BIMTECH Business Perspectives

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About the Journal

BIMTECH Business Perspectives is a scholarly Open Access journal of Birla Institute of Management Technology, India. The journal publishes original contribution in the functional areas of business management (see Aims and Scope). Furthermore, the journal is a platform for interdisciplinary studies that provide both empirical evidence and nuanced perspectives on business management in the national, regional, and global contexts. The contexts include, but not limited to, the contemporary economic, political, social, technological, and environmental challenges facing business stakeholders.

The journal brings out two issues per year, and it follows a double-anonymized peer-review process. All contributions should be well written in English. Submission to the journal should be relevant to one or more business and allied disciplines and backed by suitable methodology, sound analysis, practical perspectives, and managerial or policy implications.

To this end, *BIMTECH Business Perspectives* invites contributions from both the academic community and business practitioners. The journal publishes and disseminated original articles, review essays, perspectives, book reviews, interviews and invited pieces. Special theme-focused and/or guest-edited issues are also planned.

Aims and Scope

The objectives of *BIMTECH Business Perspectives*, the journal, are to encourage and publish research in the field of business management. The terms business and management are both broadly defined. While the former encompasses both discipline and business problem-based research, the latter includes the management of firms, groups, industries, regulatory bodies, government, and other institutions. The journal has a special focus on emerging and functional areas of business management. Consistent with the policy, the journal publishes peer-reviewed research in financial markets, emerging economies, entrepreneurship and start-ups, emerging technology and innovation in business functions, consumer behaviour, human behaviour in management decisions, risk management, supply chain management, business strategy, and other domains having a direct or indirect bearing on business management. The journal encourages both quantitative and qualitative research methods to unearth relevant findings. The journal aims to nurture a debate among individuals and groups, which have keen interest in business and managerial processes. The journal encourages inter-disciplinary studies that may lead to new understanding of business and management functions. The journal welcomes research papers examining dynamics of business management in the backdrop of changes in the global business environment. The journal serves as a platform that connects thought-leaders and researchers from diverse fields to address crucial business and management issues. Published twice a year (June and December), *BIMTECH Business Perspectives* is an official publication of Birla Institute of Management Technology (BIMTECH), Greater Noida, India. The journal has been publishing in its current form since 2019. Prior to 2019, the journal was known as *Business Perspectives*, which had a publication history of more than a decade.

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Articles

Embracing Digital Disruption: Using Design Thinking for Digital Transformation of Healthcare Services

BIMTECH
BIRLA INSTITUTE
OF MANAGEMENT TECHNOLOGY

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Abstract

This article investigates the application of design thinking in the digital transformation of healthcare services. The healthcare industry, which directly impacts everyone, often faces life-or-death situations depending on service quality. Our study delves into how design thinking facilitates the digital transformation of healthcare services, leading to significantly improved patient outcomes and healthcare infrastructure compared to traditional methods. This article critically analyses existing literature and reviews case studies conducted by leading consulting firms to derive key insights and analyses on the phenomenon. It provides real anecdotal evidence to bridge the gap between theory and practice, offering a comprehensive understanding of how design thinking can effectively drive digital transformation in healthcare services. The findings reveal that digitization leveraging design thinking must go beyond the obvious and actively engage participants throughout the journey. It underscores the importance of cross-functional teams collaborating from the early stages of the design process. Additionally, the study highlights the value of recognizing all ideas, even those that may initially seem unconventional. Finally, involving end users early on can lead to benefits and outcomes emerging much sooner than anticipated. This research provides valuable insights into the concept of design thinking and its role in fostering digital transformation. It contributes to the literature by delving deeply into the "how" question, offering pragmatic insights that can significantly enhance outcomes. Additionally, the study presents practical examples and case studies that illustrate the effective application of design thinking in real-world healthcare settings.

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Introduction

As traditional silos break, companies require innovative solutions to transform from industrial to digital organization. With increased environmental VUCA, top leadership must hear and act across the various facets of the organization to drive innovation. Due to the digitization wave, the business environment is changing quickly—industries are converging, boundaries are diffusing, new avenues are emerging, and legacy engagement processes are redefined. Digital disruption is making companies evaluate these imminent threats and prospects to create new business options for the future (Chan et al., 2019).

Digital transformation integrates various aspects of the digital levers available to redesign the operating models—how firms create value and deliver value to their end customers—making products and services more affordable and accessible (Asadullah et al., 2018). It requires initial investments in infrastructure, skills, resource-matching, projects, infrastructure, and a significant overhaul of the existing systems. Integrating people, devices, and business practices makes it a complicated process. Such transformation requires continued cooperation and dialogue between digital and non-digital business heads, allowing them to make informed decisions about their turnaround efforts (Davenport & Westerman, 2018). While most companies endeavor to leapfrog digital gaps, the resources remain engaged in fulfilling operational requirements since IT systems are rigid. Thus, digital transformation is like redesigning and rebuilding major infrastructure while ensuring that day-to-day operations run smoothly (Beswick, 2017). Remaining stuck in the legacy systems has negative impacts on their performance. A recent study (Kraus et al., 2022) found that incumbent firms that ignore embracing digital show a depletion of almost half of revenue growth and one-third of earnings growth. Our research focuses on the healthcare delivery context, as that has been one of the most critical settings for digital transformation. However, the learnings apply to other industries as well. We advocate using design thinking to facilitate the digital transformation process.

This article investigates the application of design thinking in the digital transformation of healthcare services. The healthcare industry, which directly impacts everyone, often faces life-or-death situations depending on service quality (Lorkowski et al., 2021). Our study delves into how design thinking facilitates the digital transformation of healthcare services, leading to significantly improved patient outcomes and healthcare infrastructure compared to traditional methods.

This article critically analyses existing literature and reviews case studies conducted by leading consulting firms to derive critical insights and analyses. It provides objective anecdotal evidence to bridge the gap between theory and practice, offering a comprehensive understanding of how design thinking can effectively drive digital transformation in healthcare services.

Methodology

Mixed Methods

The systematic literature review used both quantitative and qualitative studies, and is classified as a mixed method review, following on from the definition followed by Joanna Briggs Institute. The mixed method review allows us to review various levels of complex and ambiguous questions and the possibility of combining findings in different ways. Healthcare comprises complex systems, structures and cultures having high stakes at times, which can be a matter of life and death, with industry needing proof of success rather than a proof of concept that works often comes as a detriment as it shows a lack of synergy between the firms and healthcare issues which they intend to solve (Walsh & Rumsfeld, 2017). To ensure the validity and reliability of the mixed methods review, we followed the guidelines of Joanna Briggs's model for the same. We formulated specific research questions to focus on the sampling and search strategy.

Research Gaps & Research Objectives

As part of our detailed literature review, we found out that while the need for digital transformation in healthcare has seen significant academic interest, the challenges or struggles which healthcare providers face in implementing digital technologies have had limited academic interest to date. There is also minimal research which has explored how design thinking specifically impacts the digital transformation of healthcare services, bridging the gaps between theory and practical implications. Additionally, the literature lacks detailed insights into how digital initiatives help overcome operational rigidities and numerous constraints posed by legacy systems within healthcare settings. This interplay between design thinking and successful implementation of digital ecosystems in and interesting area of research, which has largely remained underexplored. So, the objective of the research is to look deeper into the phenomenon, understand the challenges which healthcare providers face and how by embracing design thinking, digital transformation of healthcare services can be successfully achieved.

Research Questions

The research question of this review was derived from an extensive review of the literature and after narrowing down the research gaps, we formulated the research objective. For this research, we narrowed down the following research questions:

1. To identify the specific challenges healthcare providers face in digital transformation.
2. To explore how design thinking can facilitate effective digital transformation in healthcare delivery organizations (HDOs).
3. To understand how digital initiatives help overcome operational rigidity posed by legacy healthcare systems.

Search Strategy

A detailed and comprehensive review was conducted using the guidelines set for systematic literature review. As part of this research, the following was used as a means of guidance. A search was conducted using EBSCO, Google Scholar databases, for the period of January 2010 to June 2024. Keywords included, in combination largely were: "digital transformation," "healthcare," "design thinking," "challenges," "opportunities," and "legacy systems."

However, many of the studies were omitted as they referred to other industries. All articles were independently reviewed by both researchers, who screened the articles separately, based on the inclusion criteria. Only research articles which met the strict inclusion criteria were included. In summary, the articles had to meet the following inclusion criteria:

1. To be focused on healthcare.
2. To articulate the role of digital transformation or digital initiatives in a healthcare setting.
3. To explore the role of design thinking for digital transformation in healthcare.
4. To be written in English.
5. To be published between January 2010 and June 2024.

The studies selected comprised a mix of both qualitative and quantitative studies.

Critical Appraisal of the Studies

All studies that met the inclusion criteria were critically evaluated by both the researchers on quality. Techniques like Joanna Briggs' Qualitative assessment (Stern et al., 2020) were also brought to use.

Data Extraction

The extracted data included titles, author details, abstract, methodology followed, findings and discussion, and conclusions. The data extraction was thoroughly checked by both researchers.

Wang et al. (2018) focused on how showcasing practice cases can further unlock opportunities to expand literature. We followed that by deep diving into leading consulting, analysts and vendor firms such as IBM, Accenture, hospitals, and clinicians. We followed a similar methodology for this study. Reviewing company case studies as part of academic research involves analysing real-world business scenarios to extract valuable insights. This method enables researchers to understand practical applications of theoretical concepts, identify best practices, and uncover challenges faced by companies. By examining detailed accounts of company strategies and outcomes, researchers can derive evidence-based conclusions that enrich academic knowledge and inform future business decisions.

In this research article, the author a practicing management consultant, also captures certain nuances of the work in which he was part for his client which are publicly referenceable and add additional context to the article.

We explored all the listed healthcare case studies across multiple consulting, strategy, and advisory firms and found very few that showcased success in a digital transformation journey. Analysis of the cases indicated that design thinking played a critical role in evolving the ideation process and the outcome.

Data Synthesis

Content analysis was used to synthesize the data. This involves carefully analysing the text for anecdotes or relevant narratives which can have implied meanings. We further followed the Gioia method to categorize these into themes and aggregate patterns. We also included as part of our analysis specific case studies which are unique and relevant to the application of design thinking for digital transformation in healthcare settings.

