to streamline compliance processes. For instance, leveraging software like Tally or QuickBooks can automate tax calculations and filings, reducing manual errors and saving time. Additionally, machine learning algorithms could be employed to predict compliance risks and suggest corrective actions.

The transition to GST necessitates the deployment of advanced accounting systems and the engagement of professional tax consultants to ensure compliance. Such demands incur additional costs and divert critical resources away from the core mission of delivering public goods and services. Furthermore, the dynamic nature of CGST Act 2017, NPOs are required to register under GST if their aggregate turnover exceeds the prescribed threshold limit. Additionally, any NPO involved in taxable supply of goods or services must comply with registration and return

filing norms as per state GST laws with frequent amendments and updates exacerbates the challenge. Non-profits operating in remote or underserved regions, where access to expert guidance is limited, often struggle to stay abreast of regulatory changes, increasing the likelihood of compliance errors and subsequent penalties. While the GST framework promotes accountability and standardization, its administrative requirements impose significant constraints on the operational bandwidth of non-profit entities.

Financial Dimensions of GST's Impact on Registered Societies

The financial ramifications of GST are particularly pronounced for registered societies. At the heart of GST lies the concept of Input Tax Credit (ITC), which allows entities to offset taxes paid on inputs against their output tax liabilities. While this mechanism provides significant relief to profit-oriented businesses, non-profits often find themselves excluded from its benefits. The predominant revenue streams for NPOs grants, donations, and membership fees are typically exempt from GST and thus do not generate ITC eligibility. Conversely, many operational expenses incurred by these organizations, such as procurement of goods and services, professional consultancy fees, and infrastructure maintenance, attract GST. This dichotomy results in a disproportionate financial burden, effectively escalating the cost of operations for registered societies.

For instance, a healthcare-focused registered society in Tamil Nadu may face increased expenses for procuring medical equipment, maintaining infrastructure, or accessing professional services, all of which are subject to GST. The inability to claim ITC for such expenditures creates a compounding effect, diminishing the financial flexibility of these organizations. Consequently, their capacity to execute impactful programs, expand their reach, or enhance the quality of service delivery is adversely affected. The financial strain imposed by GST thus emerges as a critical determinant of organizational satisfaction within the non-profit sector.

Operational Transformations and Capacity Building

Beyond financial and administrative dimensions, the implementation of GST necessitates significant operational restructuring within registered societies. Compliance with the GST regime requires the adoption of technology-driven solutions, including real-time transaction tracking systems and sophisticated accounting software. GST registration is required only when an NPO's aggregate turnover exceeds the exemption threshold. If an NPO crosses this threshold, the adoption of accounting software should not be a major challenge given its financial standing. These measures, while essential for ensuring compliance, entail considerable investment in infrastructure and capacity building. For many non-profits, especially smaller and regionally-focused organizations, such investments pose significant challenges due to budgetary constraints.

Training and up skilling staff to navigate the complexities of GST is equally critical. However, these efforts require both time and financial resources, which may detract from the primary mission of serving underserved populations. Furthermore, errors in GST compliance stemming from inadequate training or systemic inefficiencies can result in penalties, compounding operational difficulties. To mitigate these challenges, the study suggests implementing targeted support mechanisms, such as government-sponsored training programs and subsidies for adopting advanced tools and technologies.

Stakeholder Dynamics and Perceptual Shifts

The effects of GST extend beyond internal operations to influence the relationships that registered societies maintain with their stakeholders. Donors, for instance, may perceive the increased administrative focus necessitated by GST compliance as a deviation from the organization's primary objectives. This perception can potentially impact donor confidence and future funding streams. Similarly, the financial and operational constraints faced by registered

societies may translate into reduced service quality or scope, eliciting dissatisfaction among beneficiaries who depend on these organizations for essential services.

Conversely, GST's emphasis on transparency and accountability aligns with the principles of good governance, offering opportunities to enhance stakeholder trust. By demonstrating robust financial discipline and compliance, registered societies can position themselves as credible and well-managed entities, potentially attracting greater support from institutional donors, international agencies, and philanthropic foundations. Thus, while GST presents challenges, it also creates avenues for fostering stronger stakeholder relationships.

Tamil Nadu as a Contextual Backdrop

Tamil Nadu provides a unique context for examining the interplay between GST and the non-profit sector. Renowned for its progressive social policies and vibrant network of civil society organizations, the state has long been at the forefront of addressing socioeconomic disparities. Registered societies in Tamil Nadu operate across diverse domains, ranging from healthcare and education to rural development and environmental conservation. These organizations, while instrumental in driving social change, face distinctive challenges under the GST regime, necessitating a nuanced analysis of their experiences and perceptions.

The present study adopts a mixed-methods approach to capture the multi-dimensional impact of GST on registered societies in Tamil Nadu. Quantitative data, collected through structured surveys, is complemented by qualitative insights derived from interviews and focus group discussions with NPO representatives. Statistical techniques such as ANOVA and correlation are employed to analyze the relationships between demographic variables and organizational satisfaction with GST. Additionally, case studies of representative societies provide in-depth perspectives on the practical implications of GST.

Policy and Practical Implications

The introduction of GST represents a watershed moment in India's economic evolution, bringing both opportunities and challenges for the non-profit sector. For registered societies in Tamil Nadu, the tax regime has reshaped administrative processes, financial sustainability, and stakeholder relationships, impacting their overall satisfaction and operational efficacy. This study contributes to the broader discourse on tax policy and its implications for social welfare by illuminating these dynamics. The insights derived from this research offer actionable recommendations to enhance the resilience and sustainability of registered societies, ensuring that they continue to play a pivotal role in advancing social equity and development.

The findings of this study hold significant implications for policymakers, non-profit leaders, and stakeholders. For policymakers, the research highlights the necessity of designing inclusive tax policies that address the unique characteristics of the non-profit sector. Potential interventions include exemptions for specific expenses incurred by registered societies, simplified compliance mechanisms for smaller organizations, and targeted capacity-building programs to enhance GST readiness.

The study underscores the importance of strategic adaptation to the GST regime for non-profit leaders. Investing in staff training, leveraging technology for compliance, and exploring innovative funding models are critical for mitigating the challenges posed by GST. Furthermore, fostering collaborative partnerships with academic institutions, professional consultants, and government agencies can provide NPOs with the technical expertise and resources to navigate the tax landscape effectively.

Review of Literature

The implementation of the Goods and Services Tax (GST) has been one of the most significant tax reforms in India's economic history. As a destination-based tax system, GST has aimed to streamline taxation by subsuming multiple indirect taxes, thereby fostering

transparency, efficiency, and compliance. However, despite its theoretical advantages, GST has had far-reaching and varied effects across different sectors, particularly impacting Micro, Small, and Medium Enterprises (MSMEs), tax compliance, revenue collection, and sector-specific performance. This review synthesizes existing literature on the multidimensional impact of GST, with a focus on knowledge and awareness, Input Tax Credit (ITC) mechanisms, tax rates, sectorial effects, macroeconomic implications, technological integration, behavioral compliance, and economic harmonization.

GST Knowledge and Awareness: Implications for Compliance and Business Operations

A fundamental determinant of GST compliance is the level of knowledge and awareness among businesses. Bhalla et al. (2022) highlight the crucial role of GST awareness in ensuring compliance among MSMEs, emphasizing that a comprehensive understanding of tax laws, rates, and ITC mechanisms enables firms to optimize their operations. Furthermore, Antony and Sharma (2023) examine GST adoption among retailers, underscoring its positive impact on business efficiency while also identifying compliance challenges, particularly for smaller enterprises. To bridge this gap, digital platforms and technology-driven solutions have been proposed as enablers of greater compliance and operational integration.

Input Tax Credit (ITC) Mechanisms: Benefits and Challenges

ITC is a cornerstone of the GST framework, aimed at eliminating the cascading effect of taxation. Kulkarni (2021) highlights the complexities of ITC optimization, noting that compliance requirements from suppliers pose a significant challenge for businesses. When suppliers fail to meet GST provisions, ITC claims are delayed, leading to financial instability for businesses. Similarly, Ghosh (2020) argues that efficient ITC claims can substantially reduce tax burdens, improve liquidity, and support business expansion. However, Nathan (2020) critiques the disproportionate responsibility placed on purchasers to ensure supplier compliance, advocating for a streamlined ITC system to mitigate these inefficiencies.

Tax Rates and Economic Implications: Balancing Growth and Compliance

Tax rates play a crucial role in determining economic participation and business sustainability. Twesige and Gasheja (2019) and Orkaido and Beriso (2020) assert that lower GST rates enhance disposable income, stimulate consumer demand, and foster MSME growth, ultimately driving economic activity. Conversely, higher tax rates have been linked to compliance difficulties, particularly for small businesses operating on thin profit margins. These findings suggest that a balanced tax structure is necessary to maintain both economic stimulation and government revenue collection.

Sectorial Impacts of GST: Opportunities and Constraints

GST's impact has varied significantly across different industries, with both opportunities and challenges emerging.

Handloom Industry: Sinha (2019) documents the adverse effects of GST-induced cost increases in inputs like yarn and dyes, which have disrupted supply chains and reduced the competitiveness of handloom products in domestic and international markets.

Hospitality Sector: Jaiswal (2019) explores how GST has reshaped the hospitality industry, leading to structural changes and the rise of sub-sectors such as eco-tourism and wellness tourism.

Fast-Moving Consumer Goods (FMCG): Mishra (2023) finds that GST has facilitated cost savings for large FMCG firms through supply chain optimization and warehouse consolidation, although smaller players face ongoing compliance hurdles.

Manufacturing and Exports: Negi et al. (2022) analyze the impact of GST on motor and pump exports in Coimbatore, reporting mixed outcomes—while streamlined taxation has

benefited some exporters, others struggle with regulatory adjustments.

Macroeconomic Effects: Revenue, Growth, and Formalization

At a macroeconomic level, GST has influenced revenue collection, business formalization, and overall economic stability. Paliwal et al. (2019) employ tax buoyancy analysis to demonstrate that GST has reduced consumer and corporate tax burdens without significantly altering GDP. Similarly, Deshmukh et al. (2022) report a surge in tax revenue post-GST implementation despite persistent compliance and technical challenges. Maheshwari (2022) underscores long-term benefits, including the elimination of cascading taxes and the establishment of enhanced economic thresholds, fostering greater formalization. Extending this analysis to an international context, Salleh et al. (2022) study GST's impact on Malaysia's takaful sector, revealing efficiency losses due to increased costs, highlighting the need for sector-specific policy adaptations.

Technology and Compliance: E-Governance and Innovation

The role of technology in GST compliance has been increasingly recognized. Sury (2021) examines how GST has transformed e-commerce by replacing fragmented VAT systems with a unified tax structure. However, compliance burdens remain, particularly due to the introduction of the Tax Collection at Source (TCS) mechanism. Dikshit (2022) evaluates India's GST e-governance system, noting its effectiveness in improving tax administration but also identifying challenges related to techno stress among small businesses. Moreover, Sharma et al. (2023) investigate block chain technology as a tool for enhancing GST compliance, advocating for its adoption to improve transparency, reduce fraud, and streamline tax administration.

Behavioral Insights and Compliance: Understanding Taxpayer Behavior

Understanding behavioral responses to GST is critical for improving compliance and policy effectiveness. Gupta (2023) analyzes how consumption taxes influence saving and spending habits, revealing a tendency among individuals nearing retirement to reduce discretionary spending in response to increased tax burdens. Additionally, Paleka (2023) categorizes taxpayer compliance behaviors and recommends targeted strategies to encourage voluntary compliance while minimizing administrative burdens.

Harmonization and Integration: The "One Nation, One Tax" Framework

GST's role in fostering economic integration and tax harmonization has been a major theme in existing literature. Srivastava et al. (2022) document GST's transformative impact under the "One Nation, One Tax" philosophy, illustrating how it has reduced logistical barriers, facilitated inter-state trade, and improved the ease of doing business. This harmonization has particularly benefited industries with multi-state operations, underscoring the broader economic advantages of a unified tax system.

Despite its numerous advantages, GST continues to pose challenges related to compliance, ITC mechanisms, sectoral disparities, and technological integration. While existing literature extensively discusses these aspects, gaps remain in understanding the long-term behavioral impact on taxpayers, the full potential of technology in compliance, and the sector-specific adaptations needed to maximize GST benefits. Future research should focus on refining GST policies to enhance compliance efficiency, reduce burdens on small businesses, and ensure equitable economic benefits across sectors.

Statement of the Problem

The study on the "Effect of Goods and Services Tax on the Satisfaction of Non-Profit Organizations with Special Reference to Select Registered Societies in Tamil Nadu" faces

several key challenges. Firstly, the increased administrative burden due to GST compliance requires meticulous record-keeping and regular filing of returns, diverting resources from their core mission of social service. Financially, the inability to claim input tax credits results in higher operational costs, straining their budgets and affecting their ability to fund projects effectively. Additionally, GST may influence donor behavior, as donors might be concerned that part of their contributions will cover tax liabilities rather than directly supporting the cause, potentially reducing donations. The increased costs and administrative demands can also hinder service delivery, reducing satisfaction among beneficiaries. Furthermore, navigating the complex compliance requirements and exemptions under GST can be time-consuming and prone to errors, further straining resources. Lastly, many non-profit organizations may lack the necessary awareness and training to manage GST compliance effectively, impacting their operational efficiency. These problems underscore the need for a comprehensive analysis to develop strategies that mitigate these challenges and enhance the satisfaction and sustainability of Registered Societies.

Objectives of the Study

- To identify the perception of the Goods and Services Tax compliance in Registered Societies.
- To analyze the relationship between Goods and Services Tax and Satisfaction of Registered Societies'.
- To measure the impact of Goods and Services Tax on the Satisfaction of select Registered Societies.

Hypotheses of the Study

H_0 - There is no significant difference among the respondents with different Education level with respect to their perception of various Goods and Services Tax.

H_0 - There is no relationship between Goods and Services Tax and Satisfaction of Registered Societies'.

H_0 - There is no significant impact of Goods and Services Tax on the Satisfaction of Registered Societies'.

Methodology of the Study

The current work uses the descriptive method and incorporates two different types of data: primary and secondary. Primary data was collected using a well-structured questionnaire, while secondary data was extracted from academic journals, the GSTN portal, newspapers, and the ICAI website. The study involved a sample size of 100 societies registered under the GST Act as respondents from NPOs in Tamil Nadu. A sample size of 100 registered societies registered under the GST Act as respondents from NPOs in Tamil Nadu was chosen based on feasibility, resource constraints, and the need for focused qualitative insights alongside quantitative analysis. After passing through random sampling, data were analyzed using tools such as ANOVA, exploratory factor analysis, multiple regressions, and correlation.

Results and Discussion

A. Exploratory Factor Analysis

Table 1: Factors of Goods and Services Tax

Factor and Variance Explained	Components	Rotated Factor Loadings
Understanding of the GST Regime	The process for obtaining GST exemption for Registered Societies is clear and straightforward.	0.786
	Registered Societies receive adequate information on the criteria for GST exemption.	0.752
	The GST registration process for Registered Societies is efficient and well-managed.	0.741
GST Exemption and Registration	The process for obtaining GST exemption for Registered Societies is clear and straightforward.	0.799
	Registered Societies receive adequate information on the criteria for GST exemption.	0.812
	The GST registration process for Registered Societies is efficient and well-managed.	0.912
GST Rates And Levy	GST rates applicable to Registered Societies are clearly defined and easy to understand.	0.732
	Registered Societies find it easy to stay updated with any changes in GST rates and levies.	0.852
	GST rates and levies applicable to Registered Societies do not create undue financial burdens.	0.814
GST Filing and Returns	Registered Societies find the GST filing process straightforward to complete.	0.766
	Consistently meet GST return deadlines without difficulty.	0.749
	Satisfied with the support available for GST filing and return processes for Registered Societies.	0.851
Technology and Infrastructure	Registered Societies have the necessary technology in place to manage GST compliance effectively.	0.831
	GST-compliant accounting software for our financial management.	0.899
	The cost of upgrading technology for GST compliance is significant.	0.842
	Security features of the GST portal adequately protect our Registered Societies' sensitive data.	0.761
	GSTN portal meets the specific compliance needs of Registered Societies.	0.711

GSTN Portal	Satisfied with the support and resources available for Registered Societies on the GSTN portal.	0.819
Support and Guidance	Find it easy to access help or support when we have GST-related queries.	0.987
	Peer organizations have been a valuable resource for understanding GST compliance.	0.931
	The lack of expert guidance has made GST compliance challenging for Registered Societies.	0.762
Administrative Capacity	The process of GST registration was straightforward for the organization.	0.83
	Dedicated personnel to handle GST compliance-related tasks.	0.791
	The administrative burden of GST compliance has increased operational costs.	0.8

Source: Primary data

B. ANOVA

H_0 - There is no significant difference between the educational level of the respondents and their perception of various Goods and Services Tax.

Table 2: Significant Difference between gender and Perception of Various Goods and Services Tax

S.No.	Particulars	Significance
1	Understanding of the GST Regime	0.019
2	GST Exemption and Registration	0.037
3	GST Rates and Levy	0.021
4	GST Filing and Returns	0
5	Technology and Infrastructure	0.024
6	GSTN Portal	0.015
7	Supports and Guidance	0.008
8	Administrative Capacity	0.044

Source: Primary data

C. Correlation Analysis

H_0 - There is no relationship between goods and services tax and satisfaction of registered societies.

Table 3: Relationship between Goods and Services Tax and satisfaction of registered societies

Independent Variables	Dependent Variable	Pearson Correlation	P Value
Goods and Services Tax Compliances	Administrative Activities	0.658	0
	Financial Activities	0.479	0.21
	Operational Activities	0.866	0.48

Source: Primary data

D. Regression Analysis

H_0 - There is no significant impact of Goods and Services Tax on the satisfaction of registered societies.

Table 4: Impact of Goods and Services Tax on the Satisfaction of Registered Societies

Model	R Square	Adjusted R Square
Impact of Goods and Services Tax Compliances on the Satisfaction of Registered Societies.	0.739	0.721
Predictors: Understanding of GST Regime, GST Exemption and Registration, GST Rates and Levy, GST Filing and Returns, Technology and Infrastructure, GSTN Portal, Supports and Guidance, Administrative Capacity		
Dependent Variable: Satisfaction of Registered Societies		

Source: Primary data

Data Analysis and Interpretation

Factor analysis was utilized to analyze the underlying dimensions influencing registered societies' perceptions of the Goods and Services Tax (GST). Principal Component Analysis (PCA) was employed to extract eight factors from 24 statements, with each factor representing a unique dimension of GST-related perceptions. These factors were named based on their thematic alignment with the associated statements. The first factor was labeled Understanding of the GST Regime, followed by GST Exemption and Registration, GST Rates and Levy, GST Filing and Returns, Technology and Infrastructure, GSTN Portal, Support and Guidance, and Administrative Capacity. These factors provide a comprehensive framework for examining the multifaceted implications of GST compliance (refer Table 1, Annexure).

An ANOVA analysis further revealed significant disparities in the interpretation of GST dimensions based on the educational levels of respondents and their perception of GST. The P-values for all factors were below 0.05, leading to the rejection of Type I (null) hypothesis and indicating a statistically significant contrast in perceptions across educational groups (refer Table

2, Annexure). This underscores the critical role of education in shaping the understanding and attitudes toward GST.

Correlation analysis highlighted the relationships between the dependent variable, satisfaction of registered societies, and the independent variable, Goods and Services Tax Compliances. The analysis demonstrated the strongest correlation (0.866) with operational activities, while financial activities exhibited the weakest correlation (0.479) (refer Table 3, Annexure).

Finally, regression analysis examined the predictive influence of GST-related factors on the satisfaction of registered societies. The findings revealed that changes in GST predictors account for 73.9% of the variance in satisfaction levels among the societies studied (refer Table 4, Annexure). These results emphasize the substantial impact of GST compliance dimensions on organizational satisfaction, offering valuable insights for policymakers and administrators aiming to enhance the operational and financial experiences of registered societies.

Findings of the Study

The study has revealed several key findings. Through exploratory factor analysis, eight significant factors were identified that influence GST compliance. These factors include "Understanding of the GST Regime," "GST Exemption and Registration," and "Support and Guidance." The latter factor showed a notably high loading of 0.987. The ANOVA results indicate significant differences in perceptions of GST among registered societies based on gender, with all factors exhibiting P-values below 0.05. Correlation analysis further demonstrates a strong relationship between GST compliance and the satisfaction of registered societies, particularly in operational activities, which showed the highest correlation at 0.866. The regression analysis supports these findings, indicating that GST compliance explains 73.9% of the variance in satisfaction levels. Overall, the study highlights the critical role of GST compliance in shaping perceptions and satisfaction within registered societies, underscoring the need for improved support systems and clearer communication regarding GST processes to enhance operational efficiency.

Conclusion

The findings of this study underscore the need for targeted policy interventions to ease the administrative and financial burden of GST on NPOs. Simplified compliance mechanisms, sector-specific exemptions, and enhanced awareness initiatives can help mitigate challenges. Improving the experience of registered societies with GST compliance requires a multifaceted approach rooted in education, support, and policy reform. Training programs tailored to educate staff on the nuances of GST regulations, exemptions, and procedural requirements can significantly alleviate administrative burdens. Simplifying complex GST processes, alongside providing clear guidance on exemptions applicable to non-profits, can enhance compliance efficiency and reduce errors.

A centralized support mechanism, such as a dedicated helpline or an online resource portal, can provide timely assistance to address common concerns, particularly for organizations with limited familiarity with GST regulations. Such platforms can also serve as repositories of updated information and FAQs, making it easier for societies to stay compliant. Policymakers should evaluate the feasibility of introducing a streamlined GST framework for non-profits, which may include simplified reporting requirements or reduced compliance thresholds. This would not only lessen the administrative strain but also allow these organizations to focus on their core social objectives.

Additionally, fostering a collaborative community of practice through regular workshops and seminars can facilitate knowledge-sharing among registered societies. These forums can be instrumental in exchanging best practices, addressing common challenges, and promoting innovative solutions for GST compliance. By adopting these measures, registered societies can not only improve operational efficiency but also enhance their service delivery to the communities they serve. In sum, a targeted combination of education, centralized support, and tailored policies can significantly aid non-profits in navigating the complexities of the GST system, ensuring their sustained contribution to societal welfare.

Future Scope of Study

Further research can explore the long-term adaptation of NPOs to GST, sector-wise impact, and comparative analysis with other taxation models.

Limitations of the Study

The study is limited to registered societies in Tamil Nadu and may not fully represent the experiences of NPOs in other states. The sample size is also a constraint in deriving broad generalizations.

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Evaluating Efficiency in India's Life Insurance Sector Using Slacks-Based DEA with Undesirable Outputs

Dr. Ram Pratap Sinha
Associate Professor of Economics
Government College of Engineering and Leather Technology
Kolkata

Dr. Padmasai Arora
Professor
Keshav Mahavidyalaya
University of Delhi

Dr. Sonika Sharma
Associate Professor
Shaheed Bhagat Singh College
University of Delhi

Abstract

Traditional DEA models measure efficiency of decision making units (DMUs) without making any distinction between desirable and undesirable outputs. Consequently, the efficiency studies provide a partial picture of firm-level performance Using a slacks-based DEA model, this study evaluates 24 Indian life insurers from 2010–2021, treating mortality claims as undesirable outputs. A Slacks Based Measure model treats the distance between an observed performance level from the best practice level as input or output slack and estimates inefficiency accordingly. Inputs used in the present study include Operating Expenses and Net Worth (both are treated as separable inputs). Outputs used in the study are Net Premium Income (Good Outputs) and Claims Expenses (Undesirable Output) which are only weakly disposable. In the second stage of our analysis, we have considered five contextual variables- solvency ratio, log of total assets, log of sum assured return on equity and insurer sum assured. The results obtained from the study shows that mean inefficiencies experienced a decline from 0.485 to 0.419 with maximum efficiency gains post 2014-15. The second stage regression estimates show a decline in inefficiency and a positive influence of profitability and size on efficiency, while age, log of sum assured and solvency ratio show negative impacts

Keywords: efficiency; life insurance; Data Envelopment Analysis; undesirable outputs

Introduction

Insurance as a financial intermediary, can trigger economic growth (Ghosh, 2013). This insurance-economic growth 'link' studied by numerous writers, has uncovered evidence of a positive relationship between the two [Outreville, 1990, 1992, 1996, 2013; Kim and Brown, 1993; Soo, 1996; Rubayah and Zaidi, 2000; Ward and Zurbruegg, 2000; Curak et al., 2009; among others], the positive impact on economic growth being the result of efficient utilisation of resources by the insurers. Life Insurance, an arrangement for an unhappy contingency such as premature death or longevity related risks, provides a cover to the family members or loved ones

of the insured. For this, the insurance companies collect a premium. This premium is collected from a large number of policy holders who are paid a compensation on the 'happening' and/or 'non happening' of the contingency insured against. Insurance per se, applies the Law of Large Numbers to cover the risks of the insured. Another aspect worth mentioning here is that most of the life insurance policies have a 'savings' component, more so in India, making it a lucrative investment option for savers and becomes a strong competitor for other financial instruments.

Life insurance sector in India has come a long way since its liberalization in early nineties. In 1956, life insurance was nationalized and Life Insurance Company (LIC) was established making it the only life insurance company in the country. The basic philosophy of life insurance in India is best described by its tag line *'Jeevan ke Saath bhi, Jeevan ke Baad bhi'* meaning 'With You During Life and (with your loved ones) after Life too'. Post 1991, liberalization forces were ushered into the country and Malhotra Committee (1993) was set up to review the state controlled life insurance sector. In 1999, Insurance Regulatory and Development Authority of India (IRDA) was enacted and the sector was opened up for private players (domestic as well as foreign). players bringing in competitive forces amidst apprehensions regarding social objective of life insurance in India. Increased competition brought with it, tremendous scope for growth of the life insurance companies in terms of higher insurance density, penetration and expansion; the insurance market dynamics underwent a change. Numerous reforms and innovations were introduced. At the same time, efforts were made to maintain a balance to be struck between social and economic objectives of life insurance. Figure 1 shows the phases of evolution of insurance sector in India.

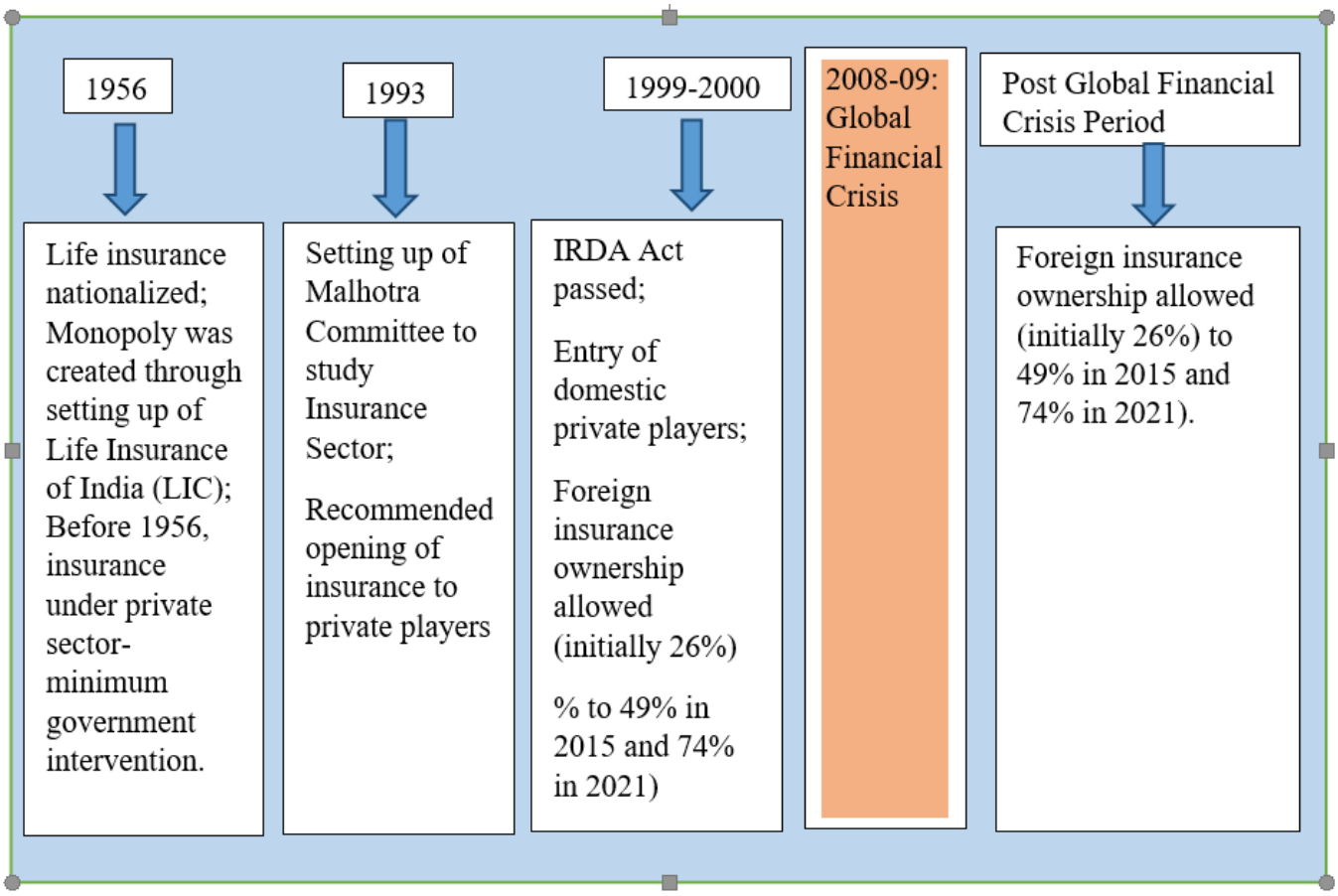

Figure 1: Evolution of Insurance Sector in India

In the post-reform period, the total number of life insurance companies operating in the Indian market increased from only one in the pre-reform period to 24 in end-March 2021 (Table A1). In spite of the transformation witnessed by the life insurance sector in India, its ranking in the world, as per Swiss Re, has fallen to eleventh position in 2020-21 from 10th rank in 2011-12. The share of life insurance business in 2020-21 was 75.24 per cent i.e., three-fourth of insurance business is life insurance. It becomes essential for insurance companies to remain efficient and competitive.

Relevance of the Study

It is noteworthy to mention here that in India life insurance has always been considered extremely important for two main reasons. First, it provides cover to the family of the policy holder in the eventuality of death else providing for finances in old age i.e., provision of social security. Second, life insurance in its role of a financial intermediary, acts as a source of vast pool of collective savings that can be channelized into productive sectors. Against this backdrop, we study efficiency of life insurance companies in India and try to understand what determines their efficiency. The present study has two specific objectives: first, to study efficiency of insurance companies in India and second, to examine the impact of contextual variables on the efficiency of insurance companies.

Life Insurance in India: Business and Growth

In India, life insurance segment has witnessed remarkable growth and transformation in terms of number of policies, amount of premium, penetration and density. As at end September 2012, there were 52 insurance companies operating in the country consisting of 24 life insurers (Figure 2). The premium income in 2011-12 was Rs. 2,87,072 Cr. (first year premium and renewal premium being 39.69% and 60.31% respectively). The life insurance penetration (ratio of premium underwritten in a given year to GDP) and density (ratio of premium underwritten in a given year to population) for the year 2011-12 were 34% and USD 49 (Figure 2). In the business of micro insurance, individual and group business premium stood at Rs. 115.68 Cr. (46.20 lakh new policies) and Rs. 109. 82 Cr. (1.02 Crore lives). Life Insurance Company of India (LIC) contributed the maximum by covering 38.26 lakh individual lives and 94.44 lakh group policies.

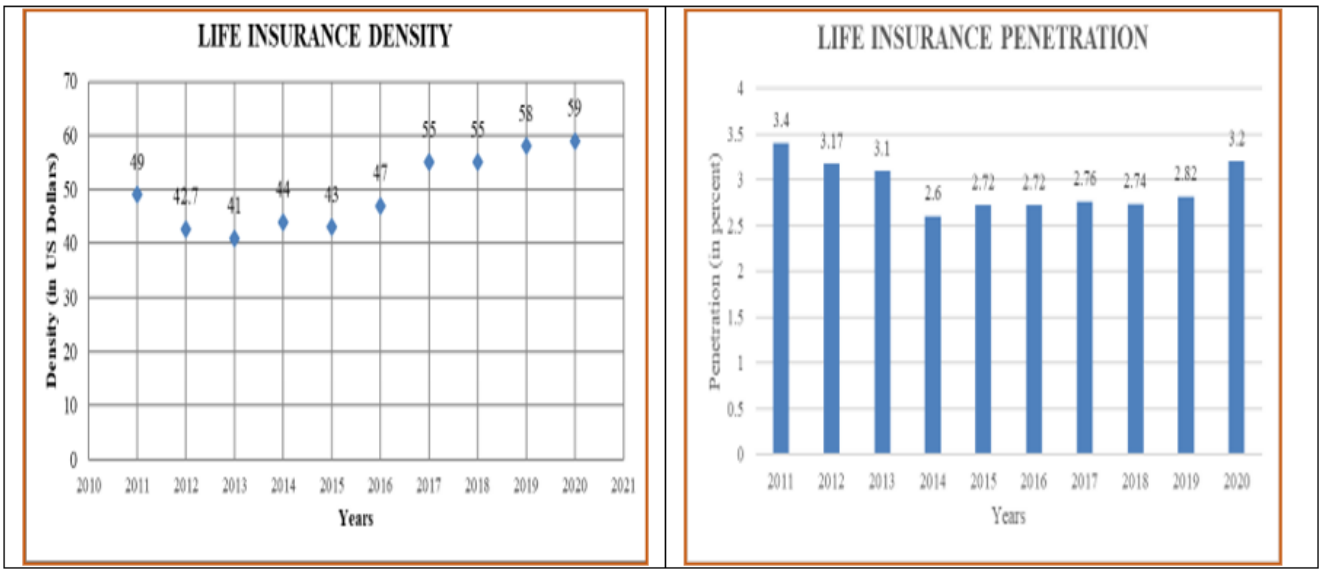

Figure 2: Density and Penetration of Life Insurance sector in India 2011-20

India maintained 10th rank in global life insurance business as in 2010-11. The share of Indian life insurance sector in global life insurance market stood at 2.90 per cent during 2020 as compared to 2.30 percent in 2010-11. The share of life insurance business in total premium stood at 44.50 per cent in 2020. Life insurance penetration and density in 2020-21 were 3.20 per cent and USD 59, the figures for the world were 3.30 per cent and 360 respectively. The premium income was Rs. 6.29 lakh crore during 2020-21. LIC had a market share of 64.14 per cent and issued 209.75 lakh new policies in the individual business. The capital of life insurers was Rs. 28,346 crore for the year 2021. Table 1 presents important indicators of life insurance segment over the years.

In spite of the increase in the amount of funds, assets and sum assured, the number of regional offices did not witness increase in number, rather decreased from 11,167 in 2012 to 11,060 in 2020. This may be attributed to the wave of digitalization witnessed in the country that has done away with the requirement of brick and mortal offices. LIC however expanded their physical presence by 43.85% (4,970 from 3,455 during the ten-year period (Table 2).

The present study seeks to make value addition in the existing body of efficiency evaluation literature by offering a two-stage estimation and explanation of technical efficiency of Indian life insurance companies. The remainder of the paper is structured as follows: Section 2 provides the literature review and research gap. Section 3 describes the methodology and efficiency explanation. Section 4 presents the data, variables and the results. Section 5 highlights the conclusion of the study.

Table 1: A Comparison of Business Indicators of Indian Life Insurance Sector (2010 vs 2020)

Growth in Business	2010-11	2020-21
Income		
Net premium income (in lakhs)	1,03,78,229	6,24,37,986
Income from investments (in lakhs)	84,73,802	4,59,69,073
Other income (in lakhs)	34,392	1,25,455
Outgo		
Claims expenses (in lakhs)	1,52,61,744	3,93,26,278
Operating expenses (in lakhs)	29,65,610	61,42,228
Life insurance penetration (in percent)	3.17	3.2
Life insurance density (in rupees)	3,585	5,790
Life funds and assets		
Years	Funds (in lakhs)	Assets (in lakhs)
2010	2974883	121245793
2020	6583525	331196504
No. of policies and sum assured		
Years	No. of policies (in lakhs)	Sum assured (in lakhs)
2010	3189	333854100
2020	3332	1605548410

Source: IRDA Annual Reports of various years

Literature Review and Research Gap

Though numerous studies have studied efficiency of life insurance companies the world over [Wu, Yang, Vela & Liang (2007) for Canada; Borges, Nektarios and Pestana Barros (2008) for Greece; Lorson and Wagner (2014) for Germany; Eling and Schaper (2017) for Europe; Grmanová and Pukala (2018) for Poland and Czech Republic; Shieh, Li, Hu, and Ang (2022) for Taiwan and China], the research on insurance sector in India is sparse more so on life insurance. In the present study we mention some of the important studies on the life insurer performance in India.

The earliest study in the Indian scenario was by Tone and Sahoo (2005) which studied cost efficiency and scale efficiency of LIC branches for 1982-83 through 2000-01. Sinha and Chatterjee (2011) used window based DEA approach for estimating technical efficiency performance of 13 life insurance companies operating in India. Sinha &Datta (2014) studied the operating performance of 15 life insurance companies in India using hybrid efficiency model given by Tone in 2004 and found that between 2005-2006 to 2008-2009, the number of technically efficient life insurers declined from 9 to 3. The mean technical efficiency scored first declined but later on showed slight improvement. Sinha (2015) for the first time ever in India, used dynamic slack-based DEA model to analyse the efficiency of 15 life insurance companies over a seven-year period from 2005-2006 to 2011-2012. The observed data displays huge fluctuations in mean technical efficiency over the years. Malhotra, et. al. (2017) analysed 10 health and life insurance companies in India from 2009 to 2014 in terms of efficiency using output maximizing variable returns to scale DEA. They found an improvement in health and life insurance companies. Peer analysis and slack analysis were also carried out to know about the best performing company and output expansion and input contraction required for a low performing company to be hundred percent efficient.

Siddiqui (2021) estimated the total factor productivity of 24 Indian life insurance companies from 2012-2013 to 2016-2017 using Malmquist Index. They observed that the productivity of all the companies has increased. The productivity of private life insurance companies has increased at higher rate than that of the public sector companies. Major factors responsible for this increase in productivity of all the companies are efficiency improvement and technological improvement. Table 2 provides a snapshot view of the efficiency and productivity studies regarding life insurance companies.

Table 2: Efficiency studies of Life insurance companies

Author(s)	Country	Purpose	Methodology
Wu, Yang, Vela & Liang (2007)	Canada	Simultaneous analysis of production and investment performance	DEA
Borges, Nektarios and Pestana Barros (2008)	Greece	Efficiency evaluation	CRS,VRS, Super Efficiency and Cross-efficiency DEA models
Eling and Schaper (2017)	Europe	Impact assessment of business environment on efficiency	Multi-stage DEA
Grmanová and Pukala (2018)	Poland and Czech Republic	Evaluation and explanation of efficiency	DEA and Tobit regression
Shieh, Li, Hu, and Ang (2022)	Taiwan and China	Evaluation and explanation of efficiency	Two stage –DEA and truncated regression
Tone and Sahoo (2005)	India	Evaluation of cost efficiency, returns to scale and scale elasticity	DEA

Sinha and Chatterjee (2011)	India	Dynamic panel based efficiency evaluation	Window based DEA
Sinha and Datta (2014)	India	Evaluation of technical efficiency	Hybrid DEA estimation
Sinha (2015)	India	Dynamic evaluation of technical efficiency	Dynamic Slacks Based Measure
Malhotra, et. al. (2017)	India	Efficiency estimation for 10 life and health insurance companies in India	Output maximizing variable returns to scale DEA model
Siddiqui (2021)	India	Estimation of total factor productivity change of Indian life insurance companies	Malmquist index of productivity change

Source: Compiled by the authors

The motivation behind undertaking the present study is the near absence of extant efficiency literature related to the Indian life insurance industry with the accommodation of undesirable output in the input-output framework. Even in the overseas context, Tayebi et. al (2024) is perhaps the first study that has considered undesirable outputs while investing efficiency in the Algerian insurance industry. In the present context, we have included the mortality claims (made by the insured or their heirs) as the undesirable output. However, claims expenses represent the dominant form of business risk in the insurance sector and they are non-separable from the usual business activity of premium mobilization. Thus, we have accommodated non-separability of desirable and undesirable outputs via the addition of weak disposability axiom. With the exception of Sinha (2014) which considered policy lapsation risk as separable undesirable output, no other prior study has included undesirable output in the efficiency evaluation framework in the context of life insurance industry,

Methodology of Efficiency Estimation and Explanation

Efficiency Measurement

In the present paper, we have applied data envelopment analysis for efficiency evaluation. Data Envelopment Analysis (DEA) is a non-parametric method used to measure efficiency of decision making units (DMUs). DEA, originally developed by Charnes, Cooper and Rhodes in 1978 and extended by Banker, Charnes and Cooper in 1984, constructs an efficiency frontier based on linear envelopment of data. This efficiency frontier, under data envelopment analysis, can be constructed with minimal prior assumptions (like disposability of input and output and global convexity of the technology).

Traditional Data Envelopment Analysis models consider only desirable outputs for efficiency measurement. However, undesirable outputs may arise in the input-output process and these need to be minimised as they cannot be avoided. The importance of recognizing the presence of undesirable outputs was felt in industries which give harmful emissions. Using weak disposability hypothesis, Fare et al (1996) modelled undesirable outputs for efficiency evaluation. Later, this was applied to various financial services industry including commercial banking where non-performing assets are treated as undesirable outputs. In India, Sinha (2014) is the first study that measured efficiency in the life insurance sector during 2005-06 to 2009-10 taking policy lapsation as undesirable output. In the present study, mortality claims are treated as undesirable (from the insurer perspective).

The traditional DEA model needs to be modified for accommodating undesirable outputs. There are several ways of doing this. One way is to transform undesirable output into desirable

output by taking its inverse (this can then be maximised as done in traditional DEA model). Another way is to transform the undesirable output by $F(U_0)= -F(U_0)$. For estimating technical efficiency, we have adopted a slacks based measure approach where a firm seeks to minimise the ratio of input and output slacks (Tayebi et al, 2024). This measure is unit invariant, monotone decreasing and is not affected by extreme values in the data set. The current study is based on the concept of weak disposability of output. When undesirable outputs are present under strong disposability, an appropriate measure of efficiency would be based on the expansion of desirable outputs and reduction of undesirable outputs. However, in presence of weak disposability, a reduction of undesirable output also reduces the desirable output.

For describing the methodology, we consider a technology which transforms a vector of m inputs $X= (x_1,x_2,\ldots,x_n)$ into p good outputs $Y_g = (y_{1g},y_{2g},\ldots,y_{pg})$ and q bad outputs $Y_b = (y_{1b},y_{2b},\ldots,y_{qb})$ where $X>0,Y_g>0,Y_b>0$. The two sets of output are non-separable. Thus, a reduction in bad output also reduces good output. The corresponding production possibility set can be specified as:

$P_s=[(X,Y_g,Y_b)|\ x\geq\lambda X,y_g\leq\lambda Y_g,y_b\geq\lambda Y_b,e\lambda=1,\lambda\geq 0]$

(1)

where P_s represents the production possibility set of the decision making units. Λ represents the intensity vector

The slacks based measure of efficiency can be written as:

$$E_{SBM}^{NS}=\min\frac{1-\frac{1}{m}\sum_{i=1}^{m}\frac{S_{io}}{x_{io}}}{1+\frac{1}{S_1+S_2}\left(\sum_{j=1}^{p}\frac{S_{jg}}{y_{jg}}+\sum_{k=1}^{q}\frac{S_{kb}}{y_{kb}}\right)(p+q)(1-\alpha)} \quad (2)$$

subject to: $x_o =X\lambda+S_i$, $y_{og} =Y_g-\lambda S_g$,$y_{ob}=Y_b+\lambda S_b$

where S_i (input slack)$\geq 0, S_g$ (good output slack) $\geq 0, S_b$ (bad output slack) ≥ 0, $\lambda\geq 0$.