Theoretical Background

Digital Transformation Through Design Thinking

The existing incumbents suffer from the "strange anatomy of Big Bang disruption" (Downes & Nunes, 2014). Strategic business-related changes caused by incremental technology improvements are victimized because exponential technologies lead to significant disruptions. Such exponential technologies continuously lead to declining information and innovation costs, resulting in skewed and shorter industry and product life cycles. Digital disruption is a "big bang disruption" (Chan et al., 2019). Digital ecosystems are also transforming traditional industry structures and the nature and scope of firm interdependencies from completion to collaboration-focused. In healthcare, the future ecosystem is the intersection of legacy pharmaceutical firms and technology giants such as Google's Verily unit and IBM's Watson (Baidoo-Anu & Ansah, 2023). The need to adapt to digital ecosystems has pushed traditional companies to initiate digital transformation. Such transformation initiatives usually see many ups and downs. Challenges faced during digital transformation were experienced in several leading firms—GE, Lego, Procter & Gamble, and Ford (Davenport & Westerman, 2018). These companies spent billions of dollars on developing digital services, products, and infrastructures and receiving high media and investor attention; however, they faced severe performance challenges leading to shareholder wrath.

A recent research (Rösch et al., 2023) mentioned that the human-centered experience is fundamental to nurturing a firm's Digital IQ. Businesses must consider how their digital plans will impact customers and employees, as even the best-crafted initiatives can have unforeseen consequences. The challenges posed by the wave of digitization can be transformed into opportunities if firms utilize design thinking (Sussan et al., 2017). This approach can serve as a "Noah's Ark,"

guiding businesses through the turbulent conditions of digitization. By focusing on empathy and innovation, design thinking helps firms navigate and adapt to changes, ensuring that digital initiatives mitigate risks, enhance overall experiences, and propel growth in an evolving digital landscape.

"Design thinking is a creative, human-centred, participative, exploratory and problem-solving process that values different perspectives of a problem" (Bender-Salazar, 2023; Dunne & Martin, 2006). This method is increasingly becoming critical across companies. The "design lead" sometimes takes a seat in strategic planning meetings. This method is seen as a technique to help initiate and propagate creativity across ranks and files of digital organizations (Figure 1). By focusing on innovation as a social process, design thinking can help to shape and influence complex human systems. Design thinking challenges the underlying premise of the agent being rational by focusing on innovation as a social process intimately tied to human emotions and reliant on inexact methodologies in which humans collaborate and solutions emerge over time (Cross, 2023). Design thinking focuses on the end value created, focusing on "what" is to be created and "how" it will delight the end user (Rösch et al., 2023). Hackett's philosophy derived from design thinking was asking the right questions early on, which allows for the design of better products—and faster—through quicker decision-making. Thus, one of the challenges of digitization—digital transformation initiatives not generating value for firms—may be avoided using design thinking.

Organizations can fast-track digital transformation by using design thinking to observe and empathize with customers, interviewing them frequently to build insights into consumer experiences (Braun & Clarke, 2022). Digital experience data such as chat-log mining and clickstream provide critical inputs on customers' usage patterns and pain points. Data analysis can guide the designer in identifying pain zones and focusing on improving the consumption experience. Cross-discipline teams brainstorm solutions for identified problems—using a divergent-convergent approach—followed by rapid prototyping, which is tested on a sample
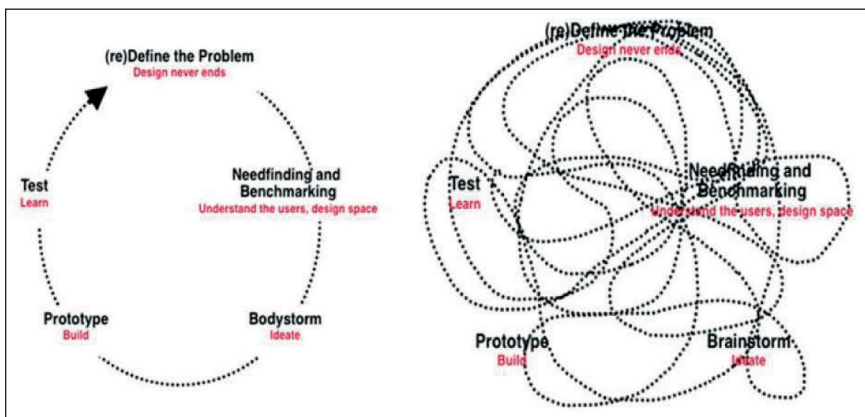
Figure 1. Iterative Engagement and Feedback Mechanism in Design Thinking.

Source: Design Thinking Research (Plattner et al., 2012).

set to receive feedback and for further iteration. The iterative cycle continues, focusing on delighting the consumer. Foundational behaviors are vital in developing a cognitive mindset before venturing into design thinking exercises (Cross, 2023). Some of the critical behaviors which need to be applied are— practicing empathy, eliminating silos, diverge than converging, ideating before assessing, listening actively, encouraging differences, and having unique ways of working (You, 2022).

Design thinking can be used to navigate the digital transformation process in HDOs, which has yet to show many positive results. Here, we discuss how design thinking exercises adopted by organizations help teams to think beyond the obvious and out of the box and seed creativity and innovation to build better products and services.

Healthcare Delivery—Need for Digital Transformation

Improving healthcare services' reach, affordability, effectiveness, and efficiency has become increasingly important for national and federal governments and private healthcare providers. Emerging customer preferences seeking more control and access to healthcare on their terms across multiple channels necessitate HDOs to speed up the digitization of their operation—across different activities of their value chain. HDOs have rising digital transformation aspirations but lack the capability needed. Multiple Gartner research reports (Kraus et al., 2022) prescribed an urgent need for healthcare providers to embrace digital transformation.

While healthcare has been witnessing increased spending, that has not led to increased value or innovation at the scale as in other industries (Rehman et al., 2022), the impact of healthcare IT on quality and efficiency has not shown positive results, highlighting that most health providers are not able to navigate the implementation process to convert investments into real paybacks (Agarwal et al., 2010).

Challenges of Digital Transformation in HDOs

While digital technologies over the past decade have been successful in consumer-driven sectors like telecom, media, and banking, one sector that continues to be a noticeable exception is healthcare (Iyanna et al., 2022). Despite massive investments in digital health services and technologies, both new ventures and reputed technology companies—healthcare delivery transformation still relatively lags other sectors. While we have seen the impact of digital firms—Facebook, Amazon, Apple, Netflix, and Google—we have yet to witness any significant impact of these firms on healthcare delivery. As seen in sectors like banking, media, and telecom, digital innovation can deliver similar value in healthcare (Iyanna et al., 2022). It can expand access and affordability of health services, improving efficiency and effectiveness across the value chain. Patients can be better off leveraging tools and services for self-health management and public health initiatives, which can be more effective with digital interventions. However, the sector has been slow to embrace these technologies (Rehman et al., 2022) that

have had far-reaching benefits for other sectors, as it is still trying to figure out deep-rooted problems concerning costs, access and quality of health, leading to all participants across the value chain—providers, payers, and patients being deprived of the benefits (Walsh & Rumsfeld, 2017). Key reasons identified for this lag of digital transformation in healthcare (Walsh & Rumsfeld, 2017) are:

1. Healthcare is complex; culture and structures must be established to absorb innovation.
2. Stakes are much higher; sometimes, they can be life-and-death decisions, and the industry needs proof of "it works" and not proof of
3. concept before adopting it.
4. Tech companies need domain expertise and insights, which leads to a lack of synergy between technology companies and the clinical problem they are trying to solve.
5. EHR (Electronic Health Records) implementation, which was seen as the first step to transform digitally, is seen as a misstep with growing dissatisfaction among clinicians and patients, for example, National Health Services in the UK (Abbas et al., 2023).

Discussion of Relevant Author—Involved Case Studies

Case 1: Digitization of Patient Experience at a Leading Health Authority

The firm in consideration is a public sector organization that oversees the health system of the UAE. It started operations in 2007 under the direction of the ruler. The program began in March 2008. Leading health authority initiated a mission to digitally transform its services to improve healthcare services to the citizens. The firm wanted to embrace creative innovations to create compelling experiences delivered through an orchestrated ecosystem. With health becoming centerstage and tightening regulations, it wanted to curtail practices that needed to be aligned with the mission of providing high-quality services and were not in line with regulations. Further, it also wanted to ensure that as part strategy for 2015–2021, a 360° approach was needed across all areas of healthcare with the capacity to provide meaningful and positive transformation of health service delivery.

The leading health authority engaged a technology major as part of the digital transformation initiative. The digital transformation team used design thinking methodology in their digital transformation process. Design Thinking leverages a model of an "uninterrupted and steady loop of activity." Teams observed the end customers doing the work, reflected upon the observations, analysed the insights, and synthesized what they had observed to develop a rapid prototype of a better experience. A collaborative team effort which iterated through this loop, observing, reflecting, and making a final product. This collaborative-feedback-based-iterative approach helped the teams to be agile—grasp it quickly and apply it for quick wins.

Cross-disciplinary and multi-functional teams engaged through actions, such as *empathy maps* and *storyboarding*, could better appreciate their user and visualize the outlook. The artifacts created during this exercise formed the story

and enabled teams to share ideas with the customers quickly; users' and stakeholders' ideation ensured enough opportunity was given to the participants to come up with absurd and brilliant ideas. In the initial stages of ideating, it was boring, at times average or even absurd; as it continued, a brilliant idea was generated; the team which was working together in the design thinking voted on both ease of feasibility and impact; an idea which was both feasible and impactful was carried forward and executed. During the process, the focus was not on perfection but on jumping in and continuing iterating, which is evident from the comments shared by the team head of the project:

> While perfection was necessary, the team did not wait for "the perfect solution" but assumed that it was impossible to know everything initially; we were just aware of some things that were good enough to jump in. The earlier one starts "making" rather than "waiting"—the faster he learns. The ideation process to the concept development, and finally, how we delivered, was iterative.