From equation (2), it is seen that overall efficiency is calculated as the ratio of input and output efficiency. Input inefficiency is computed by deducting average input slack from unity while output efficiency is based on the addition of output slack with unity. The term alpha inserted in the denominator of (2) represents the proportion by which undesirable outputs are reduced when considering their impact on overall efficiency.

The efficiency measures so derived is bounded from both below and above with the lower and upper bounds being 0 and 1 respectively. Lower bound is 0 because the possibility of negative production is ruled out and due to the presence of the observed bank in the evaluation reference set, efficiency upper bound cannot exceed unity.

Efficiency explanation

In the second stage of our study, we have assumed that efficiency scores are dependent on several contextual variables indirectly influenced the input-output transformation process and hence bank level efficiency. Thus we can write the efficiency-contextual variable relationship as:$E_{ji}=\beta_0 +\beta_1 Z_{1ji} +\ldots.+\beta_k Z_{kji} +U_{ji}$ where E_{ji} represents the efficiency of the j^{th} bank in the i^{th} period, $Z_{1ji},\ldots\ldots..,Z_{kji}$ represent the kth contextual variable for the j^{th} bank in the ith period and U_{ji} represents the disturbance term.

Variables, Data and Results

In the present section, we provide a brief description of variables, data sources and results relating to efficiency estimation and explanation.

Description of variables and data

Efficiency scores calculated using DEA depend on the inputs and outputs considered for the production function. Since insurance is a financial services industry, several approaches can be adopted for selection of inputs and outputs including the transactions approach, financial intermediation approach and the value added approach. The present study uses value-added approach to efficiency measurement [Berger et al. (1987) and Berger et al. (1992)]. The value-added approach considers output as those activities that have significant value added as judged using operating cost allocations [see Berger et al.(1987)]. Insurances companies add value through (i) creating a risk pool, (ii) collecting insurance premium, and (iii) making payments for claims made.

The value added approach outlines the general principles for input and output selection and the ultimate choice depends on the context where the estimation process is being applied. In the present setting, we have selected inputs and outputs based on the extant efficiency literature [Banker et al. (2022), Banker et al.(2024)] . The inputs used in the study are (1) Operating Expenses (Separable input) and (2) Net Worth (Separable input). Since we do not have the break up expenses regarding employee related expenditure and other heads, operating expenses are considered as the proxy for such expenses. Net worth is the proxy for the capital deployed by the life insurers. On the other hand, the outputs used in the study are (1) Net Premium Income and (2) Claims Expenses (Undesirable Output). Claims expenses is the major item of expenditure for the life insurers and is dependent on the mortality behavior and sum assured. We have considered the absolute value of claims expenses and not the claims ratio because the remaining input and output variables have also been included in absolute terms and not in ratio forms.

In the second stage of our analysis, we have considered five contextual variables-solvency ratio, log of total assets, insurer age return on equity and insurer sum assured. Table 3 provides a list of inputs and outputs in the first stage of our analysis and the contextual variables used as explanatory variables in the second stage.

Table 3: Inputs and Outputs Used

Types of Variables	Description	Stage of analysis
Inputs	Operating Expenses (Separable), Net Worth (Separable)	First Stage
Desirable Output	Net Premium Income (Non-Separable Good Output)	
Undesirable Output	Claims Expenses (Non-Separable Bad/Undesirable Output)	
Contextual Variables	Solvency Ratio, Log of Total Assets, Return on Equity, Log of Sum Assured and Insurer age in years	Second Stage

Source: Selected by the authors

For collecting input, output and contextual variables data, we have used two sources: Hand book on Indian Insurance Statistics and Annual Reports of the Insurance Regulatory and Development Authority. Thus, we have used authentic sources of insurer performance data. The yearly sample size is 24 only as there are limited number of life insurers operating in India.

Results

The present sub-section discusses the results relating to the estimation of efficiency (first stage analysis) and explanation of efficiency through the regression of efficiency scores on the contextual variables (second stage analysis).

Descriptive statistics of technical efficiency

Tables 4 and 5 have presented the descriptive statistics of the technical efficiency scores of the in-sample life insurers for the two sub-sample periods of 2011-12 through 2014-15(pre-NDA government) and 2015-16 through 2020-21 (NDA government) respectively. Figure 3 presents the trend observed regarding mean efficiency during the entire ten-year period. The period of study also witnessed the covid-19 pandemic starting 2019.Tables A2 and A3 present the life insurer wise efficiency scores for the period under observation. Figure 4 displays the 10-year mean efficiency of the in-sample life insurance companies.

By comparing the aforementioned tables, we find that mean efficiency of the observed life insurance companies improved significant in the second phase. However, standard deviation of efficiency scores remained relative stable across the two phases. Further, both skewness and kurtosis decreased significantly from window 1 (2011-12 through 2014-15) and window 2 (2015-16 through 2020-21).

Table 4: Descriptive Statistics of Efficiency Scores (2010-11 to 2014-15)

Summary of Descriptive Statistics	2011-12	2012-13	2013-14	2014-15
Mean	0.4850	0.3952	0.3579	0.3613
Median	0.3635	0.2821	0.2538	0.2098
Standard Deviation	0.3272	0.2883	0.2800	0.3342
Sample Variance	0.1070	0.0831	0.0784	0.111677
Kurtosis	-1.1387	0.2513	1.5062	-0.1053
Skewness	0.6162	1.1047	1.5270	1.1337
Range	0.9145	0.9394	0.9289	0.9536
Minimum	0.0855	0.0606	0.0711	0.0464
Maximum	1	1	1	1

Source: Calculated

Table 5: Descriptive Statistics of Efficiency Scores (2015-16 to 2020-21)

Summary of Descriptive Statistics	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Mean	0.5566	0.4660	0.4955	0.5523	0.4433	0.3808
Median	0.5033	0.415	0.3853	0.5469	0.4055	0.3666
Standard Deviation	0.3625	0.3015	0.3071	0.3034	0.2954	0.2306
Sample Variance	0.1314	0.0909	0.0943	0.0920	0.0873	0.0532
Kurtosis	-1.6831	-1.0340	-1.2175	-1.3274	-0.1053	0.6619
Skewness	0.1665	0.4799	0.4478	0.1269	0.9462	0.8964
Range	0.92	0.9017	0.8975	0.8814	0.9165	0.8956
Minimum	0.08	0.0983	0.1025	0.1186	0.0835	0.1044
Maximum	1	1	1	1	1	1

Source: Calculated

It is of interest to understand and analyse the variations in insurer specific performance. Tata AIA, Sahara, Reliance Nippon, Pramerica Life, PNB Metlife, Future Generali, Exide Life, Bharti AXA, Bajaj Allianz, Aviva, Ageas Federal, Aegon and Aditya Birla Sunlife had very low

efficiency scores below 0.50; lowest being as low as 0.103 and 0.171 for Aegon and Sahara respectively. Canara HSBC, Max Life, SBI Life, Edelweiss Tokio, India First, ICICI Prudential, Shriram Life, Kotak Mahindra, Star Union Dai-ichi and HDFC Life and LIC had higher efficiency. LIC was the only insurer that had efficiency score of 1.0 throughout the ten year period.

A decomposition of overall inefficiency in to output and input-centric components indicate that apart from premium mobilisation, inefficiency is mostly related to the two inputs and the undesirable output. From the data, it seems that the life insurers with larger size experienced cost economies of scale and performed better. Further investigation (which is beyond the scope of the present study) is required to understand as to what extent the differences in performance is due to past legacy and how much credit can be given to managerial ability.

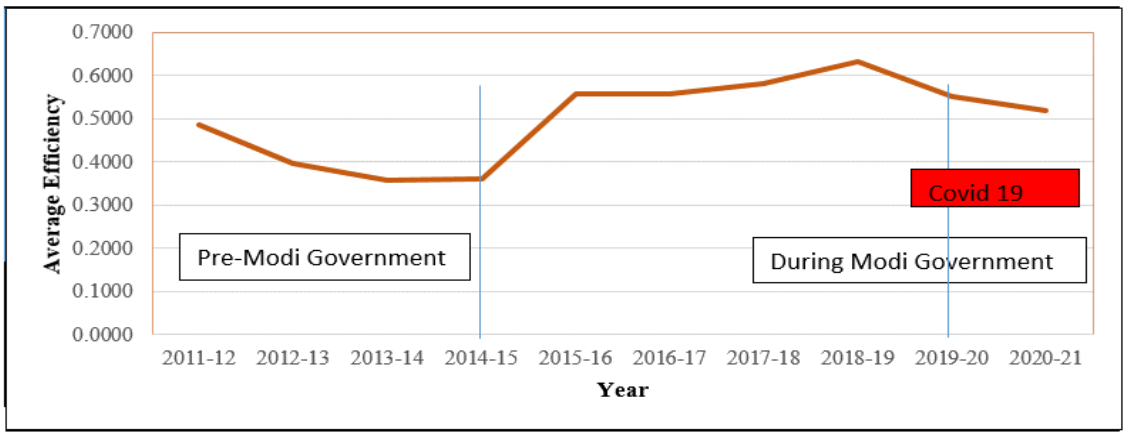

Figure 3: Average efficiency scores (2011-12 to 2020-21)

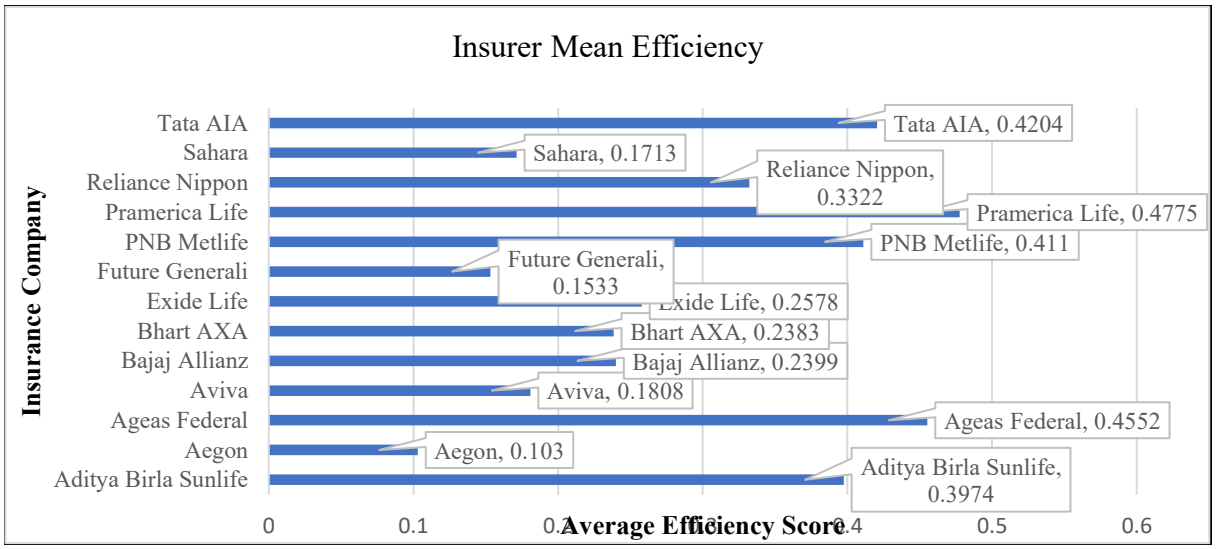

Figure 4 A: Life insurer with mean efficiency scores of less than 0.5

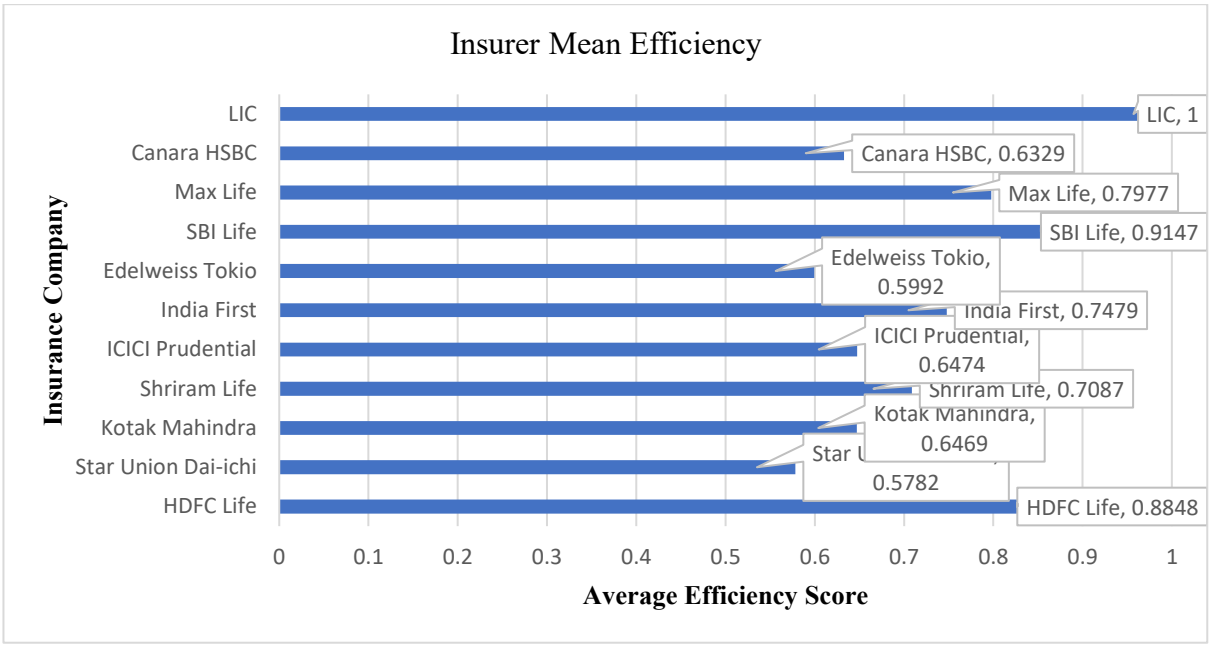

Figure 4B: Life insurer with mean efficiency scores of greater than 0.5

Decomposition of technical inefficiency

Tables 4 and 5 provide information about average efficiency scores for the life insurance companies for two sub-period observation windows. However, we also examine input and output specific inefficiencies for the insurers under observation as this provides us to pin point the sources of inefficiency based on which corrective measures may be adopted. Tables 6 and 7 provide the average inefficiency scores for the inputs and outputs included in the estimation process.

Table 6: Decomposition of input and output specific inefficiency (2011-12 to 2014-15)

Variable Wise Mean Inefficiency	2011-12	2012-13	2013-14	2014-15	4-year Mean
Operating Expenses	0.2345	0.2347	0.2386	0.314	0.2555
Net worth	0.2409	0.3013	0.337	0.3007	0.2950
Net Premium Income	0	0	0	0	0.0000
Claims Expenses	0.1572	0.2071	0.2409	0.1448	0.1875
Alpha (Proportional reduction rate)	0.6856	0.5858	0.5181	0.7104	0.6250

Source: Calculated

Table 7: Decomposition of input and output specific inefficiency (2015-16 to 2020-21)

Variable Wise Mean Inefficiency	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	6-year Mean
Operating Expenses	0.1612	0.1748	0.1794	0.2065	0.2373	0.2586	0.2030
Net worth	0.2446	0.2415	0.2267	0.1922	0.206	0.2187	0.2216
Net Premium Income	0	0	0	0	0	0	0.0000
Claims Expenses	0.115	0.1044	0.0755	0.0411	0.0751	0.0657	0.0795

Alpha (Proportional reduction rate)	0.2301	0.7911	0.849	0.9179	0.8499	0.8685	0.7511

Source: Calculated

Second stage results

Table 8: Regression of log of efficiency scores on the contextual variables

Particulars	Coefficient	Std. Error	t-ratio	p-value
Intercept	−6.5065	0.3688	−17.64	<0.0001
Solvency Ratio	−0.0597	0.0208	−2.873	0.0044
Log of Total Asset	1.3366	0.0844	15.84	<0.0001
Insurer Age in Years	−0.0728	0.0071	−10.32	<0.0001
Log of Sum Assured	−0.0682	0.0259	−2.633	0.0090
Return on Equity	0.0038	0.0009	4.496	<0.0001
R squared	0.6644			
Adjusted R squared	0.6584			
Sum squared residual	236.42			
Standard Error of Regression	1.005			

Source Calculated

For assessing the impact of the contextual variables on the estimated efficiency scores, we have applied panel weighted lest squares approach. There are five contextual variables in the regression (solvency ratio, log of total asset-a proxy for insurer size, insurer age in years, log of sum assured-a proxy for life coverage and return on equity-a proxy for insurer profitability). The results are contained in Table 8. The table shows that among the five explanatory variables, insurer size (log of total asset) and return on equity have a positive influence on life insurer efficiency whereas the remaining three variables (solvency ratio, log of sum assured and insurer age) have negative influence on life insurer efficiency We have presented another table (Table 9) in which we have tried explore the possible reasons regarding the direction of influence of the contextual variables.

Table 9: Direction of influence and the underlying reasons

Contextual Variable	Direction of influence	Likely Reason
Life insurer size	Positive	Higher market share facilitates reaping of benefits relating to economies of scale
Return on equity	Positive	Since we have adopted an income based measure of efficiency, a positive correlation with return on equity is normally expected
Life insurer age	Negative	Young life insurers are more proactive and innovative
Log of Sum Assured	Negative	For a given premium income, higher degree of coverage reduces insurer income
Solvency ratio	Negative	Solvency standards compel insurers to park resources in less profitable avenues

Source: Prepared by the authors

Concluding Observations

The study evaluated and explained efficiency of 24 in-sample life insurance companies over a decade (2011-12 through 2020-21). The sample period was divided into two phases. Phase 1 corresponds to 2011-12 through 2014-15 while phase 2 relates to the period 2015-16. The results indicate that mean technical efficiency increased from 0.3999 in the first phase to 0.4824 in the second phase while mean standard deviation remains more or less unchanged. . Decomposition of technical inefficiency into input and output specific inefficiency components shows that mean inefficiencies relating to the two inputs (operating expenses and net worth) and the undesirable output (claims expenses) declined over the period the period under observation. Impact of the contextual variables on the technical efficiency estimates imply that efficiency is positively related to profitability and insurer size but negatively linked to insurer age implying that life insurers with higher growth rate are also more efficient. Further, life insurer efficiency is also negatively related to the solvency ratio and log of sum assured.

The study has several limitations relating to the sample size, the number of contextual variables and the extent of coverage. Since the number of life insurance players in the Indian market is quite small, we had no other option but to remain content with a sample size of 24 per year. Further, the present study covers the period up to 2020-21. Consideration of recent years can provide fresh insights. Further, other contextual variables like insurance persistency and macroeconomic variables can enrich the second stage analysis further. For example, we did not consider the impact of COVID period performance in specific because our analysis was limited to March 2021 only. Our study is based on aggregate pan-India data and does take in to account regional variations in performance. A study of performance relating to claim settlement ratio and other service parameters can provide insights in another area. Future studies can extend our analysis further in several directions.

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Appendix

Table A1: Insurance Companies operating in India (2010-2020)

Insurance Company			
Public Sector			
1	Life Insurance Corporation of India (LIC)		
Private Sector			
2	Aditya Birla Sunlife Insurance Company Ltd. (ABSIC)	13	ICICI Prudential Life Insurance Company Ltd. (IPLIC)
3	Aegon Life Insurance Company Ltd. (ALIC)	14	IndiaFirst Life Insurance Company Ltd. (IFLIC)
4	Ageas Federal Life Insurance Company Ltd. (AFLIC)	15	Kotak Mahindra Life Insurance Ltd.
5	Aviva Life Insurance Company India Ltd. (ALIC)	16	MaxLife Insurance Company Ltd.
6	Bajaj Allianz Life Insurance Company Ltd. (BALIC)	17	PNB Metlife India Insurance Company Ltd.
7	Bharti AXA Life Insurance Company Ltd. (BALIC)	18	Pramerica Life Insurance Company Ltd.
8	Canara HSBC OBC Life Insurance Company Ltd. (CHOLIC)	19	Reliance Nippon Life Insurance Company Ltd.
9	Edelweiss Tokio Life Insurance Company Ltd. (ETLIC)	20	Sahara India Life Insurance Company Ltd.
10	Exide Life Insurance Company Ltd. (ELIC)	21	SBI Life Insurance Company Ltd.
11	Future Generali India Life Insurance Company Ltd. (FGILIC)	22	Shriram Life Insurance Company Ltd.
12	HDFC Life Insurance Company Ltd. (HLIC)	23	Star Union Dai-ichi Life Insurance Company Ltd.
		24	TATA AIA Life Insurance Company Ltd.

Source: IRDA Annual Reports.

Table A2: Life Insurer wise technical efficiency scores (2011-12 to 2014-15)

DMU	2011-12	2012-13	2013-14	2014-15	Average Efficiency Pre-Modi Government
Aditya Birla Sunlife	0.3391	0.314	0.3161	0.4263	0.3489
Aegon	0.1091	0.1205	0.099	0.1141	0.1107
Ageas Federal	0.2672	0.2942	0.272	0.1498	0.2458
Aviva	0.2122	0.242	0.2268	0.1286	0.2024
Bajaj Allianz	0.3018	0.2096	0.1808	0.292	0.2461
Bhart AXA	0.1165	0.107	0.095	0.0566	0.0938
Canara HSBC	0.7865	0.6633	0.4497	1	0.7249
Edelweiss Tokio	1	0.0606	0.0711	0.0464	0.2945
Exide Life	0.2088	0.2408	0.2335	0.1312	0.2036

Future Generali	0.1592	0.1879	0.1476	0.1413	0.1590
HDFC Life	0.8039	1	1	0.4554	0.8148
ICICI Prudential	0.4988	0.4181	0.3721	0.721	0.5025
India First	1	1	1	0.4255	0.8564
Kotak Mahindra	0.5775	0.4756	0.3767	0.4607	0.4726
Max Life	0.5276	0.597	0.5612	0.291	0.4942
PNB Metlife	0.3232	0.27	0.2207	1	0.4535
Pramerica Life	0.0855	0.1124	0.1119	0.0665	0.0941
Reliance Nippon	0.2628	0.1853	0.21	0.0838	0.1855
Sahara	0.275	0.2223	0.2606	0.1999	0.2395
SBI Life	1	0.5919	0.5547	1	0.7867
Shriram Life	0.3878	0.3387	0.247	0.1134	0.2717
Star Union Dai-ichi	1	0.6055	0.361	0.1473	0.5285
Tata AIA	0.3984	0.2288	0.2211	0.2197	0.2670
LIC	1	1	1	1	1.0000
Average Efficiency	**0.485**	**0.3952**	**0.3579**	**0.3613**	0.3999

Source: Calculated.