Technology major co-created—engaging with all relevant stakeholders—the right solutions to enable the firm's digital reinvention. At the core of this vision was— an electronic medical record system that brought technologies, capabilities, and processes to the firm's healthcare service network, which operates at different tiers. With the technology major's help and by leveraging design thinking, the firm was able to realize its digital transformation vision as planned (AlSuwaidi & Moonesar, 2021).

Case 2a: Healthcare App for Health Authority Built on Design Thinking

Technology major also designed two award-winning healthcare apps for the citizens. These applications targeted the needs of diabetic patients and those who care for them, and the needs of pregnant women and their family members.

Approximately one in five Dubai residents and citizens have type-2 diabetes. However, access to information on how to manage type-2 diabetes is poor. Furthermore, those who have diabetes—especially type-2—are reluctant to seek help, increasing their risk. To ease the pains of diabetes patients, the health authority engaged a technology major to design a digital platform personalized support system for diabetic patients and their caregivers—to help diabetes patients lead healthy lifestyles. Using design thinking, the mobile app targets the diabetic community, including type-1 diabetic children, elderly type-2 diabetics, caretakers, and family members. The app provides relevant tools and personalized content to help users manage their condition more confidently and gently. Multi-user engagement allows family and caretakers to monitor and support tracking their health. Relevant localized content helped to educate about diabetic topics. Describing the approach of the digital design team, one of the members mentioned:

> We focused on critical issues based on our interactions with the users and their caregivers. What problems were they facing and challenges they were encountering in keeping diabetes in control; what would make them feel successful in winning over the disease; and what they saw as potential hindrances in achieving the same were kept centre stage in designing the app—voted as one of the best apps in the region.

In Design Thinking, team composition and the process of team formation are vital to achieving superior outcomes; diversity and empowerment are essential factors to consider during the team formation stage. These teams usually possess varied experiences, the level of skills and expertise they carry, and diverse backgrounds and races where they come from genders and ages. Further, teams are well-equipped with the skills and empowered to deliver outcomes. By moving operational decisions to the users, teams can develop rapid prototypes as they go through the loop.

During the entire "built stage" of the application, iteration and evolution of user outcomes—through multidisciplinary teams—was the key. Significant time was spent empathizing with the end users' values and beliefs, their life experiences and sources of pain and joy. The design team's focus was to redesign the experience of diabetes patients and their caregivers, an end-to-end solution—from diet management to diabetes control. Each stage's user reviews—and inputs—were vital during the design process. Visualization techniques like storyboarding, scenario mapping, empathy mapping, personification, and accelerated visioning exercises were used to capture and utilize end users' vision to arrive at the most user-friendly application.

Case 2b: Healthcare App—Your Partner in Parenthood

Every 3.5 hours, a baby is born in Dubai. The city's population is expected to grow by 50% by 2020. The growing number of pregnant women lacking access to relevant knowledge on how to manage the pregnancy period increased the frequency of their visits to the doctors. As a part of the citizen's mobile app program to digitize the health service, the health authority engaged a technology major in designing a digital solution to address this pain point of pregnant women and their family members.

A series of steps, the Keys, were applied to scale and utilize Design Thinking across remotely distributed teams. *Hills*, *users*(sponsors), and *playbacks* ensured that teams were aligned around a common purpose and maintained such alignment during the engagement. Hills are purposeful statements written to define user outcomes. Playbacks ensure stakeholders are in the loop—continuously having feedback from them—in a safe space to relate to the user-focused stories and their needs.

Parenthood is a critical milestone in an individual's life. End users of the app were deeply involved in the entire process. The team focused on what else had been done previously, ensuring the incorporation of best practices and past learnings in the conception stage. Stakeholder feedback on ideas—what works for them—was a vital feature of the digital design process. Mentioning the design process, one of the digital design team members mentioned,

> Reflection ensures that there is a convergence of points of view, ensuring the right decision-making based on a good understanding of situations and what difference, in the end, it is making for users.

The healthcare applications, commissioned by health authority and powered by Design Thinking, allowed the firm to deliver toward fulfilling its mission partially—"to provide an accessible, effective, and integrated healthcare system that protects public health and improves citizens' quality of life" leveraging design

thinking as it helped developing better products and services both for clinicians and patients alike. The apps were appreciated across multiple platforms for innovation in government services. The success provides evidence that using design thinking makes digital transformation possible.

Findings

The cases discussed above have one typical pattern—design thinking facilitated success in a digital transformation initiative in HDOs, digitization in healthcare works! Based on the analysis of the cases, we prepared four key insights and a *5-point checklist* on how design thinking helps HDOs embrace digital disruption and successfully transform themselves digitally (Figure 2).

While the propositions below hold good across industries, they are highly relevant for healthcare firms looking to embrace digital technology to provide better products and services for better healthcare delivery.

The findings reveal that digitization leveraging design thinking must go beyond the obvious and actively engage participants throughout the journey. It underscores the importance of cross-functional teams collaborating from the early stages of the design process. Additionally, the study highlights the value of recognizing all ideas, even those that may initially seem unconventional. Finally, involving end users early on can lead to benefits and outcomes emerging sooner than anticipated.

Insights

We found in the discussed cases that design thinking ensures participation across the value chain from the suppliers to the end customers, who would be the users. Participation ensures that the needs of all stakeholders are addressed. In successful cases of digital transformation in HDO-patient, clinician, and hospital/healthcare provider engagement through design thinking led to the building of superior products and services.

> Insight 1: The digitization design and implementation team should be able to look beyond the obvious and engage participants across the value chain during the design phase to enhance the success potential of digitization in healthcare delivery organizations.

✓ Look beyond the obvious and engage participants across the value chain.
✓ Engage cross functioning teams through collaborative activities.
✓ Treasure ALL ideas, some of the absurd sounding ones may hold the key to the solution.
✓ Decide faster, by letting end users rapidly prototype for the product.
✓ Statement of Intent, Sponsor Users, and Playbacks ensure teams remain focused and maintain alignment across complex projects.

Figure 2. 5-Point Checklist on How Design Thinking Helps Embrace Digital Disruption.

Source: Author created a checklist.

Usually, most organizations' leadership styles and siloed structures limit cross-functional cooperation and impede rapid decision-making (Moser et al., 2021). Design Thinking brings together all functions and ensures requirements across the functions are met; this is of significant help as cross-functional conflicts can derail the digital transformation process.

> Insight 2: The digitization design and implementation team should involve cross-functional teams through a collaborative design process from an early phase to enhance digitization's success potential in healthcare delivery organizations.

Design Thinking ensures all ideas are treasured, even though they may sound weird at the start; some ideas that may sound absurd initially have the potential to be truly revolutionary and can be the panacea for the identified pain areas.

> Insight 3: The digitization design and implementation team should value all ideas generated through collaborative thinking, including absurd ideas, during the planning process to enhance the success potential of digitization in healthcare delivery organizations. The "absurd" ideas found may finally lead to the solution.

Designers can quickly decide what product users need by involving end users. Through design thinking, one can rapidly prototype and iterate, leading to quicker turnarounds and faster product rollout.

> Insight 4: The digitization design and implementation team can crash their project time by involving the end users in the prototyping phase to enhance the success potential of digitization in healthcare delivery organizations.

Design thinking ensures that solution-planning teams are aligned and focused on the purpose throughout the digital transformation initiative. Through the statement of intent and playbacks, stakeholders are aligned throughout the process, ensuring success during the implementation phase.

Managerial Implications

This document offers significant perspectives on applying design thinking in the digital transformation of healthcare services. The managerial implications derived from the article suggest that managers should ensure that the digitization design and implementation team look beyond the obvious and engage participants across the value chain during the design phase to enhance the success potential of digitization in HDOs. Managers should involve cross-functional teams through a collaborative design process from an early phase of the design process to enhance the success potential of digitization in HDOs. Managers should ensure that the digitization design and implementation team values all ideas generated through collaborative thinking, including absurd ideas, during the planning process to enhance the success potential of digitization in HDOs. Managers can crash their project time by involving the end users in the prototyping phase to enhance the

potential for the success of digitization in HDOs. Further, managers should ensure that the solution-planning teams are aligned and focused on the purpose throughout the digital transformation initiative. Through the statement of intent and playbacks, stakeholders can be aligned throughout the process, ensuring success during the implementation phase.

However, design thinking is not a magic formula that guarantees success in every digital transformation project. Managers should know the challenges and risks of such complex and uncertain endeavors and be ready to adapt and learn from failures. The above implications can serve as valuable guidelines for managers leveraging design thinking to achieve better patient and organizational outcomes.

To successfully implement digital transformation, managers must embrace design thinking as a method and mindset. Design thinking can help managers understand patients' and stakeholders' needs and expectations, generate creative and feasible solutions, and iterate and improve them based on evidence and feedback. The above implications can assist managers in using design thinking strategically and collaboratively to deliver better outcomes for their patients and organizations.

Conclusion

As we saw from the above systematic literature review and discussion around author—cases, digital disruption powered by design thinking has helped teams across cultures and contexts be innovative problem solvers and provide immense value to the users and the organization implementing digitization. By improvising, designers and engineers can improve products and services on the go, resulting in outstanding customer experience over a long time, leading to a significant increase in staff satisfaction and improving the quality of services delivered productively through teams of product managers, designers, technical teams working together (Bender-Salazar, 2023).

This research provides valuable insights into the concept of design thinking and its role in fostering digital transformation. It contributes to the literature by delving deeply into the "how" question, offering pragmatic insights that can significantly enhance outcomes. Additionally, the study presents practical examples and case studies that illustrate the effective application of design thinking in real-world healthcare settings.

Thus, design thinking can facilitate the success of digital transformation across industries. It is pivotal in helping healthcare firms design products and services that meet stakeholder needs across the value chain, leading to successful adoption. If design thinking is scaled up in HDO digital transformation processes, healthcare will catch up with some of the other industries in imbibing digital. This transformation will benefit patients and clinicians and unlock $300–450 bn in value (Kokshagina, 2021).

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Authors' Contributions

All authors contributed to the conceptualization and execution of the research article.

Data Availability

Data sharing does not apply to this article due to privacy and ethical concerns, neither the data of industry experts nor its source can be made available to the public. The references are provided in the manuscript.

Declaration of Conflicting Interests

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Ethical Statement

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Unveiling the Pathway to Green Entrepreneurial Intentions: The Role of Entrepreneurship Education and Environmental Values

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Abstract

As the commercial and environmental landscapes change, the world community has come to accept the idea of a "green economy." Integrating green ideals into higher education can support a behavioral approach to encouraging green entrepreneurship. Although the importance of entrepreneurship education has been acknowledged, it is still unclear how exactly it would affect students' intents to start green businesses. Taking into consideration the moderating effect of the environment, this review of the research aims to elucidate the relationship between green entrepreneurial intention and entrepreneurship education. A review of the literature was conducted to determine the connection between ambitions for green entrepreneurship and entrepreneurship education. A theoretical framework for analyzing green entrepreneurial intents is suggested by the results, which is based on the theory of planned behavior. This study is noteworthy because it examines for the first time how environmental values impact the relationship between entrepreneurship education and the three primary determinants of intention: attitudes, subjective norms, and perceived behavioral control.

Keywords

Entrepreneurial education, entrepreneurship, intention, sustainability, theory of planned behavior

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Introduction

The concept of green entrepreneurship has garnered increasing attention from governments, academia, and policymakers as a strategic approach to tackling pressing social and environmental challenges. Over the years, various terms have emerged to define this concept, including enviropreneurship and sustainopreneurship (Huda, 2016; OECD, 2011; Tharindu & Koggalage, 2020), ecopreneurship (Gunawan, 2012), ecological entrepreneurship (Mieszajkina, 2016), environmental entrepreneurship (Huggins, 2013), and sustainable entrepreneurship (Hoogendoorn et al., 2019; Sarango-Lalangui et al., 2018). Despite its growing significance, inconsistencies in its definition and measurement have led to a lack of clarity in fully understanding its core principles (Gevrenova, 2012; Melay & Kraus, 2012; Ye et al., 2020). This ambiguity extends to identifying the key factors influencing individuals' willingness to engage in green entrepreneurship, making it essential to explore the motivations behind such entrepreneurial activities.

A critical method for assessing green entrepreneurship is through entrepreneurial intention models, as research suggests that entrepreneurial intention serves as a strong predictor of actual entrepreneurial behavior (Bui et al., 2020). The theory of planned behavior (TPB) (Ajzen, 1991) is one of the most widely applied frameworks for understanding the cognitive processes behind entrepreneurial decision-making. However, while TPB provides a strong theoretical foundation, recent studies argue that it does not fully capture the complexity of green entrepreneurial intentions (Nordin, 2020; Vuorio et al., 2018; Yasir et al., 2021). Specifically, TPB falls short in addressing the socio-environmental motivations that drive individuals toward sustainable entrepreneurship. Recognizing these limitations, this study expands on the TPB framework by incorporating entrepreneurship education and sustainable values as key determinants of green entrepreneurial intentions.

Entrepreneurship education is instrumental in developing entrepreneurial mindsets and equipping individuals with essential skills (Sun et al., 2017). While previous studies (Hoang et al., 2020; Shi et al., 2019) have highlighted the significance of entrepreneurship education in fostering general entrepreneurial intentions, limited research has examined its specific influence on green entrepreneurship. This study seeks to fill this gap by investigating how tailored entrepreneurship education, with a focus on sustainability, can cultivate stronger green entrepreneurial intentions.

Additionally, recent global studies suggest that social and environmental values play a crucial role in shaping individuals' motivations to pursue sustainable business ventures (Peng et al., 2021; Thelken & de Jong, 2020). However, there remains a significant gap in understanding how environmental values interact with entrepreneurship education to influence green entrepreneurial intentions. This study aims to bridge this gap by incorporating environmental values into the entrepreneurial intention model, exploring their moderating effect on the relationship between entrepreneurship education and green entrepreneurial intentions. By doing so, this research introduces a novel perspective that extends prior studies and provides valuable insights into how educational interventions can effectively nurture future green entrepreneurs.

In summary, this research seeks to contribute to the existing literature by addressing key gaps in the study of green entrepreneurial intentions. Unlike previous studies that focus solely on TPB variables, this research emphasizes the role of entrepreneurship education and environmental values in shaping green entrepreneurial intentions. By doing so, it provides a more comprehensive understanding of the factors influencing green entrepreneurship, thus contributing to the literature and offers practical recommendations based on empirical findings for fostering sustainable business practices, which can help create a more supportive environment for aspiring green entrepreneurs.

The following sections of this study will review relevant literature on TPB, green entrepreneurial intentions, entrepreneurship education, and sustainable values setting the foundation for the empirical analysis that follows.

Literature Review and Hypotheses Development

The present study deals with the relationship between green entrepreneurial intention and entrepreneurship education. Green entrepreneurship is a planned behavior that can be molded in college through the study of entrepreneurship. Through the execution of green entrepreneurship, social marketing programs, institutional infrastructure development, and entrepreneurial ecosystems, in addition to universities, have a role in shaping interest in and behavior related to green entrepreneurship. A comprehensive assessment of the literature was conducted on green entrepreneurial intents from 2011 to 2021. The publications were sourced from reliable sources such as SCOPUS, Emerald, ProQuest, and Google Scholar.

From Table 1, it is clear that, the TPB is widely recognized as one of the most extensively applied and validated models for predicting entrepreneurial intentions. Several studies have leveraged TPB to explore the development of non-traditional entrepreneurial intentions, including social entrepreneurship (Teran-Yepez et al., 2020) and green entrepreneurship (Dees, 2017). Given its strong theoretical foundation, the present study focuses specifically on the pre-behavioral component of TPB, which is commonly used in entrepreneurial research.

Within this framework, attitudes toward sustainability, subjective norms, and perceived behavioral control are key factors influencing entrepreneurial intentions. The first two elements assess whether a particular action is perceived as beneficial, while the third determines the feasibility of engaging in that behavior. Each of these factors is shaped by an individual's level of confidence in the potential benefits of a given action (Ajzen, 1991). This study incorporates the core antecedents of TPB, as follows:

- Attitude toward sustainability refers to an individual's perception of the positive or negative outcomes associated with a particular behavior, making it a crucial determinant of sustainable practices (Schick et al., 2016).
- Subjective norms reflect a person's beliefs about whether key social groups would support or discourage a specific action (Ajzen, 1991). This aspect

relates to an individual's ability to align with or resist social expectations in the pursuit of sustainable entrepreneurship (Vuorio et al., 2018).

• Perceived behavioral control encompasses both self-efficacy and perceived controllability (Gao et al., 2017). It represents a combination of an individual's confidence in their own abilities and the external factors—both facilitators and barriers—that may impact their entrepreneurial journey.

By integrating these elements, the TPB framework provides a structured approach to understanding the cognitive processes that shape green entrepreneurial intentions and supports the development of effective strategies for fostering sustainable entrepreneurship.

Green Entrepreneurial Intention

Krueger (1993) defined "entrepreneurial intention" as the decision to start a business. Entrepreneurial intention is the state of mind that drives a person's focus, abilities, and actions toward starting a new business (Bui et al., 2020). TPB explains how intentions are created by stating that people always have a rationale for what they do. This theory consists of three main components: attitude (the degree to which people perceive the behavior as favorable or unfavorable), perceived behavioral control (the degree to which people believe the behavior is easy or difficult to perform), and subjective norm (the perceived social pressure to engage in the behavior or not) (Zaremohzzabieh et al., 2019).

The phrase "green entrepreneurial intention" refers to the aspiration of an individual to launch their own company while keeping environmental issues in mind. "Green entrepreneurship" refers, according to Jabarzadeh et al. (2018), to a range of entrepreneurial endeavors that offer ecologically friendly goods and services in order to generate value for the environment and the economy. According to Demirel et al. (2019), green entrepreneurs are individuals who effectively develop business models that address social and environmental issues while also generating financial gains and benefits to society and the environment. Compared to conventional commercial and social entrepreneurship, green entrepreneurship is characterized by its ability to improve the environment; mitigate the adverse impacts of climate change, including rising sea levels and global warming; and exhibit a resolute dedication to reducing environmental degradation and exploitation (Frederick, 2018). It is imperative that businesses encourage ecologically responsible behavior since social and environmental challenges need to be addressed immediately. Green entrepreneurship fosters sustainability and helps to establish a green economy by reducing the negative consequences of entrepreneurial activities on environmental deterioration worldwide.

Entrepreneurship Education

Entrepreneurship education plays a major role in the formation of planned behavior, including intents and activities associated with green entrepreneurship. According to

Sun et al. (2017), entrepreneurship education must include essential components such as know-what, know-why, know-who, and know-how to foster students' entrepreneurial attitudes and intentions. According to Hoang et al. (2020) and Shi et al. (2019), entrepreneurship education can promote entrepreneurial attitudes and intents. Communities' and colleges' social marketing initiatives can be quite effective in encouraging people to launch green businesses. The goal of green entrepreneurship social marketing is to operate sustainably and provide students with business ideas. Liguori et al. (2020) discovered that while students may aspire to pursue entrepreneurship as a career, this aspiration is typically frustrated by a lack of resources and assistance. As a result, educational institutions have a responsibility to promote green entrepreneurship and the adoption of ecologically friendly economic methods.

Educational establishments must help students. They can do this by creating awareness campaigns and developing concepts for green business. These institutions offer students opportunities, networks, information, and skills that are all part of educational assistance (Saeed et al., 2015). Students who are exposed to entrepreneurship education during their academic journeys gain invaluable experiences that act as a major motivator for them to seek professions in entrepreneurship. As a result, the entrepreneurial intention model has to incorporate entrepreneurship education as a new variable (Zhang et al., 2019).

Hence, as per above explanations, the following hypotheses have been formulated:

H_1: Entrepreneurship education significantly and positively impacts the attitude toward behavior.

H_2: Entrepreneurship education does not have a significant impact on subjective norm.

H_3: Entrepreneurship education does not have a significant impact on perceived behavioral control.

The Theory of Planned Behavior

Ajzen (1991) established TPB, which explains the relationship between attitudes, beliefs, intentions, and behavior, building on the notion of reasoned action. The concept of reasoned action holds that an individual's desire to engage in a certain behavior is influenced by two main factors: their attitude toward the behavior and subjective norms. Perceived behavioral control is a brand-new element added to TPB by Ajzen (1991).