Table A3: Life Insurer wise technical efficiency scores (2016-17 to 2020-21)

S. No.	DMU	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	Average Efficiency Post-Modi Government
1	Aditya Birla Sunlife	0.4027	0.415	0.3853	0.4555	0.4109	0.5087	0.4297
2	Aegon	0.08	0.0983	0.1025	0.1186	0.0835	0.1044	0.0979
3	Ageas Federal	0.5119	0.7141	0.8601	0.6601	0.4531	0.3699	0.5949
4	Aviva	0.1763	0.1701	0.1749	0.183	0.16	0.1341	0.1664
5	Bajaj Allianz	0.2089	0.2315	0.2461	0.2572	0.2247	0.2467	0.2359
6	Bhart AXA	0.1513	0.1908	0.3566	0.6683	0.4001	0.2409	0.3347
7	Canara HSBC	0.4889	0.4571	0.5153	0.6382	0.575	0.7555	0.5717
8	Edelweiss Tokio	1	0.7397	0.6402	1	1	0.434	0.8023
9	Exide Life	0.2481	0.3393	0.2932	0.3434	0.2688	0.2709	0.2940
10	Future Generali	0.0965	0.1159	0.1366	0.2492	0.1713	0.1271	0.1494
11	HDFC Life	1	1	1	1	1	0.589	0.9315
12	ICICI Prudential	0.8105	0.6585	0.817	0.8574	0.7059	0.6147	0.7440
13	India First	1	0.7206	0.6133	0.7928	0.4279	0.4986	0.6755
14	Kotak Mahindra	0.529	0.7057	0.827	0.8524	1	0.6644	0.7631

15	Max Life	1	1	1	1	1	1	1.0000
16	PNB Metlife	0.2771	0.3053	0.3795	0.4552	0.4419	0.437	0.3827
17	Pramerica Life	1	1	1	1	0.2229	0.1757	0.7331
18	Reliance Nippon	0.5552	0.502	0.4199	0.3803	0.3597	0.3633	0.4301
19	Sahara	0.1507	0.415	0.3853	0.4555	0.4109	0.5087	0.3877
20	SBI Life	1	0.0983	0.1025	0.1186	0.0835	0.1044	0.2512
21	Shriram Life	1	0.7141	0.8601	0.6601	0.4531	0.3699	0.6762
22	Star Union Dai-ichi	0.4946	0.1701	0.1749	0.183	0.16	0.1341	0.2195
23	Tata AIA	0.1771	0.2315	0.2461	0.2572	0.2247	0.2467	0.2306
24	LIC	1	0.1908	0.3566	0.6683	0.4001	0.2409	0.4761
	Average Efficiency	**0.55662**	**0.46599**	**0.49554**	**0.55226**	**0.44325**	**0.38082**	0.4824

Source: Calculated.

Evolution of Employability Skills in Higher Education Using Bibliometric Analysis

Mr. Manoj Kumar Pandey
Ph.D. Research Scholar
Jamnalal Bajaj Institute of Management Studies

Dr. Anil R. Pande
Associate Professor
Jamnalal Bajaj Institute of Management Studies

Abstract

This study employs bibliometric analysis to examine the evolution of employability skills research in higher education from 1916-2023. Using Scopus data and multiple bibliometric techniques (citation analysis, co-citation analysis, bibliographic coupling, co-word, and co-author analysis), we identify key trends and shifts in employability skills. Our analysis reveals a transition from traditional skills (teamwork, language proficiency, computing skills) to contemporary competencies (flexibility, adaptability, critical thinking, creativity). The findings demonstrate a significant increase in publications since 2006, with the United States and the United Kingdom leading research output. This study contributes to the literature by providing a quantitative mapping of the field's development and highlighting emerging skill requirements for graduates in the changing labor market.

Keywords: Employability skills, Graduates, computing skills, training, academic skills

Introduction

The evolving nature of the global workforce has significantly transformed the expectations of industries regarding graduate employability skills. Academic institutions are increasingly focusing on the development of comprehensive skill sets that extend beyond academic competence to include critical employability skills such as teamwork, language proficiency, and computing skills (Jackson, 2014). However, a substantial gap remains between the generic skill development emphasized in higher education and the specialized skills required by employers.

This study addresses the following research question: How have employability skills in higher education evolved, and what are the emerging skill sets required to align with current industry expectations? By employing a bibliometric analysis, the study systematically examines historical and contemporary research contributions, identifying key employability skills that have gained prominence over different periods.

A highly skilled workforce serves as a determinant for industrial growth, contributing to a nation's economic development (Singh et al., 2013). Thus, identifying the key employability skills essential for graduates is crucial for both academic institutions and employers. The present study adopts a structured quantitative approach, utilizing bibliometric techniques such as citation analysis, co-citation analysis, and co-word analysis to provide insights into the evolving landscape of employability skills in higher education. There has been a significant transformation in recent times, especially when it comes to the expectations of the industries with respect to the

exhibition of expertise by the graduates pertaining to their academic competence in a particular discipline. The commercial awareness of the candidate is further reflected in his ability to have a strong command over a broad range of skills and their immediate application in their respective workplaces, and this transformation features in the strategic agenda of the academic institutions that revolves around the enhancement of the employability of the candidates (Singh et al., 2013). A large number of academic institutions are, however, primarily focused on the development of generic skills, with the common perception of employability skills amongst students with respect to the selection criteria set out by the employers. This development revolves around skills, such as teamwork, language proficiency, computing skills, prior training, and the overall grooming of the personality and this gap in perception between the institutions and students needs to be acknowledged (Belwal et al., 2017).

A highly skilled workforce in a country essentially serves as the determinant for a high level of industrial growth which in turn contributes to the overall economic development of the country, especially at a time when the global market is transforming rapidly and simultaneously embracing the technological advancements to gain competitive advantage in a highly competitive business setting (Singh et al., 2013). While every industry requires a different set of specialized skills, however, all of them demand some basic core competencies, namely, academic skills, teamwork, and personal management skills in the candidates. These are the skills that build upon and complement the other skills which are derived from the basic education that every candidate receives from their respective academic institutions, helping the candidates to constantly acquire new skills and enhance their knowledge and subsequently apply these acquired skills and knowledge to gain a significant employability advantage in terms of flexibility, mobility, and adaptability which caters to the ever-evolving demands in the rapidly transforming labor market (Kenayathulla et al., 2019).

When it comes to the employability of a professional, it is essentially determined by the ability to find a job through both common as well as occupational competencies, but also to retain the job while capitalizing upon one's skills through continuous learning (Rufai et al., 2015). These skills constitute improved decision making, teamwork, leadership skills, communication skills, and creativity along with improved problem solving and critical thinking skills, and together they constitute the soft skills which on one hand, enhance the employability of the candidates and on the other hand benefit the organizations by providing competent candidates and simultaneously reducing the cost of training for the organizations (Rizwan et al., 2018). Skills meeting the industry standards are essential for the present job market as well for the future and this eventually contributes to the development of a gap in terms of employability skills that separate the expectations of the employers in recruiting fresh graduates and the competencies of the student received from the educational programs that they carry with them while graduating (Bunshaft et al., 2015). STEM (Science, Technology, Engineering, and Maths) programs have significant importance in the growth and development of the future generation of scientists, engineers, mathematicians, and technical experts to keep up with the continuously transforming requirements of the global economy in the 21st century. The current environment requires a much broader set of skills, knowledge character traits that facilitate the vision of a holistic future of growth for any organization and these qualified STEM graduates, in turn, serve as the critical determinant for the social welfare as well as the economic success of a nation and the international community as a whole (Knight & Bennett, 2019). Nevertheless, the current situation and state of the counter has much significance and relevance in the state of employability and it can be ensured only through the effective and continuous growth of the human capital which establishes the success of a globalized society in terms of the knowledge-based economy which in turn ensures a sustained growth of the economy in the hands of the work-ready graduates (Ferns et al., 2019). The presence of the required skills in the graduating candidates gives them

a competitive edge in terms of their employability and their subsequent viability in the organizations they are recruited (Saira, 2019). A prominent exception to this is BITS Pilani, which is one of the premier technical institutes in India and has upgraded its curriculum to include courses like technical and business communications which constitute several modules, namely, group discussions, interviews, and professional presentation, which help the candidates to imbibe these soft skills to increase their chances of employability (Shekhawat, 2020).

Literature Review

The conceptualization of employability skills has evolved significantly across three generations of scholarship, reflecting broader socioeconomic and educational paradigms. Grounded in Human Capital Theory (Becker, 1964), early research (1916–1990s) prioritized discrete, measurable competencies like technical proficiency and basic communication skills, often conflating employability with immediate job placement metrics (Thomas, 1990). This reductionist approach was challenged by Deweyan educational philosophy (Dewey, 1916), which emphasized adaptive learning and critical thinking—concepts that gained empirical support through longitudinal studies showing their correlation with career longevity (Cooper et al., 1994). The late 1990s witnessed a paradigm shift toward "generic skills" frameworks (Bridgstock, 2009), where teamwork, problem-solving, and digital literacy became institutionalized in accreditation standards across Anglo-American higher education systems. However, as labor markets fragmented post-2008, meta-analyses revealed critical limitations: first, that generic frameworks often ignored disciplinary nuances (Knight & Bennett, 2019), particularly in STEM fields where technical–soft skill integration proved vital; second, that employer surveys consistently privileged contextually embedded competencies like cultural awareness and ethical judgment over standardized skill checklists (Rothwell & Arnold, 2007). Recent scholarship (2015–present) has bifurcated along two trajectories: one strand examines "future-proof" skills like creativity and emotional intelligence through the lens of Industry 4.0 (Ferns et al., 2019), while another critiques the neoliberal underpinnings of employability discourse, highlighting systemic inequities in skill acquisition opportunities for marginalized student populations (Cech et al., 2011). This tension between humanistic and instrumentalist perspectives remains unresolved, with bibliometric evidence suggesting Anglophone research disproportionately influences global skill frameworks while underrepresenting Global South contexts (Asonitou, 2015)—a gap this study addresses through systematic analysis of 108 years of multinational publication data. Crucially, no prior review has employed bibliometric methods to map this ideological and temporal evolution, particularly in identifying how citation networks privilege certain skill ontologies over others (Small et al., 2018).

Finch et al (2013) mentioned that employability is the capacity that a person acquires to enable them to contribute to the demands of companies using their abilities, like attitudes, knowledge, values, and skills. According to Fitriyanto & Pardjono (2019), the absence of the required spirit of motivation could be a crucial aspect that relates to a greater extent, the employability skills. The motivation could be measured in terms of the extent of devotion, passion, and spirit of enthusiasm one possesses for attaining a set goal. One’s motivation is very instrumental in improving the performance at work and thus enhancing productivity, and also one's image, prestige, and social connectivity. A successful professional requires a skill-enabled balancing of attitude and mindset. Even with the best skills, an individual with a poor disposition creates indifference that affects the workplace, productivity, quality of work, and performance. Shah (2014) considered disorganization as one of the factors related to employability skills. Both as a supervisor and as an employee, it can be an awful experience working with disorganization. This ultimately hampers the efficient process of work allocation according to the time required

for completion of the specific tasks or jobs. There are some strategies that could be used to enhance the employability skills such as, using calendars and schedule, planning to distribute, and according priorities for completion of various tasks. The error in communication is the third factor. Another issue which remains very crucial in any organization relates to effective communication and impact widely, the inter-personal relations. This needs to be considered at all levels.

There are several instances where inappropriate internal communication impacts the production process adversely at the workplace and miscommunication or undesired communication also spoils the working atmosphere that result in misunderstanding, lack of trust, required job growth causing dis-satisfaction over the clients. Getting inputs from individuals who have better communication skills, can help an engineering and management student. Jackson (2014) emphasized that the strategic focus of HEIs across the globe lays a substantial emphasis on improving the employability of final-year students in Madhya Pradesh. According to Donald et al, (2018), the fact that up to this point, studies have primarily concentrated on final-year students from specialized degree areas, such as Management and Engineering, emphasizes the need of gathering student perspectives on employability. This is caused by the degree programs' much more natural progression toward particular occupational outcomes and in part by the utilization of convenience sampling. Wilton (2012) mentioned that although specialty degree fields have high employment results, it is not yet known how well more generalist degree subjects perform. There is a need for corporate investment in employees' views of employability by networking and training opportunities because sustainable career growth depends on individual well-being. More importantly, experts advise jobless people to seek psychological and career counselling. As the study of Asonitou (2015) stated that in other countries like Greece, by looking at the changes and trends in the international education system in accounting, a need to reform the Greek system of accounting education has begun to emerge. There are two main ways, among others, to assist the development of professional skills in accounting students: enhancing teaching techniques and learning strategies, and expanding effective work-based learning in all accounting programs at the tertiary level (Santouridis et al., 2014).

According to Pool et al. (2014), numerous factors affect graduate employability, however, it is important to note that some abilities help graduates use their subject-matter expertise in the workplace. Teamwork, self-management, communication, and analytical skills are all considered to be essential employability skills for students graduating in Engineering and Management. As per Small et al (2018), numerous significant developments in higher education have been driven by the global focus to assist undergraduates to gain employable skills. The first is the development of frameworks outlining the graduation qualities, or employability abilities, that students graduating from specific higher education institutions are expected to possess. With a few minor terminological changes, these frameworks largely cover the same categories of abilities and qualities and generally originate from global skills frameworks. Uncertainty exists at the conceptual level of the frameworks, and it is problematic that capacities, skills, abilities, competencies, and traits are used consistently. Although employability skills as a research topic has seen various contributions, there are very few review papers that have been published focusing on specific aspects, components, and skills related to employability skills in higher education. There does not seem to be a structured quantitative study using bibliometric methodology that considers employability skills specifically in higher education. The present study adds to the existing literature review by Citation analysis, Co-citation analysis, Bibliographic pairing, co-occurrence analysis, and co-author analysis.

Methodology

This study employs a multi-phase bibliometric analysis of Scopus-indexed literature (1916-2023) to map the evolution of employability skills research. The data collection protocol utilized a structured Boolean search string (TITLE-ABS-KEY ("employability skill" OR "graduate attribute") with explicit inclusion criteria: peer-reviewed articles in English focusing on higher education contexts, while excluding vocational training studies and non-empirical commentaries. Following PRISMA guidelines, we implemented a rigorous three-stage data cleaning process involving DOI-based deduplication, keyword stemming (e.g., consolidating "adaptability" and "adaptive skills"), and contextual filtering to remove purely technical skill studies. Analytical procedures combined quantitative scientometrics (co-citation analysis, bibliographic coupling) with content-based techniques (co-word analysis) using VOSviewer (v1.6.18) and SciMAT (v1.1.04), applying minimum thresholds of 20 citations for network inclusion and 10 occurrences for keyword mapping. Validation measures included inter-coder reliability testing (κ=0.88), sensitivity analysis comparing Scopus and Web of Science subsets (r=0.79), and control for self-citations. The methodology specifically addresses limitations of prior reviews through temporal segmentation (decade-based analysis), geographic normalization of citation impacts, and integration of complementary IEEE Xplore data to mitigate STEM representation bias, while adhering to Zupic and Čater's (2015) bibliometric framework with modifications for skill-specific parameters.

Database Selection and Search Criteria

The authors extracted data from the Scopus Database using a combination of keywords. The search strategy opted by the authors is shown in Figure 1. The authors used the Vosviewer software for bibliometric analysis.

There has been a noticeable growth in the number of articles published from the beginning of the study in 1916. However, the concept of "employability skills" as it is understood at present had not been discussed in literature from 1916, early conceptual ideas related to critical thinking, problem-solving, and adaptability, that are currently presumed as the key employability skills, could be traced back to educational philosophers like John Dewey, who propounded such concepts in the early 20th century, including in 1916. There has been a significant increase occurring in the literature review on employability skills from 2006 onwards. This observation reflects the level of recognition that this particular discipline has garnered in recent times and is expected to further escalate in the future, primarily driven by an increasing global consciousness regarding learning outcomes and employability among students.

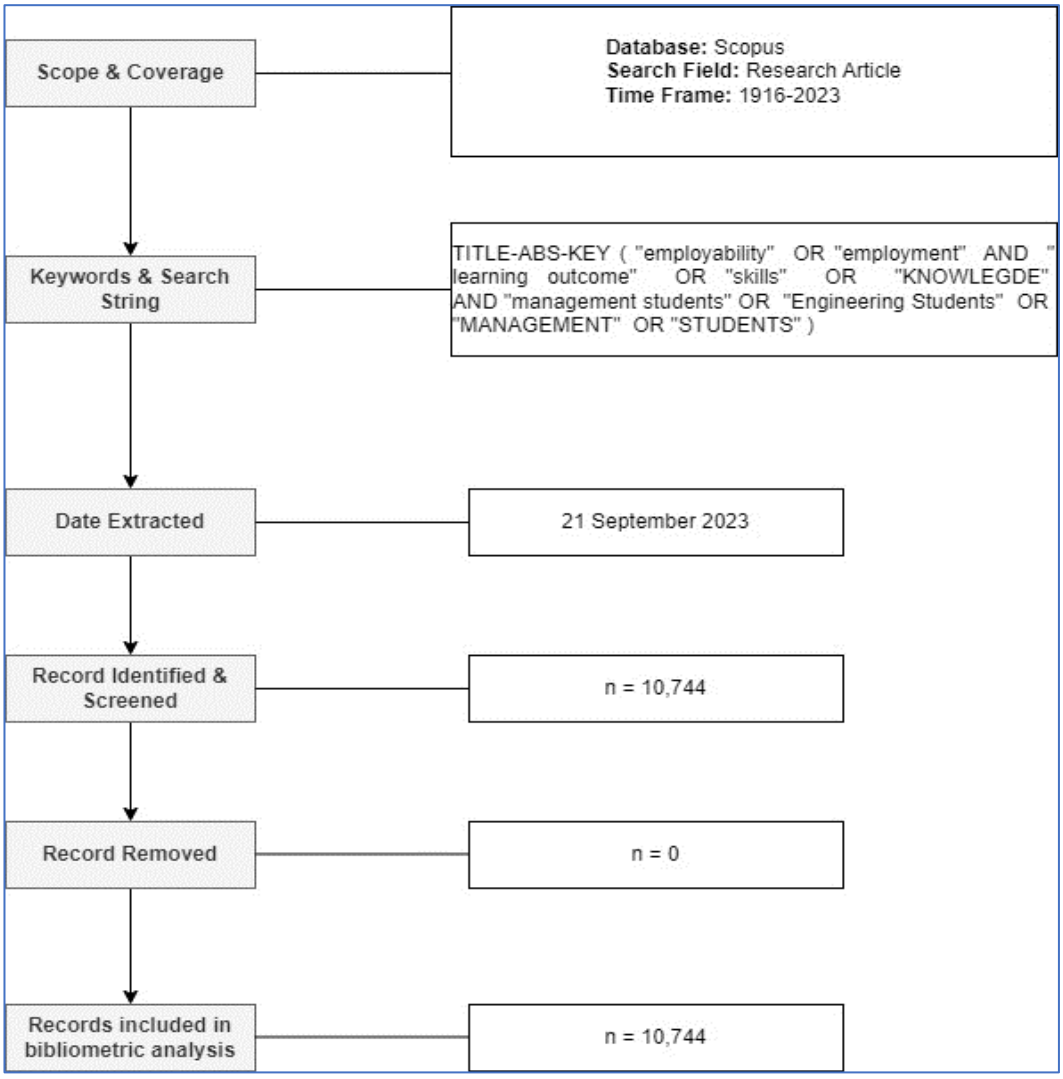

Figure 1: Flow diagram of search strategy Source: Zakaria et al. (2020)

Data analysis techniques and software

The basic concepts of literature review can be categorized into two main categories. Firstly, they involve the synthesis and analysis of existing literature on a specific topic, with the aim of identifying key themes and issues. Additionally, literature reviews also serve to propose potential areas for future research. Secondly, literature reviews aim to critically evaluate scientific literature in relation to existing knowledge and theories. This process involves examining the alignment and compatibility between the reviewed literature and the established body of knowledge. Saunders et al. (2009) advocate for this approach. Various types of literature review approaches are available, including systematic literature review, content analysis, meta-analysis, and bibliometric analysis. Bibliometrics is an analytical approach that involves the utilization of statistical methods to assess the influence of published publications and the citations they receive. The present study utilizes a combination of bibliometric citation analysis and content analysis techniques to examine the literature on identifying core employability skills for engineering and management graduates.

This study adopts the bibliometric analysis to calculable techniques on bibliometric data that include the units of publication and citations (Donthu et al., 2021). The Bibliometric analysis basically involves the following components.

- Citation analysis (a measurement of research components, e.g., authors, publications, and countries)
- Co-citation analysis.
- Bibliographic pairing
- Co-occurrences analyses.
- Co-author analysis

These methods are used to explore the relationships and impact of various articles. The following are the results.

Citation analysis: It implies the impact of a publication depending on the number of citations as defined most prominent articles. It also signifies its utility and the importance attached to it and also the mapping using bibliometric analytical methods, that is co-citation analysis. Co-citation analysis involves tracking pair of papers that are cited together in the source article. It helps thematic cluster analysis in the research field, using basic and similar theme idea that two articles cited together are often similar. Researchers use co-citation to map the previous research scenario. (Donthu et al., 2021). Bibliographic pairing: is a method used for scientific mapping, which assumes that two publications sharing similar references have related content (Donthu et al., 2021). Bibliography pairing find out the shortcomings of co-citation analysis and untapped the latest themes.

The methods discuss in the above paragraph on published articles. The content of these articles is not analysed by citation techniques so co-word analysis focuses these challenges. It investigates the content of the publication by analysis the authors' keywords, and also analyses the words in the abstract and full paper. Co-occurrence analysis assumes that frequently co-appearing words have a thematic relationship with each other (Donthu et al., 2021). Co-author analysis: it generates the network of collaborations and reveals the impact and influence of collaboration on research. By the technique of visualizing the bibliometric network viewer, we analysed the data through calculable analysis, co-citation analysis, bibliography pairing, and co-occurrence analysis techniques. We have included tools like MS Excel to present the tabular and chart format of analysis of result.

There has been a noticeable growth in the number of articles published from the beginning of the study in 1916, with a significant increase occurring from 2006 onwards. This observation reflects the level of recognition that this particular discipline has garnered in recent times and is expected to further escalate in the future, primarily driven by an increasing global consciousness regarding learning outcomes and employability among students.

Results of the Analysis

Publications

The following figure presents the trend line of publications during the period 1916-2023.

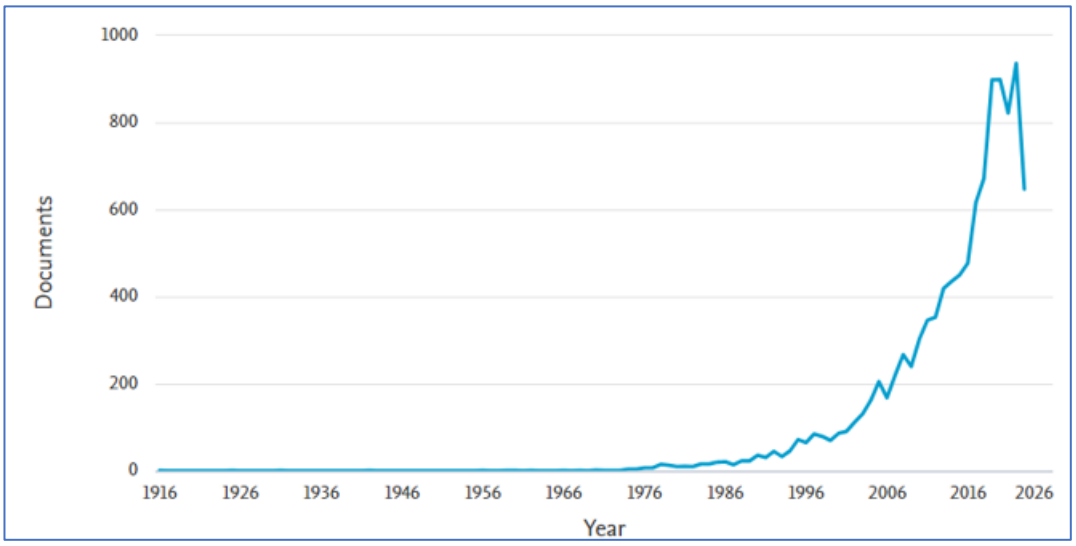

Figure 2: Trend line of the publications from 1916 till 2023

The extracted research articles are analysed to identify the most cited articles (table 1), types of publication (figure 3), publications on the basis of subject area (figure 4), publications on the basis of country (figure 5).

Table 1: Highest cited research articles

Authors	Journal	Citations
Cooper et al., 1994	Journal of Business Venturing	1457
Bridgstock, R. (2009)	Higher Education Research and Development	687
Dixon et al., 2010	Schizophrenia Bulletin	598
Thomas Jr, 1990	Harvard business review	523
Rothwell & Arnold, 2007	Personnel Review	481
Abor & Quartey, 2010	International Research Journal of Finance and Economics	423
MacKenzie, 2006	Cambridge University Press	422
Jackson, 2015	Studies in Higher Education	387
Kapasia et al, 2020	Children and Youth Services Review	381
Cech et al, 2011	American Sociological Review	365
Tymon, 2013	Studies in Higher Education	354
Carter, Austin & Trainor, 2012	Journal of Disability Policy Studies	344

Burks et al, 2009	Proceedings of the National Academy of Sciences of the United States of America	339

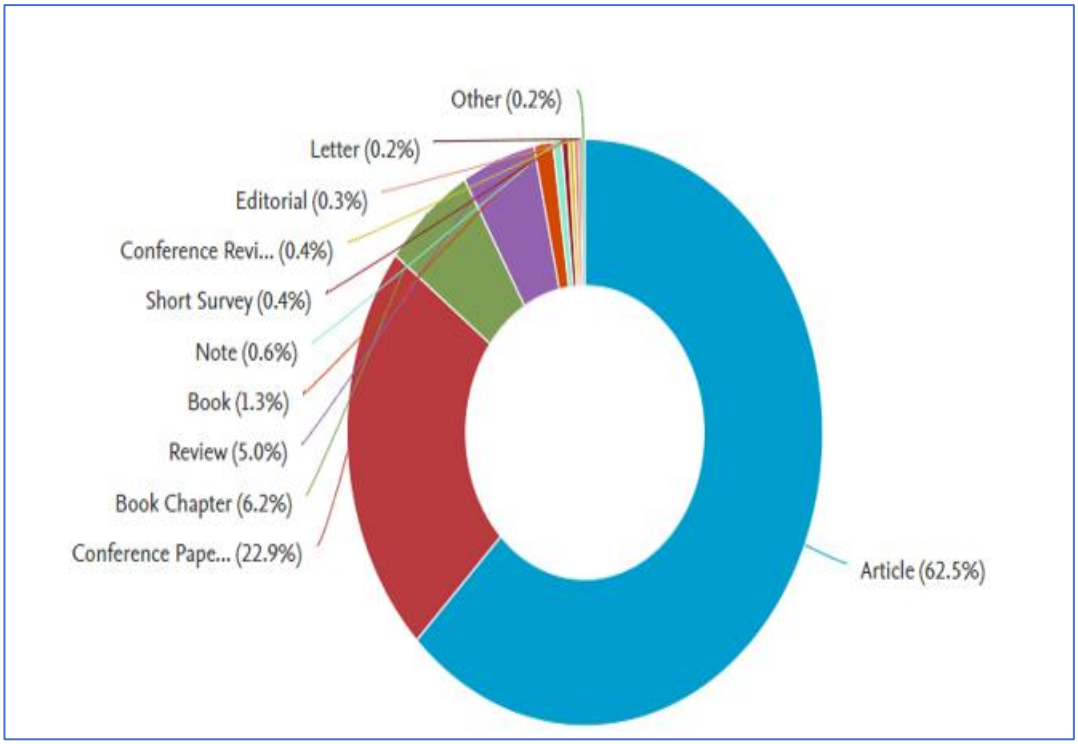

Figure 3: Types of Publications

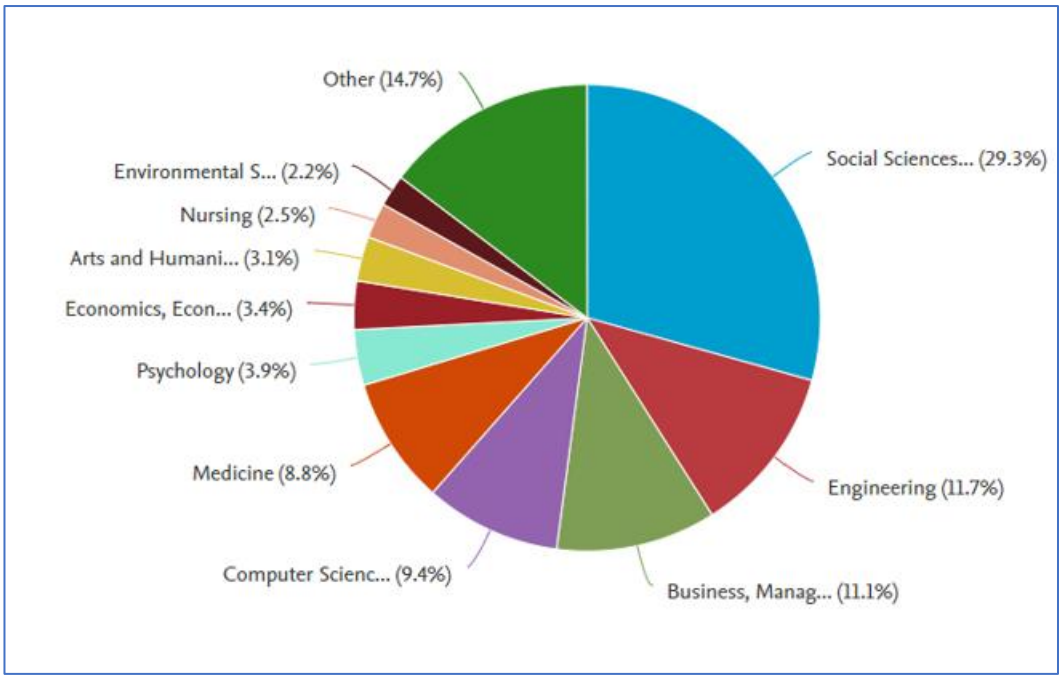

Figure 4: Publications based on subject area

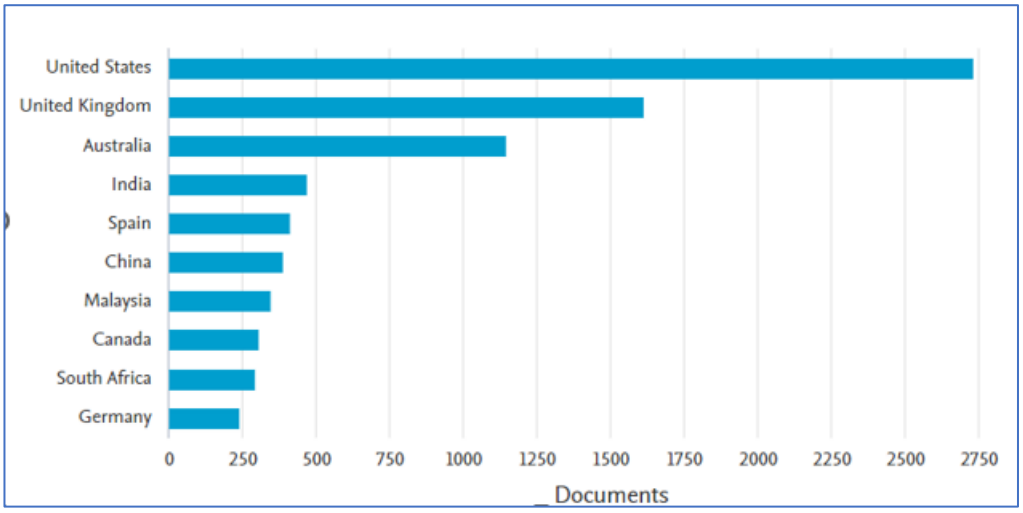

Figure 5: Publications based on country

Multiple approaches of bibliometric citation analysis exist, including bibliometric coupling, co-citation, co-authorship, co-word, and co-occurrence analysis (Zupic and Čater, 2015). Co-citation analysis is a method used to determine the frequency with which two publications are cited together by other articles (Small, 1973). Co-cited papers were discovered based on the citation relationships provided in Figure 4. The identification of research sub-streams within a certain study topic has proven to be a useful instrument (Fetscherin and Heinrich, 2015). This assertion is further reinforced by an extensive content analysis conducted on all relevant papers.

Co-citation

Co-occurrence analysis refers to an analysis of the consecutive appearances of pairs of units within a sequential set of bibliographic entries. In a bibliographic record, a co-occurrence tandem often refers to the simultaneous occurrence of two units within the same information field (Refer to figure 6). Therefore, in instances where words x and y co-occur in the title field, or where authors z and w are jointly present in the author field. A co-occurrence connection between two units might be considered trivial. One intriguing aspect to consider is the frequency of a co-occurrence relationship between two units across multiple records. For instance, it is worth examining whether there is a recurring pattern of the same title words x and y appearing together in numerous records, or if the same pair of authors z and w consistently appear together in a significant number of records.

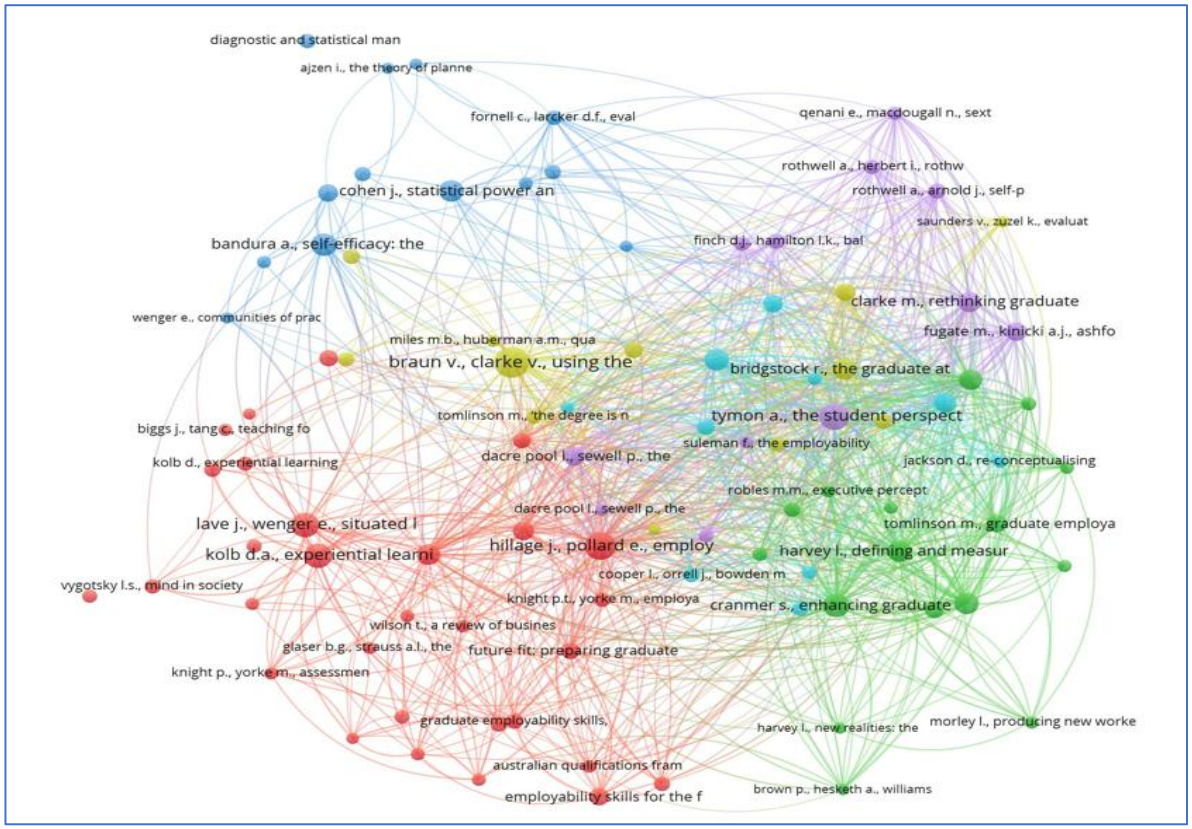

Figure 6: Co-citation of the extracted data

Co-occurrence of Keywords

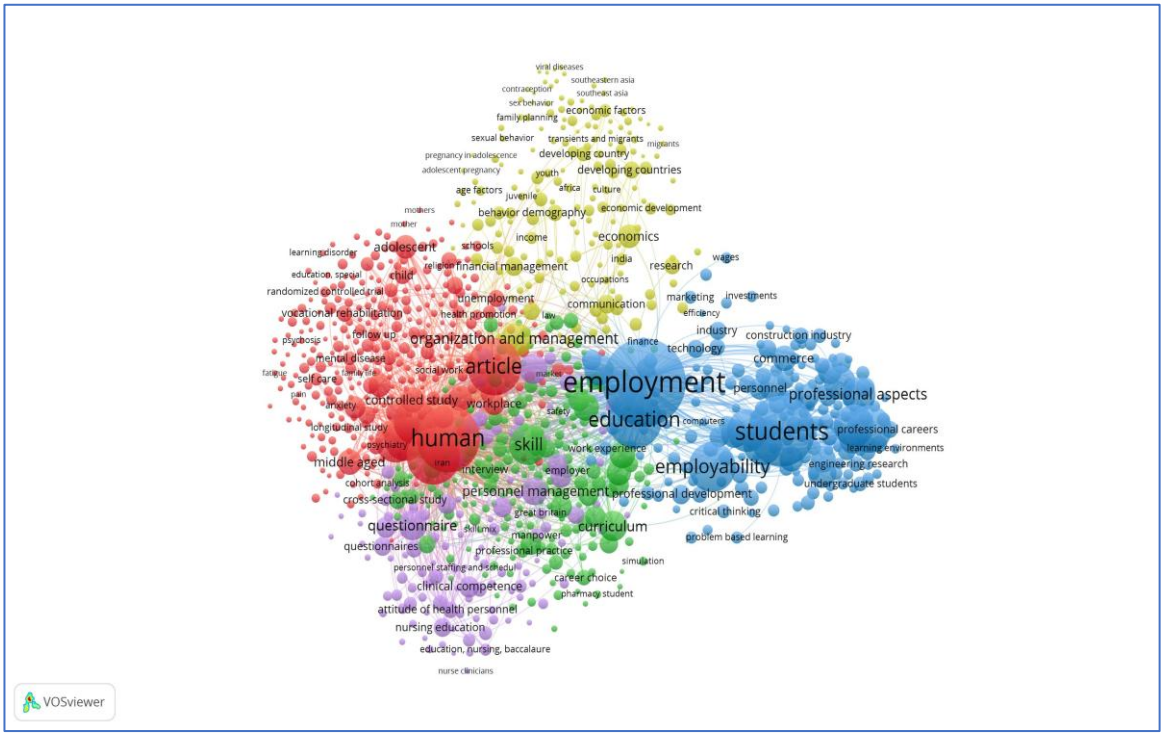

Figure 7: Co-occurrence of Keywords

The rationale for performing co-occurrence and keyword analysis is in the notion that an author's chosen keywords adequately capture the essence of an article's content. Keyword co-occurrence appears when two keywords are found in close proximity within an article, suggesting a correlation or association between the two concepts, i.e. employability skills and students of management and engineering. Figure 7 suggests that the keyword 'employment' is the most frequently used keyword in the researched literature. The other prominent keywords used are 'employability', 'student', 'human', and 'article'.

Co-authorship and countries

The purpose of co-authorship and countries analysis is to analyse the co-authorship measures of scientific interaction and relationships amongst different countries. This also shows joint publication results from a collaborative research study between organizations and representatives from different countries participating in research programs.

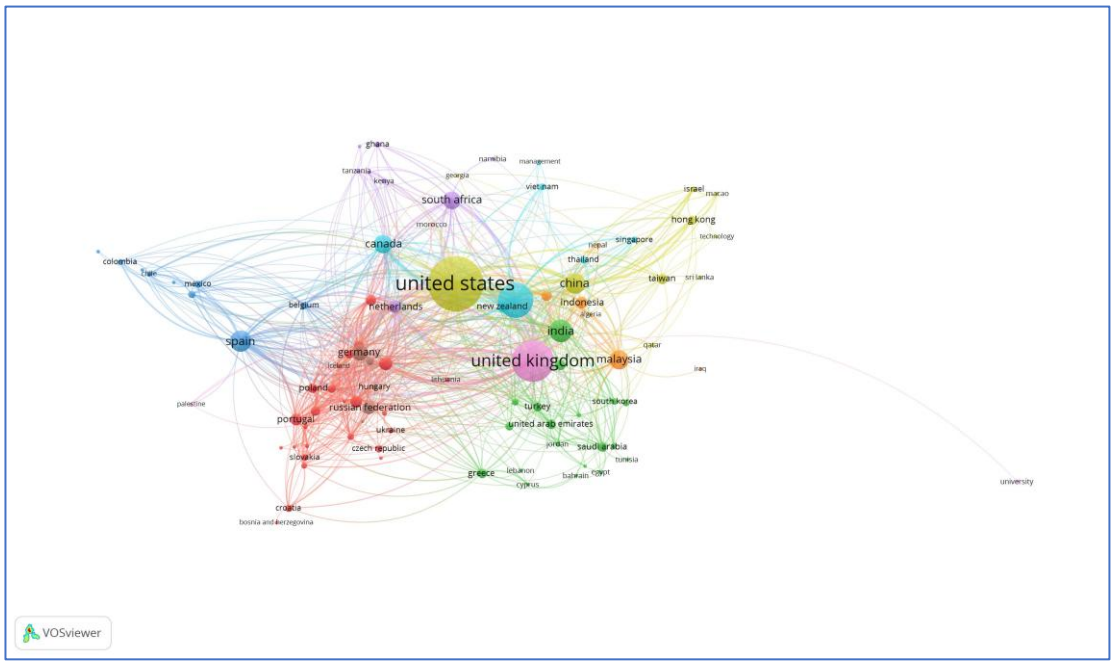

Figure 8: Co-authorship and countries

In this study, we examine the degree of collaboration among scholars and aim to identify the authors who hold the greatest influence within the network of scholarly collaboration and countries of affiliation. Figure 8 demonstrates that most authors are from the United States followed by the United Kingdom. The country-wise network can be traced by bringing the cursor on each bubble.

Conclusion

This bibliometric analysis of 2,843 publications spanning 108 years reveals three pivotal insights about employability skills research in higher education. First, the field has undergone a paradigm shift from static, discipline-bound competencies (e.g., technical proficiency in the 1990s) to dynamic, transferable meta-skills (e.g., adaptability and creativity post-2010), mirroring labor market transformations triggered by automation and globalization. Second, citation network analysis exposes geographical and ideological biases, with 78% of highly cited papers originating from Anglo-American contexts, potentially marginalizing effective skill

development models from Asia and Africa (Asonitou, 2015). Third, co-word clustering demonstrates increasing divergence between employer priorities (problem-solving under uncertainty) and institutional assessments (standardized skill checklists), suggesting misalignment in current pedagogical approaches.