Hence, intents and behavior could be predicted using the widely recognized TPB, which is especially useful when examining the intents of entrepreneurs (Solesvik et al., 2012). Empirical research has validated its applicability in describing entrepreneurial attitudes, intentions, and behavior since Kolvereid first introduced it to the field of entrepreneurship (Bui et al., 2020). The idea states that a person's intention in becoming an entrepreneur is based on their attitude toward entrepreneurship, positive subjective norms about entrepreneurship, and their sense of control over pursuing entrepreneurship (Trivedi, 2016).

Research has shown that TPB can be a helpful tool in predicting the intents and behaviors of business owners in various personal groups (Trivedi, 2016). Research has consistently shown that students' attitudes toward behavior, subjective norms, and perceived behavioral control have a favorable and significant impact on their intentions to launch their own businesses (Munir et al., 2019; Paray & Kumar, 2020; Peng et al., 2021; Wardana et al., 2020; Yasir et al., 2021). Empirical studies on green entrepreneurship have also confirmed the positive and significant influence of attitude toward behavior, subjective norms, and perceived behavioral control. The aforementioned justifications allow for the formulation of the following hypotheses:

H_4: Attitude toward behavior does not have a significant impact on green entrepreneurial intention.

H_5: Subjective norm does not have a significant impact on green entrepreneurial intention.

H_6: Perceived behavioral control does not have a significant impact on green entrepreneurial intention.

Environmental Values

The relationship between green entrepreneurial intention and entrepreneurial education has been the subject of numerous studies, which has led to the identification of disparities in previous findings. A number of studies have reported no such effect (Galvão et al., 2018; Karimi et al., 2016), but others (Otache, 2019; Paray & Kumar, 2020; Sun et al., 2017; Wardana et al., 2020; Zhang et al., 2019) have found a positive and significant effect of entrepreneurship education on behavior attitudes, subjective norms, and perceived behavioral control.

There is conflicting evidence regarding the effects of attitude, subjective norm, and perceived behavioral control on green entrepreneurial aspirations. A positive and significant relationship between attitude toward behavior and green entrepreneurial intentions has been found in some studies (Nordin, 2020; Peng et al., 2021; Thelken & de Jong, 2020; Vuorio et al., 2018; Yasir et al., 2021); however, no significant relationship has been found in other studies (Hamzah et al., 2016; Sargani et al., 2020). Ranasinghe and Ajward (2019), Nordin (2020), Thelken and de Jong (2020), Londono et al. (2020), Sargani et al. (2020), Yasir et al. (2021), and Peng et al. (2021) all show variations in subjective norm and perceived behavioral control.

To address these disparities, a new variable might be added. Using environmental value as a variable, it is also possible to investigate the relationship between entrepreneurial education and attitudes, subjective norms, and perceived behavioral control. This is in line with TPB, which holds that intentions and behavior are influenced by a variety of factors, including attitudes, subjective standards, perceived behavioral control, values, and beliefs. In the context of green entrepreneurship, environmental value can enhance the norms, attitudes, and control linked to green entrepreneurial behavior (Nave & Franco, 2019; Vesper & Gartner, 1997). The aforementioned justifications allow for the formulation of the following hypotheses:

H_7: Environmental values do not have a significant impact on attitude toward behavior.

H_8: Environmental Values do not have a significant impact on subjective norm.

H_9: Environmental values do not have a significant impact on perceived behavioral control.

Methodology

Based on a detailed analysis of the literature on green entrepreneurial goals, entrepreneurship education, and drawing from TPB, a conceptual framework has been developed. Figure 1 depicts the created diagram that demonstrates the relationship between entrepreneurship education and green entrepreneurial objectives.

According to the conceptual framework, attitudes, subjective norms, and perceived behavioral control are shaped by entrepreneurship education, which in turn influences green entrepreneurial intents. What sets this research review apart from others is the addition of the additional variable of environmental values, which improves the influence of entrepreneurship education on attitudes, norms, and control relevant to green entrepreneurial behavior. In an earlier study, Qazi et al. (2020) also looked into the usage of environmental values as a factor for the influence of attitudes and subjective norms on green entrepreneurial desires. According to Yasir et al. (2021), environmental values have an effect in a stepwise manner, affecting attitudes, norms, behavior control, and intention in turn. Both actual facts and TPB support this.

Questionnaire Development

A closed-ended, structured questionnaire provided the data. The Likert scale (5 points) was used as the basis for the statements of different constructs. With funding from the central government, subject matter experts from a university in India conducted the
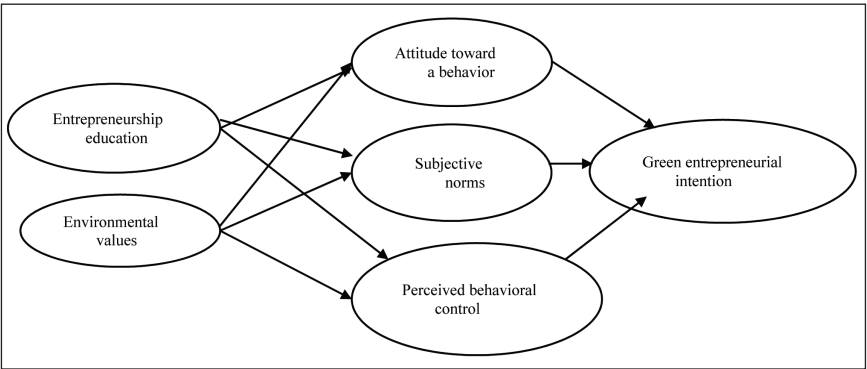
Figure 1. Conceptual Model.

pilot testing. They recommended that phrases be rephrased and that exploratory factor analysis be used to modify the scales (Hair et al., 2010; Malhotra & Dash, 2011). Entrepreneurial education consisted of five statements: "Entrepreneurship course should be made compulsory in order to stimulate entrepreneurial spirit in campus," "More entrepreneurial and business educational programs on campus would help students to start businesses," "The entrepreneurial education and training is enhancing my problem-solving and critical-thinking skills," "The entrepreneurship course should offer opportunities for hands-on learning (e.g., business simulations, startup projects)," and "If a major in entrepreneurship were available, I will change my major to it." Environmental values were taken from the scale developed by Kuckertz and Wagner (2010). The Liñán and Chen (2009) scale was used for the questions of attitude, subjective norms, perceived behavioral control, and green entrepreneurial intention.

Sample

Sampling is a critical component of marketing research, ensuring the selection of a representative group from the target population. This study focuses on MBA students in India, whose education in business and entrepreneurship directly influences their entrepreneurial intentions. To maintain sample quality, institutions were selected based on the NIRF Ranking 2023, covering 10 central universities recognized for academic excellence and diversity. Given the study's focus on entrepreneurial intention, the sample was drawn exclusively from top NIRF-ranked MBA programs, ensuring relevance and rigor. Data was collected via Google Forms, distributed through e-mails and WhatsApp groups. Screening questions ensured the inclusion of only MBA students enrolled in entrepreneurship-related courses. Of the 977 participants, 884 valid responses were recorded for analysis.

Data Analysis

Demographic Analysis

Table 2 displays the demographic profiles of the respondents (884 final samples). There were 884 pupils in the sample, including 31.5% females and 68.5% males. The majority (80%) belonged to middle-class and upper-class groups with yearly incomes of $5,000,00,000 and higher.

Exploratory Factor Analysis

The responses of the survey were subjected to EFA (Malhotra & Dash, 2011). According to various studies, items having a value of 0.5 or above should be retained (Fen & Sabruddin, 2008; Hair et al., 2006). Therefore, items having loading more than 0.5 were retained in the present study. For a more meaningful factor solution and better interpretation of the factors, factor rotation was employed. Varimax rotation was selected for the present study (Khan & Kirmani, 2018). The results of the retained items are shown in Tables 3 and 4.

Table 1. A Comprehensive Review of Recent Research Examining Entrepreneurial Intention Through the Lens of Theory of Planned Behavior Models.

| | | Factors of TPB | | | | | | |
Year	Author	AT	SN	PBC	INT	ACT	Others	Analysis Tool
2014	Koe et al.	Yes	Yes	Yes		Yes		Structural equation modeling
2014	Chen & Tung	Yes	Yes	Yes	Yes		Yes	Structural equation modeling
2015	Abina et al.			Yes	Yes		Yes	Regression
2015	Ahmad et al.			Yes	Yes	Yes	Yes	Structural equation modeling
2018	Vuorio et al.	Yes			Yes		Yes	Structural equation modeling
2019	Ranasinghe & Ajward	Yes	Yes	Yes	Yes		Yes	Structural equation modeling
2019	Ali et al.		Yes		Yes		Yes	Structural equation modeling
2019	Ramayah et al.			Yes	Yes		Yes	Structural equation modeling
2019	Nuringsih et al.		Yes		Yes		Yes	Structural equation modeling
2020	Thelken & Jong	Yes	Yes	Yes	Yes		Yes	Structural equation modeling
2020	Ye et al.	Yes	Yes	Yes	Yes			Structural equation modeling
2020	Nordin	Yes	Yes	Yes	Yes			Structural equation modeling
2020	Qazi et al.	Yes	Yes	Yes	Yes			Structural equation modeling
2020	Jiang et al.			Yes	Yes		Yes	Regression
2020	Sargani et al.	Yes	Yes	Yes	Yes		Yes	Structural equation modeling
2020	Polas et al.	Yes		Yes	Yes			Structural equation modeling
2020	Soomro et al.			Yes	Yes		Yes	Structural equation modeling
2021	Yi		Yes		Yes	Yes	Yes	Structural equation modeling
2021	Yasir et al.	Yes	Yes	Yes	Yes		Yes	Structural equation modeling
2021	Hameed et al.		Yes			Yes	Yes	Structural equation modeling
2021	Peng et al.	Yes	Yes	Yes	Yes		Yes	Structural equation modeling
2022	Cui & Bell				Yes		Yes	Structural equation modeling
2022	Melia et al.				Yes		Yes	Structural equation modeling
2023	Wang et al.			Yes	Yes			Structural equation modeling
2023	Zhuang & Sun				Yes		Yes	PLS—structural equation modeling
2024	Duong & Vu			Yes	Yes		Yes	Process macro

Note: EE, entrepreneurial education; AT, attitude; SN, subjective norm; PBC, perceived behavioral control; INT, intention.