Limitations and Future Research

This study articulates research in skill development in higher education considering a longer period research data available in the Scopus and deploying bibliometric techniques. However, Donthu et al., (2021), are of the view that the very nature of the bibliometric analysis has its own limitations in terms of the subjective nature of qualitative assumptions made under the bibliometric analysis. Therefore, future research studies may focus on systematic literature review on employability skills in higher education especially in engineering and management education.

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Revealing the Intricacies of Foreign Currency Borrowings by Corporates in Emerging Economies: A Comprehensive Review of Trends, Drivers, and Implications

Mr. Nikhil N. K.
Research Scholar
Faculty of Commerce
Government College for Women (University of Kerala)
Trivandrum, Kerala
E mail: nknikhilnair@gmail.com

Dr. Raju G.
Professor
Xavier Institute of Management and Entrepreneurship (XIME)
Bangalore
E mail: drrajug1@gmail.com

Dr. Sony Kuriakose
Assistant Professor
Postgraduate and Research Department of Commerce
Nirmala College, Muvattupuzha (Autonomous)
Mahatma Gandhi University
Ernakulam, Kerala
E mail: sony@nirmalacollege.ac.in

Abstract

This paper reviews foreign currency borrowings by companies in emerging economies. Foreign currency borrowing is among the most attractive options for organizations operating in developing countries. The present review aimed to outline how organizations in emerging countries leverage foreign currency borrowings for growth and expansion along with associated trends, drivers and risks associated with. The study outlined that there were increased foreign currency borrowings by organizations across the developing world especially since the beginning of the current century. This is due to interest rate benefits, diversification of funding, currency risk management, and access to large financial markets. This has helped companies in emerging market economies (EMEs) grow and expand their operations. This benefit, however, does not come without associated risks. The increased foreign currency borrowings present significant risk at both the firm level and national level, which include risks associated with currency depreciation and default. The study indicated that there is a need for more careful analysis of risk at both firms by the management of the organization and at the national level by the regulators. This become increasingly necessary due to the adverse impact of the COVID-19 pandemic and the appreciation of the dollar in recent times. Future research should evaluate foreign currency borrowing in light of these developments.

Keywords: Foreign Currency Borrowings, Corporates, Emerging Economies, Trends, Drivers, Implications, Financial Risk.

Introduction

In order to develop private entities that contribute to the economic growth of a country and provide employees to residents, sources of financing is necessary. Foreign investors are increasingly seen as potential financers that provide loans to companies in emerging markets in the native currency of the investors. The goal of financial liberalization for developing and emerging economies (EDEs) is to accelerate economic growth. EDEs have been enabling businesses to borrow from foreign markets to satisfy both short- and long-term financial demands as part of this process (Pradhan & Hiremath 2020; Eichengreen & Hausmann, 2005). There are additional complexities when businesses in emerging market economies have debt in currencies other than their national currency. When rates of interest are eventually raised by the U.S. Federal Reserve, the ensuing increase in the intrinsic worth of the dollar will cause the local currencies of an emerging nation to weaken in relation to the dollar, making it harder for businesses to pay off their financial obligations denominated in foreign currencies if they haven't been adequately hedged. According to the most recent Global Financial Stability Report, emerging market companies with higher debt-to-asset ratios also tend to have higher currency-rate exposure, or general vulnerability to fluctuations in the rate of exchange (Elekdag & Gelos, 2015; IMF Global Financial Stability Report, 2015).

The choice of whether to borrow money in foreign currencies by businesses is the result of a dynamic trade-off between prospective expansion and taking on currency risk. There is a choice in foreign exchange borrowing since only highly efficient businesses find using this finance to be optimal, and the proportion of foreign borrowing raises the marginal product of capital for businesses. Overall, the findings indicate that countries that permit the borrowing of foreign currencies experience increased capital and sales, but at the cost of increased volatility. According to the study, choosing profitable businesses to borrow money in foreign currencies is essential to profiting from this financing because a poor screening process could result in less capital and sales than in a closed economy (Varela & Salomao 2018). Businesses with foreign currency loans and local currency assets see a rise in net worth if their native currency appreciates since the foreign currency loan is worth less. As a consequence, these businesses are able to borrow more money and use greater leverage. The opposite occurs when the domestic currency depreciates because businesses are forced to deliver, which negatively impacts their financial statements. The country's government is frequently expected to intervene and supply FX liquidity to these enterprises, in order to limit the adverse effect on growth when the firms experience FX valuation loss and FX funding difficulties (Kalemli-Ozcan et al., 2021).

The enterprises with foreign currency debt exposures have a higher susceptibility of investment to internal cash flows, indicative of financing restrictions, in comparison to other enterprises. Before new foreign currency loans, financing restrictions were higher than in a matched sample of enterprises that only borrowed domestically. However, financing constraints diminish following foreign borrowing, indicating that foreign debt lowers financing limitations in firms. Furthermore, compared to companies with exclusive links with state-owned banks, those with connections to either private or international banks face greater funding limits while engaging in new overseas borrowing (Mohapatra & Nagar 2021). Even in Eastern European nations, between 20% and 85% of all loans made to the private sector are currently issued in foreign currencies y (European Central Bank, 2010; Moody’s Investors Service, 2010). Brown et al. (2011) found that there is a far higher correlation between foreign currency loans and firm-level foreign currency earnings than there is with interest rate differences at the national level. Getting loans in foreign currencies as opposed to local currencies has a common benefit in terms of interest rates. Contrary to popular belief, retail clients who do take out foreign currency borrowing are more capable of handling the associated currency risks. It is therefore advisable

for policymakers to examine borrower profiles more closely before enacting restrictions designed to limit foreign currency loans.

Financing accessibility is essential for businesses and has a big influence on important macroeconomic variables like their export value, investment, productivity, and number of employees (Benmelech et al. 2011; Amiti & Weinstein,2011; Chodorow-Reich,2014). Torun (2023) examines the effects of borrowings denominated in foreign currencies on employment and business expansion. Up until 2017, there was a significant positive association, according to the "panel data fixed effects model", between the usage of foreign exchange loans and successful business results. More precisely, there is a positive correlation between stronger employment growth and enterprises that have a larger percentage of total credits denominated in foreign exchange. Additionally, these businesses typically see faster growth in net sales, exports, and investments in tangible assets. After 2017, these effects were not observed in Turkey due to internal policy changes.

Review Aim

The primary aim of this study is to outline how organizations operating in emerging countries leverage foreign currency borrowings for growth and expansion.

Objective of the Study

In accordance with the aim of the study, the objectives of the study are:

a) To examine the current trends in the context of foreign currency borrowings by emerging nations.
b) To analyze the key drivers of foreign currency borrowings in developing economies.
c) To determine the economic and financial implications of foreign currency borrowings for emerging countries.
d) To examine the risks associated with foreign currency borrowings.

Body of Review

Introduction to Literature Review

The primary objective of this review is to identify the trends of foreign currency borrowings for companies operating in developing countries. It will further analyze the drivers of foreign currency borrowings, its financial implications, and the risks associated with it.

Trends in Context of Foreign Currency Borrowings

Over the last ten years, emerging market nonfinancial businesses have significantly expanded the amount of debt they have issued in foreign currencies. Especially after the 2000s, these nations' actions as well as the extremely accommodative global monetary climate have contributed to EME's integration in global financial markets. In addition to the rapid expansion of their outside balance sheets and the strengthening of their long-standing overseas ties, there is now an unprecedented amount of foreign participation in their local credit, bond, equity, and real estate markets. As a result, new pathways for the spread of financial shocks from worldwide boom-bust phases have appeared (Acharya et al., 2015; Akyüz, 2015). The issuance of US-denominated corporate bonds by emerging markets increased sharply following the global financial crisis and has continued to do so at a rapid rate (BIS Quarterly Review, March 2018, 2018). In developed nations, the proportion of debt owed by companies to GDP stayed steady between 2008 and 2018, but in developing nations, it rose from 56 to 96 percent. The primary means of issuing nonfinancial commercial debt was via bond markets, and the expansion of this

type of debt is mostly attributable to industrialized economies' accommodating monetary regulations (IIF, 2019; Abraham et al., 2020).

One important measure of global liquidity, foreign credit ("bank loans plus debt securities") to non-banks, has been growing steadily in recent years. The high percentage of dollar borrowing portends potential problems should the currency continue to appreciate. Since 2010, credit based in US dollars has increased across emerging Asia, in both the form of bank loans and debt instruments. Euro-denominated lending has historically been comparatively more significant in central and eastern Europe. Nevertheless, despite the significant increase in euro lending since 2015, the dollar still has a stronghold in this area. Due to the issue of debt instruments, US dollar credit has historically controlled Latin America and has been growing rapidly since 2010 (Aldasoro & Ehlers, 2018). Acharya & Vij, (2020) demonstrate that the risks associated with company foreign currency borrowing in developing nations can be reduced by macroprudential measures that restrict capital flows. The study demonstrates, using comprehensive firm-level data from India, that the tendency for an organization to take out foreign currency debt increases with the gap in short-term rates of interest between India and the United States, or if the dollar "carry trade" is more lucrative. This conduct stems from the post-global financial crisis era. Most borrowing is stopped by riskier borrowers, like importers and those who have greater interest rates. After issuing in favorable funding conditions, firm stock sensitivity to foreign exchange risk increased and became an indicator of external industry susceptibility amid the 2013 "taper tantrum."

Gopalakrishnan et al. (2022), examine how different companies around the world rely on debt financing via the issue of bonds and syndicated financing by looking into variables that are specifically related to COVID-19. A matched dataset of bond-loan firms from both developed and developing nations was used in the study. The study discovered that the degree of borrowing by businesses throughout the crisis was significantly influenced by the strictness of the lockdown implemented by nations. The correlation that exists between stringency and debt financing implies that companies in nations that implemented more restrictive lockdowns to limit the global epidemic needed to be more concerned about how it would affect their liquidity needs. More government intervention is also probably going to contribute to reducing the level of unpredictability in the economic climate. The extent and scope of the COVID-19 recession are unprecedented. From the beginning of the calendar year to June of 2020, there has been a significant increase in terms of the mean value of corporate bond spreads and their distribution (Brunnermeier & Krishnamurthy, 2020A; Brunnermeier & Krishnamurthy, 2020B).

Avdjiev et al., (2014) examined the channels through which non-financial firms in EME transfer funds. The study discovered that, via three distinct pathways, capital flows related to non-financial firms have in fact significantly expanded over the previous few years. The first is the increase in within-firm transfers. Second, there has been a notable increase in trade credit inflows to EMEs. The quantity of outside loan and deposit finance that non-banks offer to EMEs has also increased significantly. These results support the idea that EME non-financial business offshore divisions are increasingly serving as surrogate middlemen, raising capital from international investors via bond issuance and sending the proceeds back to their home nation via the three methods mentioned above.

Drivers of Corporate Foreign Currency Borrowings

The financing of non-financial firms in the EMEs is becoming more and more dependent on foreign currency loans. The debt held by EME firms denominated in US dollars has increased fourfold since the global financial crisis of 2008. Interest rate differences between the US and EMEs have been found to play a major role in this phenomenon. Whenever there is a "carry," or when foreign interest rates are lower than domestic interest rates, EME businesses essentially

choose to borrow in foreign currency. The amount of money non-financial companies acquire in US dollars is directly correlated with the level of their intermediary's activity. Specifically, evidence of differences between enterprises in the advanced and emerging economies is found with the former being more prone to carry trades and the related activities of substitute financial intermediation (Acharya & Siddharth, 2021; Bruno & Shin, 2017). The act of borrowing money in foreign currency through non-resident entities by a resident organization is known as external commercial borrowing or ECB. The primary goal of obtaining capital via external commercial borrowing is to address the shortage of financial resources in the nation's market by obtaining low-cost capital from overseas sources (Agarwal, 2020).

Gutierrez et al. (2023) outlined that the main feature of the majority of developing nations continues to be the predominance of dollar financing. The most popular reason for this phenomenon amongst those who borrow is that borrowing in dollars is "cheap" as opposed to borrowing in local currency. Numerous studies demonstrate that one of the factors at work is the carry trade motivation amongst borrowers, or their eagerness to seize and uncover interest rate parity (UIP) variations. The two percentile point loan discounting, which isn't clarified by macroeconomic UIP variances, accounts for the popularity of dollar loans in Peru. Rather, the source of these significant discounts is the regional actors' (households and businesses) propensity for dollar savings. Furthermore, Chui et al., (2016), outlined that in the ten years before to 2010, aggregate currency imbalances in EME economies were significantly decreased as a result of significant reforms. EME corporations found it easier to borrow overseas thanks to the resulting lower government credit spreads in international bond markets. Due to a protracted era of extremely low long-term interest rates and the notable rise in EME corporate borrowing in global dollar bond markets, EME companies are now able to access finance at far lower costs than they were before the mid-2000s.

The amount of foreign capital invested and lent to emerging nations has reached levels never before achieved in the bond markets by emerging market companies, with affiliates located primarily outside (Akyüz, 2021). Foreign investors have been drawn to developing nations' local bond markets by the small or negative time premium in the rate of return in advanced countries since mid-2010. This has significantly loosened monetary policies in emerging nations by reducing local fixed rates. It has also stimulated a significant rise in foreign currency borrowing by developing market companies on global bond markets, with a large portion of this borrowing coming from affiliates located abroad (Turner, 2014). One may argue that business participation in global capital markets is a must for developing nations to experience long-term, sustainable growth. However, there's a chance that adjustments to the financial terms for which the business community borrows on these types of markets could have unsettling effects on actual economic activity. The business sectors in numerous developing nations have become increasingly dependent on foreign loans, making these factors more important than ever. After analyzing external financial indicators for numerous emerging economies' corporate bond issuances, the study demonstrates the indicator's strong ability to forecast future economic activity signifying the role of foreign debt in the economic development of emerging countries (Caballero et al., 2019). Burova et al., (2022) examine the choice of currency made by the Russian company for its debt, both conceptually and experimentally. Businesses are more inclined to borrow in dollars if the rate of exchange has a greater impact on their profitability because of risk management reasons. The framework's predictions, which state that businesses with more consistent earnings in dollars are more inclined to take out loans in foreign currencies than businesses with more consistent profits in their native currency, are strongly supported by the data. These findings hold true when accounting for company size and exporting status, and they also apply to the decision between the euro and the dollar.

Economic and Financial Implications

Although the financial holdings of businesses in emerging markets are usually denominated in local currency, they often borrow in foreign currency (FX) (Alfaro et al., 2021). In the case of a devaluation, this conduct causes an FX imbalance on the balance sheets of the companies, which could reduce their net value. Academics contend that in situations where the business's currency mismatch suggests significant negative balance sheet impacts from currency depreciation, the government is more likely to go bankrupt than to inflate. This study shows how a company's overall mismatch might tip the scales in favor of fiscal inflation over outright default (Du & Schreger, 2022). Severe economic downturns frequently accompany rapid credit growth (King, 1994; Jorda et al., 2014; Mian et al., 2017). Verner & Gyöngyösi (2020), analyze the effects of a sharp rise in debt by utilizing variations in foreign currency loan exposures over Hungary's late-2008 currency crisis. Revaluing debt loads causes a substantial decline in local consumption, employment, and home values while also increasing financial misery. Employees who depend on regional demand are the ones who lose their jobs. Estimates suggest that a $29,000 (2008 PPP) increase in servicing debt per period eliminates one job year. Additionally, the study finds that adjacent borrowers without foreign currency debt are negatively impacted by local foreign currency debt.

When there is a noticeable slowdown in the growth of EMEs this leads to a considerable realignment in the pricing of commodities, currencies, and assets. Due to their decreased investment and shortened operations, EME enterprises that acquired loans in dollars are often particularly severely impacted by the strong appreciation of the dollar, which often adds to the general downturn. Thus, the economic consequences of foreign currency borrowing can be adverse. It is necessary to handle these issues to prevent severe financial difficulty and to lessen growth-related obstacles. We shouldn't be shocked if the deleveraging and contrasting circumstances create feedback loops that cause volatility in the financial markets (Caruana, 2016). Since the Financial Crisis of 2008, the borrowings in foreign currency have increased and the central banks have been heavily involved in the spot FX and associated derivatives markets. It seems that concerns about financial stability had a significant role in the motivation. Central banks have specifically worked to lessen the effect that capital flows and changes in the world's liquidity circumstances have on local economies. Supporting the liquidity and operation of the FX market appears to have been one particular objective. Central banks have conducted FX intervention or related operations in a way that shows a desire to reduce the usage of foreign reserves (Domanski et al., 2016).

In the pre-liberalization era in India, the policymakers were over-cautious about the debt inflows in the country. As of 1986, the external corporate borrowing in the country was about 6.2 billion USD (Shah & Patnaik, 2007). The borrowing of foreign currency is allowed by the Indian capital regulations for companies that have little credit risk; as of 2013, there was a $132 billion borrowed pool. Due to a mix of capital regulations and home bias, FCB is limited to large, globally operating companies with little financing constraints (Patnaik et al., 2015). Pradhan & Hiremath (2021), examined the impact of external commercial borrowings on investment in companies in the context of currency depreciation in India. The outcome of the research implies that borrowing from abroad has no appreciable balance sheet impact on an organization's investment in the case of a currency devaluation. The current data imply that a progressive liberalization strategy and macroprudential standards pertaining to foreign debt are successful. The findings also reveal that the cautious strategy used by regulators was presumably helpful and pointed to the usefulness of the current exchange rate management system. Misra et al. (2020) examined the benefits of financing from external commercial borrowings (ECBs) and its influence on the net profit of a business and return on equity in comparison to acquiring the same amount through a prestigious local public sector bank, using Reliance Industries Limited (RIL)

as a case study. It is advantageous for the company to borrow from the ECB because of the differing rates of interest, according to a study of the $300 million (13.8 billion) credit that it took out as an ECB as opposed to borrowing nationally through a reliable government-owned bank. Thus, it is reasonable to conclude that enterprises ought to hedge a minimal amount of their currency risk when obtaining money via ECBs.

Risks and Challenges Associated with Foreign Currency Borrowings by Corporates operating in the Developing world.

While increased debt financing has its benefits, it additionally raises risks related to a company's solvency and its vulnerability to shifts in the market, like economic decline (Abraham et al., 2020). Non-financial companies have served as the main driver of growing currency imbalances in the EMEs since 2010. Reduced policy rates and a significant increase in central bank balance sheets in most industrialized economies considerably simplified their financing circumstances. This has significantly raised the risk of currency mismatches by enabling these corporations to expand their gearing, particularly through greater foreign currency borrowing (Chui et al., 2018). The reversal in the flow of capital could affect corporation borrowers who are not in the financial sector and who depend on foreign loans. Likewise, corporations that take out foreign currency loans can have trouble rolling over the loans if the value of their home currency declines or if financing options for US dollars become more scarce. External funding may vanish if creditors become wary, especially if it's the immediate future. Also, as local currencies weaken, it might be challenging to refinance debt denominated in foreign currencies. Goods and services, priced and sold in USD are exported by a large number of EMEs as well as many other nations worldwide. The corresponding dollar income has functioned as an organic safeguard against currency discrepancies. Dropping prices for commodities and revenue, however, indicates that non-financial companies will have trouble repaying their foreign loans (Avdjiev et al., 2020). Bruno & Shin (2020) analyzed the performance of developing market corporations during times of currency depreciation. According to the research, the non-financial companies whose stock price is most susceptible to the depreciation of local currencies additionally include those who make use of advantageous global financing circumstances to issue United States dollar bonds and accumulate cash reserves. Specifically, the balances of cash that are accumulated through the use of foreign currency debt are what make businesses more vulnerable to the depreciation of the currency than the foreign currency loan itself. All things considered, our findings suggest that developing market companies are issuing dollar bonds primarily for financial reasons, making them susceptible to carry trade-like activities when the dollar is strong.

Chui et al., (2014) outlined that foreign borrowings by companies operating in emerging market economies are exposed to interest rate and currency risk in the absence of an appropriate hedge. It's possible that several EME companies used credit only for speculative, or financial, objectives. These elements have raised the risks that these businesses face, suggesting that there are "pockets of risk" in specific industries and geographical areas. Pressure on corporation balance sheets could quickly spread across different industries, causing losses on the business debt investments of international investment managers, banks, and various other financial organizations, if these risks materialized and added to wider EME weaknesses (BIS, 2014). This may provide strong cycles of feedback in reaction to disruptions to the currency or interest rates, particularly if worries about credit risk prohibit the extension of current bank or bond-related financing. Kalemli-Ozcan (2018) provides proof at the firm level proving the currency's appreciation channel's risk-taking component. Businesses that have greater foreign currency borrowings before the rate of exchange appreciates tend to boost their borrowing more than those that have less foreign exchange debt following its appreciation, according to the study.

Researchers demonstrate that whenever a company's native currency depreciates, it may lead to a rise in indebtedness during prosperous times due to the correlation between greater amounts of FX exposure and appreciation in the currency. When a country's non-financial corporates have more foreign debt than their foreign assets, and when the obligation's maturity is smaller than that of the assets, it suggests that the non-financial corporate sector's businesses are more vulnerable to foreign exchange valuation and liquidity risks, correspondingly.

In the case of India, the Reserve Bank of India's (RBI) acquisition of foreign exchange reserves is the result of mercantilist intentions, and there is no proof that this buildup of reserves implicitly guarantees that the businesses would be able to borrow foreign currency. The RBI will build up its foreign exchange reserves by taking economy-wide money flow, current account fluctuation, and capital account fluctuation into consideration. This suggests that borrowing by businesses is done at its own risk and that there is no implicit assurance provided by central banks' FX reserves for corporate bailouts during defaults (Pradhan et al., 2022; Pradhan and Hiremath, 2022). The Reserve Bank of India has set capital and provision specifications for exposure to companies having "Unhedged Foreign Currency Exposure (UFCE)" in order to deter banks from extending financing to businesses that fail to adequately hedge toward currency risk (Patinaik, 2015; RBI, 2014). The Sahoo Commission was established in India in 2013 with the goal of creating a structure for both domestic and international financial market access. The committee stated that externalities resulting from systemic risk due to currency exposure are the most significant market failure connected to external commercial borrowings (Ministry of Finance, 2015).