Table 2. Demographic Analysis.

Variables	Classification	Number	Percentage
Gender	Male	606	68.6
	Female	278	31.4
Annual family income	Below 2,50,000	132	14.9
	2,50,000–5,00,000	240	27.1
	5,00,000–10,00,000	216	24.4
	10,00,000 and above	296	33.5

Table 3. Exploratory Factor Analysis.

	Rotated Component Matrixa					
	Component					
	1	2	3	4	6	7
EV1	0.916					
EV3	0.928					
EV5	0.904					
EV6	0.902					
EI1		0.947				
EI2		0.590				
EI3		0.836				
EI5		0.850				
EI6		0.858				
AT1			0.752			
AT3			0.900			
AT4			0.789			
AT5			0.900			
EE1				0.806		
EE2				0.787		
EE3				0.592		
EE4				0.775		
EE5				0.746		
PBC1					0.850	
PBC2					0.920	
PBC3					0.881	
SN1						0.717
SN2						0.864
SN3						0.809

Note: [a]Rotation converged in six iterations; extraction method: principal component analysis; rotation method: Varimax with Kaiser normalization.

It is observed from Tables 3 and 4 that among six items of EE, one item was dropped. Similarly, two items of EV and PBC and one item of AT, SN, and EI were excluded. The final measurement items are listed in Table 4.

Validity Analysis

The accuracy of the instrument is measured by validity analysis (Linn, 2000). It is the extent to which the test tool accurately measures what it purports to measure. Convergent and discriminant validity are measured while guaranteeing the validity of the construct (Hair et al., 2006). Table 5 presents the validity results, which are described further.

Construct validity backs up the assertion made by the test it is designed to measure. Convergent and discriminant validity, which indicate how the observed items of the proposed model measure a construct they are attempting to assess, are the two elements that go into proving construct validity.

Convergent validity describes the empirical relationship between theoretically linked construct measures (Trochim, 2006). Two determinants—the factor

Table 4. Final Measurement Items.

| S. No. | Author | Pre-testing Results | | EFA Results | |
		Original Statements	Rephrased Items	Loadings	Decision
Entrepreneurial education					
EE1	Ooi et al. (2011)	"Entrepreneurship course should be made compulsory in order to stimulate entrepreneurial spirit in campus."	No Change	0.806	Retained
EE2	Ooi et al. (2011)	"More entrepreneurial and business educational programmes on campus would help students to start businesses."	No Change	0.787	Retained
EE3	Researcher	"The entrepreneurial education and training is enhancing my problem solving and critical thinking skills."	No Change	0.592	Retained
EE4	Researcher	"The entrepreneurship course should offer opportunities for hands-on learning (e.g., business simulations, startup projects)."	No Change	0.775	Retained
EE5	Lee et al. (2005)	"If a major in entrepreneurship were available, I will change my major to it."	"If a major in entrepreneurship was available, I would have changed my major to it."	0.746	Retained
EE6	Researcher	"In my Institute, people are actively encouraged to pursue their own ideas."		<0.50	Not Retained
Environmental values					
EV1	Kuckertz & Wagner (2010)	"I think that environmental problems are one of the biggest challenges for our society."	No Change	0.916	Retained
EV2	Kuckertz & Wagner (2010)	"German firms should take an internationally leading role in the field of environmental protection."	"Firms should take an internationally leading role in the field of environmental protection."	<0.50	Not Retained
EV3	Kuckertz & Wagner (2010)	"I think that entrepreneurs and companies need to take on a larger social responsibility."	"I think that companies need to take on a larger social responsibility."	0.928	Retained
EV4	Kuckertz & Wagner (2010)	"Corporate social responsibility should be part of the foundations of each company,"	"Corporate social responsibility ought to be part of the foundations of each company,"	<0.50	Not Retained
EV5	Kuckertz & Wagner (2010)	"The environmental performance of a company will in future be considered more and more by financial institutions."	"The environmental performance of a company should be considered more and more by financial institutions."	0.904	Retained
EV6	Kuckertz & Wagner (2010)	"Firms that are environmentally oriented have advantages in recruiting and retaining qualified employees."	No Change	0.902	Retained

Attitude

AT1	Liñán & Chen (2009)	"A career as an entrepreneur is attractive for me."	"A career as an entrepreneur is attractive to me."	0.752	Retained
AT2	Liñán & Chen (2009)	"Among various options, I would rather be an entrepreneur."	No Change	<0.50	Not Retained
AT3	Liñán & Chen (2009)	"If I had the opportunity and resources, I'd like to start a firm."	No Change	0.900	Retained
AT4	Liñán & Chen (2009)	"Being an entrepreneur would entail great satisfactions for me."	"Being an entrepreneur would bring utmost satisfaction to me."	0.789	Retained
AT5	Liñán & Chen (2009)	"Being an entrepreneur implies more advantages than disadvantages to me."	"Being an entrepreneur has more advantages than disadvantages to me."	0.900	Retained

Subjective norms

SN1	Liñán & Chen (2009)	"If you decided to create a firm, would people in your close environment approve of that decision? Indicate from 1 (total disapproval) to 7 (total approval). Your close family."	"As and when I decide to create a firm, people in my close environment would approve of my decision."	0.717	Retained
SN2	Leong (2008)	"I believe that people, who are important to me, think that I should pursue a career as an entrepreneur."	No Change	0.864	Retained
SN3	Leroy et al. (2009)	"My parents are positively oriented towards a career as entrepreneur."	No Change	0.809	Retained
SN4	Leroy et al. (2009)	"My friends see entrepreneurship as a logical choice."	"My peer group see entrepreneurship as a logical choice."	<0.50	Not Retained

(Table 4 continued)

(Table 4 continued)

S. No.	Author	Pre-testing Results		EFA Results	
		Original Statements	Rephrased Items	Loadings	Decision
Perceived behavioral control					
PBC1	Kolvereid (1996)	"To what extent It would be easy for me to become an entrepreneur."	"It would be easy for me to become an entrepreneur."	0.850	Retained
PBC2	Kolvereid (1996)	"To what extent I believe that the number of events which is outside my control could prevent me from being self-employed is numerous."	"I believe that the number of events which is outside my control could prevent me from being self-employed."	0.920	Retained
PBC3	Gurbuz & Aykol (2008)	"To start a firm and keep it work would be easy for me."	"To start a firm and keep it working well is easy for me."	0.881	Retained
PBC4	Kolvereid (1996)	"To what extent you are confident that if you start a business the failure chances will be very low."	"I am confident that if I start a business, the chances of failure shall be minimum."	<0.50	Not Retained
PBC5	Dohse & Walter (2011)	"If I wanted I could certainly become self-employed after my studies."	"I am certain to be self-employed after my studies."	<0.50	Not Retained
Entrepreneurial intention					
EI1	Liñán & Chen (2009)	"I am ready to do anything to be an entrepreneur."	No Change	0.806	Retained
EI2	Liñán & Chen (2009)	"My professional goal is to become an entrepreneur."	No Change	0.787	Retained
EI3	Liñán & Chen (2009)	"I am determined to create a firm in the future."	"I am committed to create an entrepreneurial venture in future."	0.592	Retained
EI4	Liñán & Chen (2009)	"I have firm intention to start a business."	No Change	<0.50	Not Retained
EI5	Liñán & Chen (2009)	"I have very seriously thought of starting a firm."	"I am keen on starting a firm."	0.775	Retained
EI6	Liñán & Chen (2009)	"I will make every effort to start my own business."	No Change	0.746	Retained

Table 5. Validity Analysis.

	CR	AVE	EE	SV	AT	SN	PBC	EI
EE	0.929	0.725	**0.851**					
EV	0.871	0.631	0.520	**0.794**				
AT	0.927	0.765	0.397	0.434	**0.874**			
SN	0.926	0.807	0.198	0.318	0.180	**0.898**		
PBC	0.899	0.749	0.209	0.283	0.299	0.189	**0.866**	
EI	0.941	0.763	0.226	0.327	0.192	0.201	0.280	**0.874**

Note: The correlational values are shown in boldface behind the diagonal values.

loadings and average variance extracted (AVE)—are evaluated in order to gauge convergent validity (Hair et al., 2010). When the first criterion was used, all of the factors had factor loadings greater than 0.50, as shown by the standardized loadings (Table 3). With values more than 0.50, the second convergent validity determinant, or AVE, which calculates the mean of the variance derived from the item loadings of a construct, was also determined to be acceptable (Hair et al., 2010).

Discriminant validity measures how unconnected the components of the constructs that are intended to be unrelated are. It is ascertained by contrasting the construct's correlation values with the square root of AVE. Values greater than the correlational values should be found in the square root of AVE. In Table 5, which shows the square root values of AVE, the correlational values are shown in boldface behind the diagonal values. The result suggests that the measure has discriminant validity. Consequently, the construct validity of the scale employed in this study was confirmed.

Structural Equation Modeling

To assess the data, structural equation modeling was employed. The current approach was selected above other possible methods because it provides a clear assessment of measurement errors, uses observed variables to estimate latent variables, and uses fit indices to support model testing (Kaplan, 2001). Within the allowable ranges, the measurement model's model fit indices are as follows: CMIN/df = 1.970; RMSEA = 0.048; AGFI = 0.919; GFI = 0.938; CFI = 0.855. Additionally, the composite reliability, convergent validity, and discriminant validity (AVE > 0.5, CR close to 0.7, and AVE > MSV) were all within acceptable bounds. The present study's structural model fit yielded acceptable ranges (CMIN/df = 1.980; RMSEA = 0.049; AGFI = 0.929; GFI = 0.949; CFI = 0.875). Path analysis revealed that each and every hypothesis was supported (Figure 2).

Findings

1. This research underscores the pivotal role of entrepreneurial education in fostering positive attitudes, strengthening subjective norms, and enhancing confidence toward entrepreneurship. By shaping favorable perceptions, education encourages individuals to view green entrepreneurial ventures more positively.
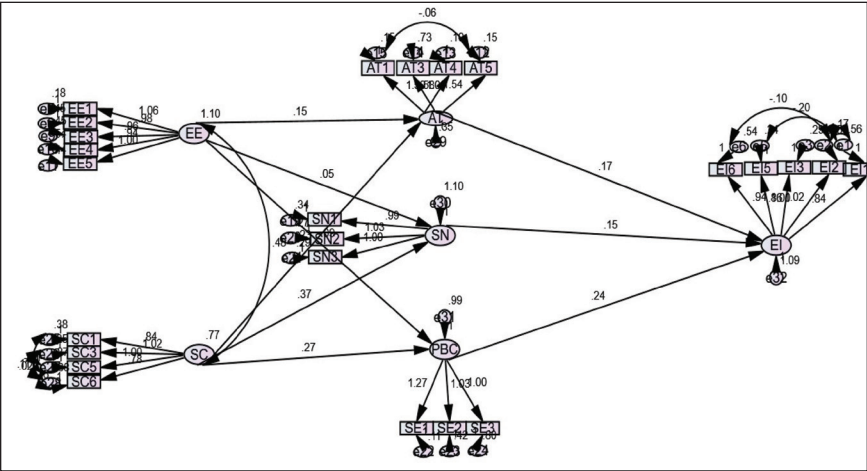
Figure 2. Structural Equation Modeling.

2. Environmental values also emerged as a key factor, reinforcing positive attitudes, strengthening social expectations, and enhancing perceived behavioral control in entrepreneurship, all contributing to a stronger commitment to creating a positive environmental impact.
3. The findings confirm that individuals with positive entrepreneurial attitudes are significantly more likely to develop green entrepreneurial intentions, aligning with the idea that favorable perceptions drive entrepreneurial intent.
4. Similarly, subjective norms, or social pressures to engage in entrepreneurship, were found to play a crucial role, indicating that societal influences shape entrepreneurial motivations.
5. Moreover, individuals with higher perceived behavioral control—a strong belief in their entrepreneurial abilities—are far more likely to pursue green entrepreneurship, emphasizing that self-confidence is a key determinant in entrepreneurial decision-making.

Together, these insights highlight how education, environmental values, and psychological factors influence green entrepreneurial intentions through attitudes, subjective norms, and perceived behavioral control.

Discussion

The findings highlight the crucial role of entrepreneurship education in fostering green entrepreneurial intentions, emphasizing how educational programs can shape positive attitudes, subjective norms, and perceived behavioral control toward entrepreneurship. By incorporating environmental values into these programs, students gain the knowledge and skills necessary to engage in sustainable business practices.

This approach not only encourages entrepreneurial spirit but also aligns it with eco-friendly goals, reflecting the growing demand for businesses that contribute to environmental sustainability. The inclusion of environmental values as a moderating factor further enriches our understanding of how personal environmental beliefs influence entrepreneurial behavior, underscoring the need for education to cultivate environmentally conscious business leaders.

Psychological factors, such as entrepreneurial attitudes, subjective norms, and perceived behavioral control, are also key drivers of green entrepreneurial intentions. Positive entrepreneurial attitudes, reinforced by social support and a strong belief in one's abilities, significantly increase the likelihood of pursuing green entrepreneurship. These findings highlight the importance of fostering both a supportive societal environment and a sense of self-confidence to encourage individuals to take entrepreneurial action. Together, these insights suggest that education, environmental values, and psychological factors are interconnected in shaping individuals' entrepreneurial intentions and behaviors, emphasizing the need for programs that support both cognitive and environmental aspects of entrepreneurship.

Implications, Limitations, and Future Research Directions

Implications

On the basis of findings, key implications are listed below:

1. Entrepreneurial education programs:
   a. Develop and deliver specialized workshops on business planning, risk management, and innovation.
   b. Partner with successful entrepreneurs to provide real-world case studies and hands-on experiences.
   c. Include pitch competitions, hackathons, and live startup projects as part of the curriculum.
   d. Offer elective courses focused on specific entrepreneurial industries like technology, social entrepreneurship, or green business.

2. Promoting sustainability in entrepreneurship:
   a. Provide tax incentives or funding for startups focused on renewable energy, waste reduction, or eco-friendly products.
   b. Establish university research centers dedicated to sustainable entrepreneurship, offering grants for innovative projects.
   c. Introduce sustainability certification programs for entrepreneurs adopting environmentally conscious practices.

3. Strengthening entrepreneurial attitudes:
   a. Launch campaigns emphasizing the economic and personal fulfillment benefits of entrepreneurship.

b. Share testimonials and success stories of entrepreneurs from similar socioeconomic backgrounds to inspire confidence.

c. Create storytelling initiatives that showcase how entrepreneurship has positively impacted communities.

4. Reinforcing subjective norms for sustainability-focused ventures:

a. Develop local "green hubs" or co-working spaces that connect sustainability-minded entrepreneurs and encourage collaboration.

b. Launch public recognition programs to reward and celebrate eco-friendly businesses, motivating others to follow suit.

c. Partner with NGOs to offer training and resources for sustainable business models.

5. Building entrepreneurial perceived behavioral control:

a. Organize regular confidence-building workshops such as public speaking, negotiation, and problem-solving exercises.

b. Provide mentorship programs where experienced entrepreneurs coach and guide aspiring entrepreneurs.

c. Set up mock business simulations where participants experience the challenges and decisions of running a business.

6. Government and institutional support:

a. Establish low-interest loans and microcredit programs specifically for sustainable and faith-driven startups.

b. Simplify licensing and regulatory processes for small businesses to encourage new ventures.

c. Partner with educational institutions to establish entrepreneurship cells that provide resources such as incubators and accelerators.

d. By adopting these targeted actions, stakeholders can effectively address the key findings and create a conducive environment for entrepreneurial growth and sustainable impact.

Limitations of the Study

All efforts have been taken to make the study error free; however, every study creates challenges and issues, some of which remain unexplored, setting the need for further researches. These issues are listed below, which require attention of future researchers:

1. This study focused only on national central universities in India. The results might be different in other cultures.

2. The study included only MBA students. The findings might vary for students in other programs like BBA, BCOM, or MCOM.

3. Changes in student attitudes over time were not considered because the study did not use a longitudinal approach.

4. All responses were collected online without in-person contact, which may have introduced bias. Face-to-face interaction with students might have led to different results.
5. The study considered only young people, excluding other age groups from the research.

Directions for Future Research

Some guidance for the researchers in the area of green marketing and social media marketing have been listed below:

1. **Cross-cultural comparisons**: Future research could undertake comparative studies across universities in various countries to examine how cultural differences influence entrepreneurial intentions. This would allow for a broader understanding of how culture shapes entrepreneurial behavior.
2. **Different educational levels**: Further studies can investigate entrepreneurial intentions among students from both undergraduate and postgraduate programs beyond MBA, including disciplines such as science, engineering, and arts, to determine whether academic fields have an impact on entrepreneurial outcomes.
3. **Longitudinal approach**: Incorporating a longitudinal approach in future research would enable the observation of changes in entrepreneurial attitudes over time, offering a more comprehensive understanding of how education shapes entrepreneurial intentions in the long term.
4. **Factor analysis**: As identified in the literature review, several factors influence entrepreneurial intention. Future researchers are recommended to explore and test these factors in-depth to better understand their role in shaping entrepreneurial intentions across different contexts and populations.

Declaration of Conflicting Interests

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Is There a Difference in Supply Chain Management Practices, Competitive Advantage, Organizational Performance, and Supply Chain Agility Between Listed and Unlisted Pharmaceutical Companies?

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Abstract

Effective pharmaceutical supply chain management (SCM) plays a pivotal role as the foundation of organizational success. This study aims to investigate the variations in supply chain management practices (SCMP), competitive advantage (CA), organizational performance (OP), and supply chain management agility (SCMA) between listed and unlisted companies in India's pharmaceutical sector. The data were gathered using a structured questionnaire, developed through a comprehensive literature review and pilot-tested in Goa. A purposive sampling approach was adopted, with responses from 192 senior supply chain professionals analyzed using advanced statistical techniques and neural network models. A holistic analysis using the Mann–Whitney test revealed no significant differences in SCMP, CA, SCMA, and OP between listed and unlisted pharmaceutical companies. The data were further segmented into large-cap, mid-cap, small-cap, and

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unlisted companies. Subsequent analysis with the Kruskal–Wallis test identified significant differences in strategic supplier partnerships (SSP), price, delivery dependability (DD), product innovation (PI) and time to market (TTM) across the categories. Large-cap companies ranked highest in SSP, price, DD, PI, and TTM, followed by mid-cap, unlisted, and small-cap companies. Additionally, large-cap companies exhibited the least variability, with mid-cap, small-cap, and unlisted companies showing progressively greater variability.

Introduction

The competitive landscape has intensified due to rivalry among established firms and emerging players. In response, organizations have increasingly prioritized internal factors, such as cost optimization and supply chain efficiency, to boost profitability (Choon Tan et al., 2002). Wisner et al. (2021) highlighted that the core objective of supply chain management (SCM) is to deliver value to end users while enhancing value at every stage of the process to ensure the final product aligns with customer needs. Efficient allocation of resources throughout the value chain helps minimize unnecessary costs and eliminate various forms of waste, thereby improving overall profitability (Kumar et al., 2012).

SCM plays a crucial role in the pharmaceutical industry, acting as a critical link in the production and delivery of medicines to patients (Faggioni et al., 2023). To ensure the continuous availability of essential medications, pharmaceutical companies must develop resilient and shock-resistant supply chains capable of withstanding uncertainties (Pattanshetty et al., 2023). Although optimizing supply chain efficiency presents a significant challenge, organizations with well-structured and streamlined supply chains gain a notable competitive advantage over their peers (Moosivand et al., 2019).

This study aims to examine the differences in supply chain management practices (SCMP), supply chain management agility (SCMA), competitive advantage (CA), and organizational performance (OP) between listed and unlisted pharmaceutical companies in India. SCMPs are delineated through five subconstructs, namely, strategic supplier partnership (SSP), customer relationship (CR), information sharing quality (IQ), information sharing level (IS), and postponement (POS). CA is given by five subconstructs, namely, price, product quality (QL), delivery dependability (DD), product innovation (PI), and time to market (TTM). OP consists of two constructs: financial performance (OP_FP) and market performance (OP_MP). SCMA is represented by two subconstructs, viz., organizational agility (SCMA_OA) and supply chain agility (SCMA_SCA).