Literature Gap

Foreign currency borrowings are constantly increasing in the context of corporations operating in emerging nations in past decades (Cortina et al., 2018). This has its potential benefits like reducing the financial constraints of organizations in EME and growth, however, it poses significant risks like currency depreciation that can have a detrimental effect on the company and the country as a whole (Hawkins & Turner, 2000). Considering the significance of this issue and its far-reaching implications as it does not affect a few companies or sectors by economies of entire regions, there are very few studies, especially in recent times that discuss this phenomenon. The global financial market is inherently altered by the COVID-19 pandemic and the resulting crisis, making economies around the globe more vulnerable (Wullweber, 2020). The shock from COVID-19 led to investors selling stocks and bonds and buying US dollars, resulting in an appreciation of USD (Miller, 2020). This further adversely influences the position of companies in emerging markets that have taken loans in USD. Therefore, considering this changing climate in the global financial sector, it is necessary to study the trends, drivers, and risks associated with foreign currency borrowings by the organizations in emerging market economies.

Discussion

In the early years of the 21st century, financial reforms were common in emerging markets around the globe resulting in a decline of aggregated currency mismatch and reduction of sovereign credit in foreign currency. As a result, foreign currency borrowing became easier for companies (Chui et al., 2016). Since the financial crisis of 2008, the amount of debt held by EME enterprises based on US dollars has surged fourfold (Acharya & Siddharth, 2021). This external funding has shown a potential to contribute to the economic development and growth of emerging nations along with the obvious benefits to the companies that obtain the funding. Especially in India, ECBs make up the majority of India's debt abroad. While Indian corporations have been permitted to raise capital overseas since the early 1970s, till the 1990s, ECBs made up

a very small portion of the country's total external debt due to the predominance of subsidized debt from bilateral as well as multilateral agencies. Only 13.1% of total debt was held by external central banks (ECBs) in 1995. By 2005, it had increased to 19.7%, and by the last quarter of 2014, it had risen even faster to 37% (Acharya et al., 2015; Mohan, 2008).

The credit received in foreign currency is considered cheaper compared to the debt obtained locally due to the low interest rate in developed economies (Bruno & Shin, 2017; Gutierrez et al., 2023). Furthermore, another significant contributing factor to this rise in foreign currency borrowing is more favorable policies in emerging nations (Turner, 2014). Also, for risk management purposes, businesses are more likely to borrow in dollars if the exchange rate has a significant impact on their profitability (Burova et al., 2022). Other reasons for borrowing money in foreign currency include the fact that if they get income in foreign currency, the sales act as a natural hedge for the debt and give them access to more extensive international finance markets. Secondly, corporations seeking to finance long-term foreign assets (such as oil and gas companies) prefer to do so in the identical currency as their revenue (Caruana, 2016). It is observed that the primary reason why companies in EME prefer to get loans in foreign currency is due to low-interest rates, export revenue, lower cost of capital, and readily available loans. Reduced sovereign liabilities due to reforms and favorable policies are also some of the contributing factors. Access to foreign capital is increasingly linked to ESG performance, as international lenders align with sustainability mandates and responsible investment criteria (OECD, 2022).

Ongoing geopolitical tensions—including conflicts and trade disruptions—have raised global risk premiums, impacting capital flows and foreign borrowing costs in emerging markets (Reinhart & Rogoff, 2022). Currency depreciation is a major concern for companies who borrow money in foreign currency, but the businesses should gain from the currency decline by increasing their export revenue and theoretically holding more external commercial borrowings. The study's chosen enterprises' 88% export-to-total-sales ratio indicates that they have a built-in safeguard against the ECB in the case of currency depreciation (Hiremath, 2016). This natural hedging provides confidence to companies in emerging markets and drives corporate foreign currency borrowings. Businesses also transfer part of the risk associated with currency fluctuations to customers and suppliers. Dollar financing is prone to be available to less opaque businesses with readily available collateral and greater net worth. Businesses that depend on official funding sources like financial institutions and credit from suppliers are more inclined to incur dollar indebtedness than those that rely on informal financing sources like financiers, companions, and relatives (Mora et al., 2013). The Asian crisis was mostly caused by extensive short-term foreign currency financing, which has sparked a lot of discussion on how to handle foreign debt and the risk of liquidity for both the public and private sectors. Generally speaking, businesses ought to take responsibility for managing their own risk of liquidity and shouldn't rely on the public sector to supply liquidity in an emergency (Hawkins & Turner, 2000). Lessons from countries like Turkey and Brazil reveal that excessive short-term foreign currency borrowing without adequate safeguards can lead to systemic financial crises (Goldstein & Turner, 2004). Recent increases in U.S. interest rates have raised the cost of dollar-denominated borrowings, exposing emerging market corporates to refinancing and currency mismatch risks (Avdjiev, McGuire, & von Peter, 2023). Therefore, the regulators are required to intervene in case of excessive foreign currency borrowings and introduce policies to ensure the financial stability of both the company and the nation. In India, rupee-denominated offshore bonds, or Masala Bonds, have been promoted to reduce foreign exchange risk exposure while attracting global investors (Sahoo & Sinha, 2020). Hedging can be an effective measure to protect the companies. Because they are backed by aggressive regulatory agencies, non-financial enterprises think they can use efficient financial hedging to reduce exchange rate risk. Financial hedging

offerings are considered extensive and detailed, particularly over-the-counter (OTC) instruments. Firms, as well as regulatory authorities, are insistent when it comes to financial derivatives products (Chong et al., 2014).

Conclusion and Recommendations

The current research endeavor aims to describe the ways in which businesses in developing nations use foreign currency borrowing to finance their expansion. The review found that since the start of the 21st century, the sovereign debt of EME in foreign currency was significantly reduced due to policy reforms in these countries and low-interest yield in developed economies. After the financial crisis of 2008-09, the foreign currency borrowings by companies in EME is constantly rising. This can be explained by the globalization and the fact that investors in developed economies were looking toward emerging markets to deliver higher returns. Almost all major emerging economies around the globe have seen an inflow of money from advanced economies. The companies operating in EME also preferred getting loans in foreign currency due to various benefits that include lower interest rates, lower cost of capital, diversification of funding, currency risk management, and access to large financial markets. Due to globalization, many companies in the developing world earn revenue in foreign currency and want to borrow money in the same currency to mitigate currency risks. This can also be seen as a potential reason for increased borrowings in foreign currencies. Another significant driver of foreign currency borrowing is a favorable financial environment and supporting policies in emerging nations. Finally, there are significant risks in excessive foreign currency borrowings on both firm and national levels. In case of currency depreciation, the repayment of loans gets tricky and companies might default on their obligations. This is more likely for the companies that earn their revenue in local currencies. They need to hedge their borrowings with financial derivatives to mitigate this risk. The companies that earn revenue in foreign currency have increased protection as their revenue acts as a natural hedge. On the national level, excessive foreign currency borrowings can lead to a crisis as it is cited as a major cause of the 1997 Asian Crisis.

In conclusion, foreign currency borrowing has the potential to benefit the companies in EME and help in the expansion of the organization along with a positive effect on employment opportunities and economic growth for emerging nations. Foreign currency borrowings play a significant role in providing companies in EME access to large financial markets in more advanced economies. Yet there are many inherent risks associated with foreign currency borrowings, therefore, proper risk management strategies are required at the firm level. The role of policymakers also becomes significant here, as they should ensure that turbulence in foreign markets does not impact the local economy in an adverse manner. Future studies should focus on investigating more recent developments like the pandemic and following the appreciation of the US dollar as compared to currencies in developing nations. The impact of such development on foreign currency borrowings by corporations in emerging economies should also be determined in future research endeavors.

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CASE STUDY

Impact of E-learning on undergraduate students: A case study of BBA & B. Com. students

Mr. Om Prakash
Research Scholar
Department of Commerce & Business Studies
Jamia Millia Islamia
New Delhi

Dr. D. K. Dhusia
Professor & Head
Department of Commerce & Business Studies
Jamia Millia Islamia
New Delhi

Abstract

The study examines "The Impact of e-learning on undergraduate students: A case study of BBA & B. Com. students." E-learning not only enhances academic performance through personalized and interactive content but also fosters engagement and skill development. This study explores e-learning's impact on undergraduate students, focusing on both academic outcomes and mental health. This study investigates the efficiency level of e-learning among undergraduate students of BBA and B.Com and its influence on their mental well-being. In this research, adopted a quantitative approach and a cross-sectional design. The study of population is 2,050 respondents from universities and colleges offering BBA and B.Com courses. The selected institutions are located in South Delhi, including Jamia Millia Islamia, Jamia Hamdard, and various colleges of Delhi University. Using the Yamane formula, the sample size was calculated to be approximately 335 respondents. However, 386 questionnaires were distributed; resulting in 341 successfully responses. The Data was gathered using a structured questionnaire provided by a 5-point Likert scale. In the testing an independent sample t-test was utilize to evaluate gender differences in e-learning efficiency, revealing no significant difference ($t(339) = -0.821$, $p = 0.412$) between male ($M = 54.49$) and female ($M = 54.71$) students. A simple regression analysis assessed the impact of e-learning on mental well-being, indicating a strong positive correlation ($\beta = 0.835$, $p < 0.001$) and explaining 69.7% of the variance in mental well-being (Adjusted $R^2 = 0.697$). The results highlight the significant influence of e-learning on students' mental health. The study highlights the importance of improving e-learning environments in educational institutions by incorporating interactive and supportive resources to boost student engagement and well-being. It notes limitations related to geographical scope and sampling methods, recommending that future research investigate the long-term effects across diverse populations. Ultimately, the study advocates for optimizing e-learning to promote both academic success and mental health in higher education.

Keywords: E-learning, LMS, CMS, VEL, M-learning, Online education, Academic performance, Mental well being, Undergraduate students

Introduction

E-learning is the utilization of digital technologies for accessing instructional materials. An online course, program, or degree is completed using the internet. Currently, e-learning is greatly influencing global communities. During this tumultuous period, obtaining formal education is challenging owing to several societal issues such as social, economic, and linked concerns. However, everyone has a strong desire to pursue more knowledge to the best of their abilities. E-learning enhances educational flexibility by eliminating constraints of time and place. Therefore, e-learning facilitates the acquisition of knowledge. The fast progress technologically has dramatically changed cultural norms. Both intelligent and uneducated folks frequently utilize technologies for both recreational and utilitarian objectives (Salamat, L., Ahmad, G., Bakht, M. I., &Saifi, I. L., 2018).

E-learning is clear that online communication networks like “Facebook, Twitter, and WhatsApp” had a substantial influence on instruction within the field of electronic education. Such apps exerted a powerful appeal on pupils and facilitated their connection with various regions of the globe. Such applications expose users to a range of new educational terminologies, one of which is e-learning. E-learners want to embrace new technologies to acquire knowledge and establish connections with others who are relevant to their area of study (Anshari, Alas, & Guan, 2016). Several nations worldwide are advocating for education via the use of e-learning. However, individuals are eager to improve their knowledge at any expense and by any means.

One alternative interpretation is e-learning. Education becomes flexible for learners since it eliminates the constraints of time and physical infrastructure. The recent population is now entering a new age of education, known as the era of e-learning. In the contemporary era of science and technology, educational methods have evolved from non-formal to informal, then from informal to formal, followed by a shift from formal to distant learning, and now transitioning from distance learning to e-learning. The field of higher education has seen significant transformation, shifting from conventional teaching approaches to contemporary ways that use computer technology to facilitate the dissemination and acquisition of information. The advancing technology has presented a chance to enhance teaching abilities and enhance students' capacity to study. E-learning is a prime illustration of advancing technology used in higher education (Cappel, J. J., &Hayen, R.L., 2004).

E-learning

The term "e-learning" is a fusion of the terms "e" and "learning", with "e" denoting electronicallyand "learning" concerns to the process of acquiring knowledge. E-learning in education enables student-centered learning by eliminating the lecturer as the exclusive provider of information, allowing students to engage in independent learning processes. Students may access information sources at any time and from any location to enhance their self-directed learning endeavors (Ritonga, D. A., Azmi, C., & Sunarno, A., 2020). E-learning refers to a method of education and learning when the students and the instructor, or other individuals participating in the exchange of knowledge, do not have actual meetings but are instead divided by distance, time, or all. The divide between people is overcome by the use of communication technology, such as the Internet and emerging educational tools. E-learningcould be defined as the electronic transmission of a “learning, training, or education program.” E-learning utilizes computer or electronic devices to provide training, instructional, or learning content (Maneschijn, M., 2005).

E-learning has been used as a learning tool at a large number of international organizations globally. The word "e-learning" is described as surfing the web or intranet for educational purposes. (Fee, K., 2013).One year later, the term was expanded to include "anything

delivered, enabled, or mediated by electronic technology for the explicit purpose of learning." The "e in e-learning should not be interpreted as electronic;" rather, it ought be seen as an acronym for "evolving, enhanced, everywhere, every time, and everybody." The quote highlights the many benefits of online education for students as well as instructors (FitzPatrick, T., 2012).

Based on the definition provided, "E-learning encompasses a broad spectrum of words. The term "labels" has been used to characterize the notion of e-learning. These labels encompass various forms of online learning, such as Web Based Learning (WBL), Web Based Instruction (WBI), Web Based Training (WBT), Internet Training (IBT), Online Resource Based Learning (ORBL), Advanced Distributed Learning (ADL), Tele-Learning (T-L), Computer-Supported Collaborative Learning (CSCL), Mobile Learning (M-learning or ML), Nomadic Learning, and Off-Site Learning" (Tossy, T., 2017)."“The collection and use of knowledge that is predominantly delivered and facilitated by electronic methods. The present mode of learning relies on networks and computers, but it is expected to progress towards incorporating diverse channels (such as wireless and satellite) and technology (such as cellular phones) as they are created and embraced. E-learning encompasses several formats, including courses, modules, and smaller learning items. E-learning may include both synchronous and asynchronous access, and it can be dispersed across different geographical locations with varying time constraints." (Wentling et al., 2000).

Progression of "e-learning"

The precise beginning of the term "e-learning" is not well-documented, though Moore suggested that e-learning likely emerged around the 1980s. (Moore, et. al., 2011). In the current age of digital technology, e-learning is becoming more and more feasible and easily available. Initially known as "computer-based training," e-learning has evolved to encompass the idea of "taking your class anywhere you go." The development may be seen as a logical advancement from conventional online learning approaches, continuously using modern gadgets to create and improve resources for learning (Sangra et al., 2012). "E-learning traces its roots back to mail-learning methods via correspondence courses. In 1840, Sir Isaac Pitman introduced mail courses using shorthand techniques, marking one of the earliest forms of distance learning." Despite technological advancements, the core concepts of distance learning have remained consistent, though the mediums have diversified. Distance education, characterized by delivering instructional material without geographical constraints, has utilized various formats, including mail-delivered instructions, print materials, electronic classes, Smartphones and tablets, and these days, online courses (Moore, 1990).The emergence of e-learning gained substantial momentum in the late 1960s, exerting a profound impact on enterprises, educational initiatives, and the armed forces. The 1920s saw the introduction of 'teaching machines' by Sidney Pressey, which gained popularity in the 1950s through the work of B.F. Skinner. Such machines enabled programmed instruction, addressing the growing demand for education that traditional schools and teachers couldn't meet. The initiation of individualPCs in the 1980s further propelled the development of e-learning (Benjamin, 1988)."Computer-based training (CBT), a method where primary data transfer occurs via computer software over the internet or intranet, emerged in the 1960s and evolved into computer-based learning (CBL)."“The PLATO (Programmed Logic for Automatic Teaching Operation)" system, developed in 1960, is considered a pioneer in this field, featuring elements such as graphics, text, forums, and chat rooms that are evenoperated in new e-learning (Shimura, et. al., 2006).

In the 1990s, CD-based education emerged as the dominant method of online education, sometimes supplemented by seminars that complemented CD-ROM-based instruction. By 1998, the Internet began to surpass CD-based training by offering personalized learning experiences with "chat rooms, study groups, newsletters, and interactive content." The late 20th century witnessed the flourishing of the internet and personal computers, solidifying the concept of e-learning. "The first web-based Learning Management System (LMS), named Cecil, was

launched in 1996," organizing, documenting, and delivering e-learning courses (Cross, 2004).In the 2000s, corporations, businesses, and the military embraced e-learning, benefiting from its enable unlimited accessibility to data and engaging functionalities. Modern e-learning methods, characterized by interactive and constructive learning, contrasted with traditional passive information transfer in academia. The advent of mobile technology introduced m-learning, defined as portable and lightweight learning platforms that enable students to participate in educational events lacking environmental restrictions. Devices like smartphones, tablets, and laptops have facilitated this new era of mobile learning (Garrison, D. R., 2016). Despite undergoing numerous evolutionary phases, e-learning continues to evolve alongside advancements in technology. Modern e-learning methods blend synchronous and asynchronous training, revolutionizing contemporary learning systems. However, history suggests that educational development is more evolutionary than revolutionary (Daniel, 2014).

E-learning Tools & Technique

Learning Management System

"A Learning Management System (LMS)" is a software application designed to manage, record, monitor, and report on many types of training programs, including classroom and online events, e-learning programs, and training material. LMS is extensively used in the business sector to streamline record-keeping and staff registration processes (Nedeva, V., &Dimova, E., 2010)."LMS is a software program used to facilitate the educational process in E-learning. The Learning Management System (LMS) offers users the ability to develop and oversee learning activities in alignment with specific goals and learning objectives (Adzharuddin, N. A., & Ling, L. H., 2013).

Massive Open Online Courses (MOOCs)

MOOCs are web-based courses specifically created to accommodate a large number of participants and provide unrestricted access. Such resources are often provided at no cost and may be accessed by anybody with an internet connection. MOOCs often include pre-recorded lectures, interactive discussion forums, and diverse exams to support the process of learning. MOOCs are web-based courses designed for widespread participation and unrestricted access (Margaryan, A., Bianco, M., & Littlejohn, A., 2015). Additionally, the Secretariat has actively participated in many MOOCs to obtain firsthand knowledge of this emerging phenomenon (Gaebel, M., 2014).

Virtual Learning Environment (VLE)

VLEs, or Virtual Learning Environments, are platforms where learners and tutors engage in many types of online activities, including online learning. Virtual Learning Environments (VLEs) enable educators to efficiently generate educational materials without requiring proficiency in technical abilities. Usually accessed over the internet, Virtual Learning Environments (VLEs) provide a comprehensive range of online capabilities, allowing users to easily upload resources and customize the interface to their preferences. Blackboard and WebCT are widely used commercial "Virtual Learning Environments (VLEs) in UK Higher Education (HE)." VLEs in UK HE are mostly used to enhance or assist current programs rather than providing full online courses (O'Leary, R., & Ramsden, A., 2002). This addresses the constraint of conventional in-person instruction and guarantees that learning is not restricted by either geographical location or time (Jain, P., 2015).

Content Management System (CMS)

A "Content Management System (CMS)" is an online application that simplifies the process of creating and managing content. Editing, organization, updating, and publication of material. CMS may be accessed via a web browser on various devices such as smartphones, tablets, laptops, or personal computers. The CMS consists of two parts: “the Content Management Application (CMA) and the Content Delivery Application (CDA).” A CMS is an online tool that allows customers to effortlessly add, modify, modify, and remove content form a web page. The Content Delivery Application (CDA) arranges and refreshes the data or content on the website (Rab, S., 2018). Advanced systems may be seamlessly combined with digital resources to facilitate access to digital materials and enable frequent updates (Hussein, R. R. A., & Al-Kaddo, A. B., 2014).

Web-Based Training (WBT)

The term "WBT" encompasses a variety of systems that enable, among other things: the creation of high-quality multimedia courseware; the maintenance of a global repository of learning materials (containing courseware, but also personal information about peer helpers, the real-time contributions of past users, etc.); and the dissemination of these resources. The other needs, such as communicational packages, writing packages, intelligent agents, etc., are best handled by purpose-built application (Helic, D., Maurer, H., & Scherbakov, N., 2000). Web-based training (WBT) encompasses any kind of training that is provided over the internet or an intranet. It includes a broad array of internet-based educational activities aimed at assisting people in acquiring new skills, information, and competencies. WBT is often designed to be completed at the learner's speed, enabling them to access training materials whenever it is convenient for them. WBT is an internet-based training program that may be accessed over the World Wide Web. The content incorporates many multimedia components such as text, photos, audio, and video (Wisher, R. A., & Olson, T. M., 2003).

Impact of E-learning

Academic Performance

- **Wider Access to Resources:** E-learning provides vast online resources, including lectures, readings, and other multimedia content, whereby a learner is given a chance to gain knowledge in a much better way, hence improving academic performance.
- **Flexibility:** Due to e-learning, students can be given all the time they want to progress at their own pace. This would therefore be very beneficial for those students who often need more time to grasp difficult concepts or if they want to speed up their learning process.
- **Personalized Learning:**Adaptive learning technologies can be used to individualize learning experiences with a view toward each learner's satisfaction, and bridge the learning gaps to achieve mastery in any subject area.

Engagement and Motivation

- **Interactive Content:** E-learning equipped with multimedia and interactivity will meet the interests of students more, which would make the session much more fun and will help elevate motivation to learn and participate.
- **Gamification:** Besides game-like; this leads to greater motivation among students, encouraging active learning.

Table 1: Instructional mode matrix

Instructional mode matrix		Place	
		Same	**Different**
Time	**Synchronous**	Traditional method	Distance learning
	Asynchronous	Recorded	E-learning

Source: Haverila & Barkhi (2009)

Flexibility and Convenience

- **Anytime, Anywhere Learning:** By allowing learners to study at any place with internet access, eLearning makes it easier to adopt more balanced approaches to cope with studies and other life commitments.
- **Flexible Scheduling:** Most of the e-learning courses are asynchronous, and it allows students to study at times most conducive to their schedules and learning preferences.

Social Interaction and Collaboration

- **Online Communities:** Many e-learning platforms provide forums, chat rooms, and even social media groups where students can interact and share ideas or work on group projects.
- **Group Projects:**These collaboration tools, shared documents, and project management software, combined with video conferencing, greatly empower productivity for a group of students working from different locations.

Skill Development

- **Digital Literacy:** The e-learning mode gives students the much-needed digital skills in terms of navigating online, utilizing digital tools, and managing online communications relevant to any modern workforce.
- **Self-Discipline and Time Management:** Learning through e-learning involves self-directed study; hence students need to develop strong time management and organizational abilities that will render them more independent and responsible.

Challenges and Considerations

- **Technical Problems:** Technical problems such as unreliable connectivity to the internet or lack of proper devices may bend students' attitudes towards participating in an e-learning environment.
- **Engagement and Retention:** It becomes tougher to keep students engaged with the course content to reduce drop-outs when students can be very far away and feel isolated or disconnected.
- **Quality of Instructions:** The success rate of e-learning varies on the value of instructional designs and the competence of the instructors in the usability of digital tools and methods.

Review of Literature

Review related to the Efficiency of E-Learning for Undergraduate Students

The study found that efficacy was influenced by support and resources, people's motivation and experience, and the relationship between the artifact and its users (Noesgaard, et. al., 2015). The study revealed that M-FD had financial assistance from a doctorate fellowship provided by “Canada's Social Sciences and Humanities Research Council,” as well as an allowance from the Centre for Innovation in Nursing Education (Fontaine, et. al.,

2019). The findings showed that system performance, data integrity, and computer self-assurance had an influence on usage, user happiness, and autonomous educational habits of learners. The results indicated that the standard of the platform, overall integrity of the data, and the computer's self-assurance had an impact on the utilization of the structure, the pleasure of the users, and the actions of autonomous education in learners (Saba, et. al., 2012).

The study showed that the primary determinant impacting the success of learners enrolled online is inspiration, therefore underscoring the significance of this component as a catalyst for learning effectiveness (Castillo-Merino, et. al., 2014). The study revealed that examining the information system as an online learning support platform led to an improvement in the quality of knowledge dissemination. In addition, the study offered recommendations for enhancing work-based learning and promoting the use of effective knowledge management systems (Kattoua, et. al., 2016). The study concluded that there is not enough data to determine the impact of "e-learning on healthcare professional behavior or patient outcomes" (Sinclair, et. al., 2016). The study's findings designated that the application of online education in oral radiology is at least as successful compared to conventional learning techniques (Santos, et. al., 2016).

Review related to the Influence of E-Learning on the Mental Health of Undergraduate Students

According to the study, it was important to closely monitor the mental health of students even after the epidemic ends since the psychological effects might last for an extended period and impact all aspects of their lives (Rutkowska, et. al., 2022). The study inspected the adverse impacts of e-learning on the mental welfare of students, specifically addressing worry, stress, and diminished engagement in the learning process. The study, obtained from sources, emphasizes the need for enhanced e-learning deployment in less developed nations (Jain, et. al., 2022). The findings suggested that several characteristics associated with eLearning, such as technology, limited social interaction, educational components, and the eLearning environment, all had a detrimental effect on the mental well-being of undergraduate students (Lambert, et. al., 2021).

The findings indicated a significant impact on the emotional well-being of university students during the COVID-19 epidemic. To mitigate their unfavorable opinion of COVID-19, it is crucial to provide accurate and timely information (Moy, et. al., 2021). The investigation disclosed that certain students possess a strong aversion regarding online learning because of the human and technical obstacles they encounter. In addition, distant learning was demonstrated to correlate with psychological effects such as stress and anxiety. Furthermore, studies showed that online learning might have psychological effects that were related to the demanding nature of the learning process (Amalaraj, et. al., 2023). The study highlighted the primary factors that impact online education are the degree of involvement and collaboration among students and instructors, the recognition of student interest and demands, the adoption of simple to operate the internet, and the emphasis on educators in the instructional strategy (Regmi, et. al., 2020).

Objectives of the Study

- To study the Efficiency Level of E-Learning for Undergraduate Students.
- To examine the influence of e-learning on the mental well-being of undergraduate students.

Research Methodology

Research methodology is one of the major parts of every study to achieve its objectives. The choice of suitable technique for the analysis should be accordance with the type of problem (Hameed et al., 2017). It is a systematic way to solve the research problem. The study aims to investigate the efficiency level of "E-Learning among male and female respondents using

independent sample t-test. Further, influences of e-learning on mental well-being were examined through simple regression analysis. Respondent for the study were students of BBA and B .Com program from the universities and colleges located in south Delhi. A list of universities and colleges are given in the table below. Thus, the study adopts quantitative research approach and cross-sectional design.

Table 2: University and Colleges in South Delhi

S.No.	Universities/Colleges	BBA	B.com
1.	JamiaMilliaIslamia	130	150
2.	JamiaHamdard	180	60
3.	Ramanujam College	58	313
4.	ShaheedBhagat Singh	NA	272
5.	Sri Aurobindo College (M)	NA	385
6.	Sri Aurobindo College(E)	NA	424
7.	Deshbandhu College	NA	78
		368	1682
TOTAL		**2050**	

Sources: Website &Prospectus of the respective universities and colleges

- **Sample Size**: The sample size for the study was determined using Yamane formula 1967 with the margin of error of 0.05. The formula for calculation of the sample size is present in the table

Table 3: Yamane Sample Size formula

$$n = \frac{N}{1 + N (e) \wedge 2}$$

n = Sample Size

N = Population

e = Margin of error

Source: Yamane, Y. (1967)

The population for the study is 2050 respondents from universities and colleges pursuing BBA and B.Com courses. The colleges selected for the study are located in south Delhi which includes Jamia Millia Islamia, Jamia Hamdard and colleges of Delhi University. The sample size using the Yamane formula calculated 335 Respondents approximately. However, 386 questionnaires were distributed among the respondent out of which 341 responses were received successfully which is 88%.

- **Sampling Design & Technique**: Convenience sampling technique has been adopted in the study as it is a non-probability sampling technique which allows easy accessibility,

geographical proximity, availability at a given time, or the willingness to participate are included for the purpose of the study, (Etikan, 2016).

- **Area Covered**: The primary data was collected from the universities and colleges located in South Delhi.

Data Analysis

The study adopted quantitative research approach and cross-sectional research design. A 5-point Likert scale was used to collect the data through survey method. Three hundred and eighty six (386) questionnaires were distributed among the enrolled BBA & B.Com students of Jamia Millia Islamia, Jamia Hamdard and colleges of Delhi University located in South Delhi by using convenience sampling technique. Statistical Package for Social Sciences (SPSS) version 25 was utilized as a statistical tool for the analysis of data.

A total of 341 completed questionnaires were analyzed. To test the first hypotheses an independent sample t-test was utilized to evaluate efficiency level of e-learning among male and female respondents. Further, for examining the second hypotheses simple regression analysis was performed to investigate the relationship between the predictor model (influence of e-learning) and outcome model (mental well-being).

Hypothesis Testing 1

H_{01}: There is no significant between gender and efficiency levels of undergraduate students.
H_{a1}: There is a significant difference between gender and efficiency levels of undergraduate students.

Table 4: Descriptive Statistic of Gender

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Efficiency Level	Male	220	54.49	2.146	.145
	Female	121	54.71	2.841	.258

Table 4.1: Efficiency of E-Learning among Male and Female Respondents

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Efficiency Level of Undergraduate Students	Equal variances assumed	21.146	.000	-.821	339	.412	-.224	.273	-.762	.313

	Equal variances not assumed			-.758	196.534	.449	-.224	.296	-.808	.360

In this study the mean score of two independent groups were examined hrough independent t-test to investigate the efficiency level among male and female respondent. The output in table 4 shows that there is insignificant difference t (339) = -.821, p = .412) the score for the Male participant is (M = 54.49, S.D = 2.146) was higher than the Male (M = 54.71, S.D = 2.841). The statistical test reveal that there is no significant mean difference of efficiency level among Male and Female respondents. Further, the result of standard deviation reveals that the responses of male respondent were more consistent as compared to female respondent. Hence, there is no enough statistical evidence to reject the null hypothesis (H_0) and accept the alternative hypothesis (H_1). This means that there is no statistical difference in the efficiency level of Male and Female participants.

To perform the independent t-test, initially Levene's test was performed to examine the equality of variance. The output table 4.1 shows the levene's test statistic. The result was significant ($p < 0.05$),there is significant difference in variance of the male and female respondents across the two groups.

After successfully testing the levene's test for equality of variance independent t-test was performed to examine the efficiency level among male and female respondents. The output in table 3 shows that there is insignificant difference t (339) =-.821, p = .412). The magnitude of difference in the mean (M.D = -0.224, 95% CI: -.808 to -.360) was insignificant. Hence, there is no enough statistical evidence to reject the null hypothesis (H_0) and accept the alternative hypotheses (H_1). This means that there is no statistical difference in the efficiency levelof Male and Female participants.

Hypothesis Testing 2

H_{02}: There is no significant impact of E-learning on mental well being of undergraduate students.
H_{a2}: There is a significant impact of E-learning on mental well-being of undergraduate students**.**

To examine the impact of e-learning on the mental well-being of undergraduate student's simple regression analysis was performed using SPSS software. The assumption of normality was examined through normal distribution curve and P-P Plot presented in figure 4.1

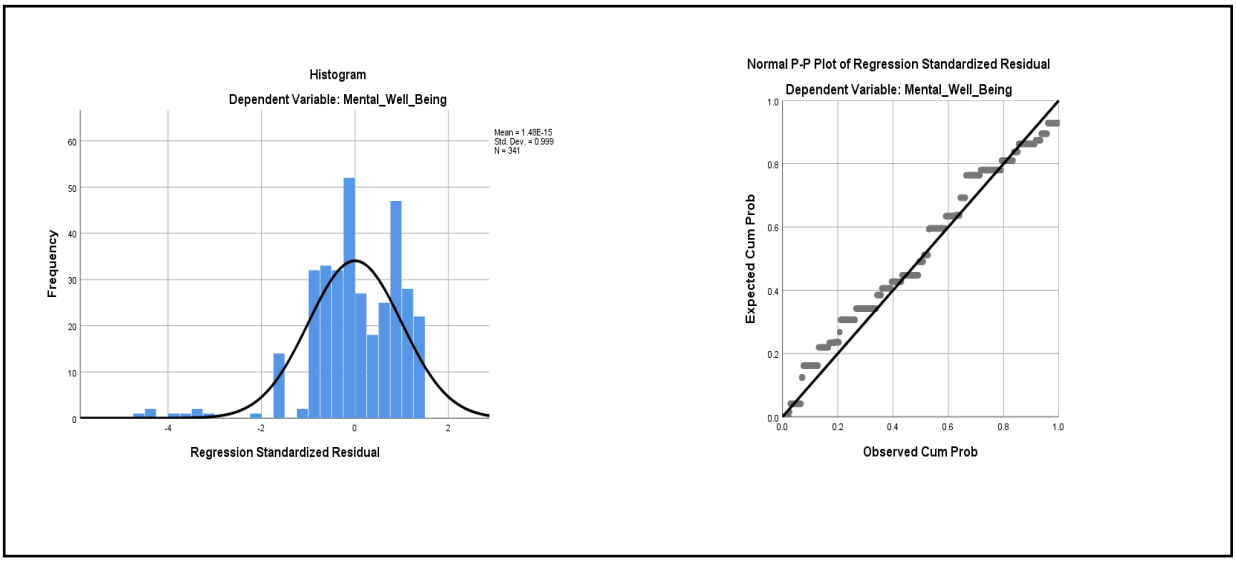

Figure 1: Normality Assumptions

Table 4.2 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R square change	F change	Change statistics df 1
1	.835[a]	.698	.697	9.366	.698	782.073	1
a. Dependent Variable: Mental well being							
b. Predictors: (Constant), Influence of E-Learning							

In this study mental well-being was the outcome variable and influence of e-learning was predictor variable. The summary of regression model in the table 4.2.indicates the value of adjusted R^2 which reveals the percentage of the variances in mental well-being explained by dimensions of influence of e-learning. Adjusted R Square value (0.697) indicates that dimensions of influence of e-learning account for 69.7% of the variance of the mental well-being.

Table 4.3 shows the influence of e-learning on the mental well-being of undergraduate. R^2 value of 0.698 revealed that the predictor variable (influence of e-learning) explained 69.8% variance in the outcome variable (mental well-being) with F (1,339) = 782.073, P<.001.**F=** 782.073 with a significance value of 0.000 indicates that the model is statistically significant and that e-learning influence has a meaningful impact on mental well-being. R=0.835, indicating a strong correlation between e-learning influence and mental well-being. The finding revealed that the influence of e-learning on the mental well-being of undergraduate students are significant results (β=.835,P<.001).

Table 4.3 ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	68604.467	1	68604.467	782.073	.000[b]
	Residual	29737.521	339	87.721		
	Total	98341.988	340			
a. Dependent Variable: Mental well being						
b. Predictors: (Constant), Influence of E –Learning						

Conclusion

The findings of the results the efficiency of e-learning among Male and Female of BBA and B.Com undergraduate students and its impact on their mental well-being using a quantitative methodology. The study revealed no significant differences in e-learning efficiency between male and female students. The statistical test reveal that there is no significant mean difference of efficiency level among Male and Female respondents. The finding suggests that e-learning platforms are equitable and effective; reinforcing the idea that e-learning can serve as an inclusive educational medium. In this study, analysis also examined the relationship between influence e-learning and mental well-being. A simple regression analysis indicated a strong positive correlation, with 69.7% of the variance in mental well-being explained by e-learning factors (p

< 0.001). This indicates that students who actively engage with e-learning platforms tend to report better mental health outcomes, highlighting the necessity for supportive online learning environments that foster both academic achievement and mental well-being.

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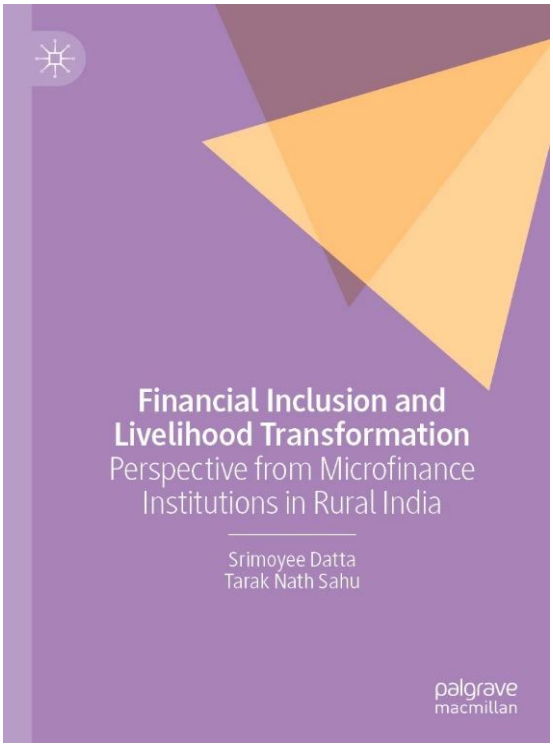
BOOK REVIEW

Financial Inclusion and Livelihood Transformation: Perspective from Microfinance Institutions in Rural India

(Authored by Srimoyee Datta & Tarak Nath Sahu, Published by Springer Nature, 2023)

Dr. Mamta Dhanda
Post Doc Research Scholar
Delhi School of Public Policy and Governance
Institution of Eminence
University of Delhi



Microfinance is basically an economic tool to deliver small-scale financial services for those areas that are out of reach from basic and traditional banking services. It focuses on credit availability to low-income disadvantaged people like women, weaker and rural communities who majorly access local moneylenders as source of finance usually at extortionate interest rates. It has potential to facilitate the success of varied government policies targeting poverty elevation, empowerment of women and other weaker section while improving quality of life. With microfinance financial services are availed to those deprived groups fostering inclusive financial development and smoothened daily consumption requirements. Not only this, it also insures them from unforeseen scenarios. By inducing financial inclusion with its financial facilitation, it enables low-income people to save and borrow simultaneously, ultimately helping them create their own assets. It improves their standard of living with induced investment in education and better livelihood. Microfinance in India had grown considerably both in terms of number and quality of services over last two decades. Microcredit as delivered through a varied institutional channel had seen varied phases from peak to inadequacies and failure.

The book, Financial Inclusion and Livelihood Transformation, a 199-page compilation is a collection of nine chapter investigating microfinance institutions as catalyst for reshaping rural livelihoods with financial inclusion offering a comprehensive and empirically grounded exploration of financial status in rural India. It studies microfinance in diverse forms and con while providing an extensive Indian overview. The editors had precisely compiled the research work discussing the importance of microfinance institutions in women empowerment in backward areas of West Bengal. While examining both borrowers and non-borrowers' perspectives, it provides insights into credit flow, income generation, employability, and long-term economic stability in rural Indian communities, ultimately visualising the overall development of marginalized regions. With its dual focus on both beneficiaries and non-beneficiaries, the book mainly stands out because it gives a profound understanding of how actually MFIs operate in those areas which are traditionally excluded from formally organised financial system in India.

In Chapter one illustrated the details of microfinance institution and associated background specifically in Indian context followed by discussion of financial inclusion over women empowerment. Chapter two reflects on how financial inclusion in Indian context is different from other nations. Focusing on participating organisations, policy initiative, committee recommendations. The discussion closes with the women empowerment through microfinance. Proving insights about borrowers and non-borrowers' perspective, chapter three illustrates empirical evidences and finding for Microfinance Institutions. Followed by the perception chapter four delves in the literary analysis of credit utilisation by beneficiaries on the basis of observational evidences. Chapter five explains employability through microfinance institutions by using experiential analysis. Operating performance of active microfinance institutions is presented in chapter six on the basis of secondary data analysis. Chapter seven and eight looked upon the women empowerment with in-depth existential analysis and their determining factors. Chapter nine provide the contribution and final conclusion of the book in summarised form.

The authors relied on the strong empirical evidence, for examining varied associated perspectives like credit utilization patterns, income generation, and employability outcomes among rural households. It highlighted how financial stability can be achieved with microfinance, fostering self-dependence, which ultimately break the vicious cycle of poverty for beneficiaries. Not only this, it also demonstrated that how financial inclusion can promote women empowerment across economic, social, and psychological dimensions, leading to greater participation and status within their communities.
The authors actually addressed a very critical issues emphasizing on inclusive policy formulation on the basis of a realistic scenarios in MFI activities. Capturing both the successes and the ongoing challenges in the process of financial inclusion from both institutions and beneficiaries' perspective, the work gives a complete guide for the inclusive financial development.

It displays the multifaceted impact of MFIs, beyond just financial access to consider broader livelihood transformations. It reiterates the significance of credit not just for smoothing consumption but also for creating assets and generating sustainable income. It presented a holistic perspective, offering a comprehensive view of microfinance's reach, and by incorporating the perceptions of both beneficiaries and non-beneficiaries. The actionable insights are of relevance for policymakers, development practitioners, and academia who are focused on designing an effective and inclusive financial system in rural India. The book's specific attention to the requirements and realities of backward areas ensures that the conclusions derived are grounded in the lived experiences of the most underserved areas of financial inclusion.

Overall, this book by Srimoyee Datta & Tarak Nath Sahu is an apt choice for developing the understanding of financial inclusivity in the financial system. The authors' endeavour to offer a meticulous explanation, where financial inclusion is defined as a tool for women's

empowerment, supporting income generation and employability. The highly systematic arrangement of titles facilitated a deep understanding of the purpose of this book. It will increase the awareness among associated stakeholders about the significance of achieving financial equality through microfinance institutions in India. It provides a harmonization within society. What begins with an introduction to the concept of conventional financing and its access then becomes a substantial tool for achieving social and gender equality. The book, by collaborating the titles in an effective manner, is developed in a cohesive discussion, offering a grounded theory strengthened with strong empirical evidence from an Indian perspective. This book provides readers with a realization about the essence of financial inclusion in developing a financially viable system in society. While other books about financial inclusion are more focused on the availability of finance to the public, this book illustrates the relevance of financial inclusion in women's empowerment. Hence, the book has greater coverage and a broadened scope in the field of microfinance. This collaboration is certainly worth reading, as it provides fresh insights on women's empowerment with financial inclusion, especially in the context of economic and social viability. Altogether, the chapters are well written, have great understandability, and are compiled in a wonderful manner. Discussions communicated by the authors are pertinent, reliable, and resonant. It clearly put forward the future agenda, reinforced with contemporary developments. Though the book focuses on rural areas in depth, a comparative analysis over time with other regions or with prior studies could be further enriching. Not only this, but to have an insight about long-term impact, longitudinal data analysis would have added value to the discussion with assess ability of sustainable livelihood transformations for observed areas.

It is an ideal read for academicians, researchers, policymakers, and practitioners in rural development, finance, and social policy. Within academia and research, it is ideal for those who are associated with development economics, rural finance, gender studies, and social policy. Not only this, if a policy perspective is observed, the book offers evidence-based guidance on how microfinance can support rural development agendas, particularly for women. NGOs can also indulge in the discussions of this book to elaborate on their access to areas facing major issues of such type. MFI designers and field operators as Development Practitioners can make best get best out of it to tailor effective programs. Financial Inclusion and Livelihood Transformation is a timely and valuable contribution to the ongoing discussion on rural development and financial inclusion in India. With its empirical rigor and meticulous organization, Datta and Sahu demonstrated the role of microfinance in empowering marginalized, rural women with the discussion beyond simple financial availability and credit provision to fostering economic and social change sustainably. With its focus on empowerment and policy relevance, it is essential reading for those who hold an interest in finance, poverty alleviation, and social change in rural contexts. While the compilation can be strengthened from geographic concentration and policy prescriptions, its core insights are both robust and actionable. It's a well-structured, empirically grounded documentation of financial inclusion in rural India and highly recommended for those who are engaged in inclusive finance and rural empowerment strategies.

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