In India, listed companies are those whose shares are publicly traded on stock exchanges such as the Bombay Stock Exchange (BSE) and the National Stock Exchange, adhering to regulations established by the Securities and Exchange

Board of India (Al-Homaidi et al., 2021). On the other hand, unlisted companies are privately held entities whose shares are not traded on any stock exchange (Gupta et al., 2022). As per BSE's classification, listed companies are categorized into small-, mid-, and large-cap firms. Market capitalization, which reflects a company's total market value, is calculated by multiplying the price of its shares by the total number of shares outstanding (Kuvshinov & Zimmermann, 2022). According to the BSE classification, companies ranked 1st to 100th based on market capitalization are categorized as large-cap, those ranked 101st to 250th are classified as mid-cap, and companies ranked 251st and beyond fall under the small-cap category (Raju, 2024).

This study examines and compares the differences in SCMP, CA, OP, and SCMA between listed and unlisted pharmaceutical companies. Listed companies, driven by stricter regulatory requirements and greater transparency obligations, often adopt distinct operational strategies, whereas unlisted companies typically enjoy more operational flexibility (Hess, 2019). Figure 1 illustrates the study's framework, adapted from the work of Lee et al. (2006). This comparative analysis offers valuable insights into how a company's listing status impacts its supply chain effectiveness and competitive positioning within the pharmaceutical industry.

The study is divided into two phases. In the first phase, companies are classified as either listed or unlisted, irrespective of their size (market capitalization) and analyzed using the Mann–Whitney U test. In the second phase, companies are grouped into four categories—small-cap, mid-cap, large-cap, and unlisted—and further analyzed using the Kruskal–Wallis test. The present study investigates the differences in SCMP, CA, OP, and SCMA between listed and unlisted pharmaceutical companies to provide critical insights into industry dynamics. By classifying companies based on market capitalization, the analysis seeks to highlight how organizational size affects supply chain strategies and performance. The findings aim to enrich the existing literature by offering a holistic view of supply chain operations across diverse pharmaceutical companies.

Literature Review

SCM Practices

SCMP comprises a comprehensive framework that covers strategies and tactics to be adopted by organizations to improve the efficiency, effectiveness and overall performance of the supply chains (Li et al., 2006). The implementation of SCMP is expected to enhance CA across various dimensions like value creation and response rate (Linda & Thabrani, 2021). Li et al. (2006) examined several SCM practices, including SSP, CR, IS and postponement (POS). They found that such practices enhance OP_Fp and organizations' competitiveness. CR involves initiatives and practices aimed at building lasting connections with customers, tracking, and addressing their enquiries and ensuring total satisfaction, thereby fostering long-term loyalty (Choon Tan et al., 2002; Claycomb et al., 1999) and enhancing the organization's brand image (Chen & Popovich, 2003). IS is crucial for sustaining businesses and seamlessly integrating supply chains, as the extent

and quality of this information directly impact an organization's competitive position (Abdulameer & Yaacob, 2020; Dwivedi, 2020; Moberg et al., 2002). POS, a supply chain practice that delays specific actions until the final point, facilitates rapid, and flexible responses to demand variations while enabling cost-effective product customization, offering a CA (Budiman & Rau, 2021; Dong et al., 2023; Yang, 2014). Reducing cost and inventory holding, POS provides for product variety and enhances the overall OP (Prataviera et al., 2020).

Competitive Advantage

CA refers to the unique and valuable strengths, either inherent within an organization or developed over time, that set it apart from its competitors (Prahalad & Hamel, 1990). These specific strengths, which are either exclusive or complex for competitors to replicate (Afraz et al., 2021), outline the crucial elements that organizations influence directly in supply chain production, thereby providing opportunities for CA (Cahyono et al., 2023; Javid & Amini, 2023). Listed companies use benchmarking as a strategic approach to gain a CA (Gichinga & Mukulu, 2015). With increasing consumer demand for quicker access to goods and services, reducing delivery time has become a key CA (Sharabati, 2023). Achieving a CA in one or more business aspects has been shown to enhance the overall OP (Cahyono et al., 2023; Li et al., 2006; Linda & Thabrani, 2021; Singh et al., 2018).

Organizational Performance

OP refers to the measurable outcomes or achievements of a firm, assessed against its set objectives. It is evaluated using specific metrics such as sales, market share, market share growth rate, return on investment, profit, profit margin and the overall position of the firm (Budianto & Dewi, 2023; Hamann & Schiemann, 2021; O'Boyle & Hassan, 2013). Internal factors such as liquidity and leverage significantly impact OP (Purwanto & Purwanto, 2020). Le (2023) expanded the understanding of OP to include organizational effectiveness, while (Al-Madi, 2017) customer satisfaction, operational efficiency, and corporate social responsibility to enhance value and overall OP. Previous studies have confirmed that OP can be improved through CA (Cahyono et al., 2023; Economou & Chatzikonstantinou, 2009; Li et al., 2006; Singh et al., 2018).

SCM Agility

SCMA encompasses the ability to predict, detect and respond swiftly to situations and recognize and adapt quickly to market dynamics (Aslam et al., 2020; Braunscheidel & Suresh, 2018). Agile companies, by rapidly recognizing market changes and implementing synchronous responses, can gain significant first-mover, and other CA while incorporating agility into a supply chain

significantly enhances OP (Abdallah et al., 2021; Braunscheidel & Suresh, 2018; Sturm et al., 2022). The components that enhance the agility within a supply chain include new technologies, speed, accountability, expertise, adaptable systems, and cost-effectiveness, while the SCM architecture determines the extent of an organization's innovative capacity and OP (Baramichai et al., 2007; DeGroote & Marx, 2013; Hamann & Schiemann, 2021; Najar, 2022; Patel & Sambasivan, 2022; Shukor et al., 2021).

Research Methodology

The current study seeks to examine whether there are differences in SCMP, CA, SCMA, and OP between listed and unlisted pharmaceutical companies in India, as well as across various company categories, including large-cap, mid-cap, small-cap, and unlisted companies. The data were gathered using a structured questionnaire, developed through a comprehensive literature review and pilot-tested in Goa. Items for the constructs of SCMP, CA, and OP were adapted from Li et al. (2006), while SCMA items were designed based on the author's understanding of the subject through the literature. The questionnaire consisted of 63 questions assessing the four constructs: SCMP, CA, OP, and SCMA. It was administered to 1,000 pharmaceutical companies using purposive sampling. The 1,000 pharmaceutical companies were chosen from listed and unlisted space ensuring contributions from small-cap, mid-cap, large-cap, and unlisted firms. Data collection resulted in 227 complete responses from supply chain professionals across various pharmaceutical companies, resulting in a response rate of 22.7%. The data were statistically analyzed using IBM SPSS 26 and Smart PLS 4. Various statistical tests were conducted to test for the reliability and validity of the instrument questionnaire. Under these measures, content validity, unidimensionality, multicollinearity (VIF), internal consistency, and discriminant validity were determined. Due to the skewness observed in the data set, statistical tests like the Mann–Whitney U test were used to evaluate differences between listed and unlisted companies based on the parameters selected. However, further evaluation was done using the Kruskal–Wallis test to assess differences between listed companies (large-cap, mid-cap, and small-cap) and unlisted companies. The study was based on the following framework for listed and unlisted companies.

The Indian pharmaceutical sector comprises both listed and unlisted companies, as well as companies of varying sizes based on market capitalization. While structural and operational differences exist between these groups, it remains unclear whether these differences significantly affect their SCMP, CA, OP, and SCMA. The following null hypotheses are proposed to assess whether these organizational differences result in statistically significant variations, ensuring an objective evaluation of their influence on supply chain effectiveness and performance outcomes.

H_{01}: There is no significant difference in SCMP, SCMA, CA, and OP between listed and unlisted companies
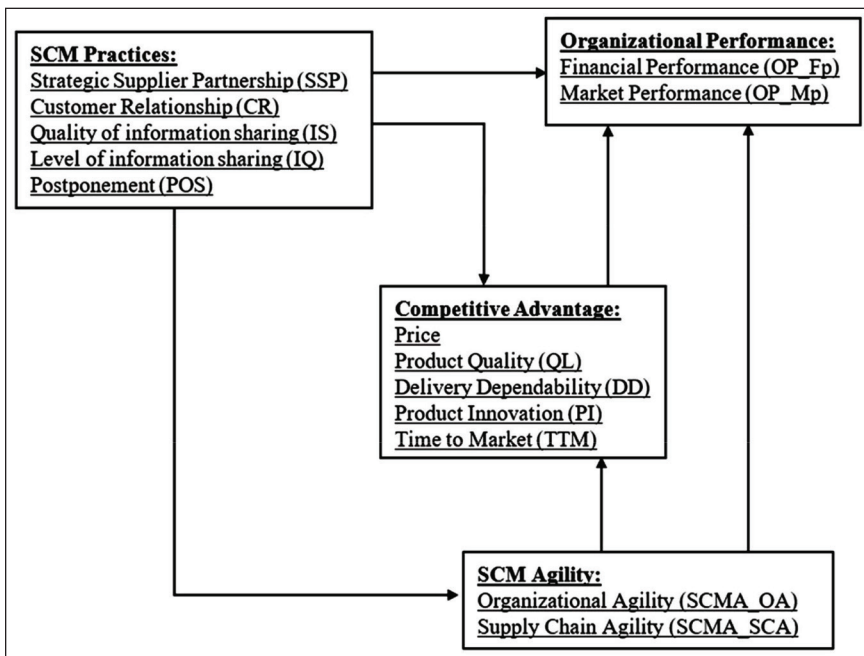
Figure 1. Construct Framework

> **H$_{02}$:** There is no significant difference in SCMP, SCMA, CA, and OP between small-cap, mid-cap, large-cap, and unlisted companies.

Data Analysis and Interpretation

Demographics

The study surveyed 227 pharmaceutical companies, both listed and unlisted. Of these, 135 companies (59.4%) were unlisted, while the remaining 92 listed companies were categorized as large-cap (12), mid-cap (16), and small-cap (64), according to BSE classification. The companies were further divided by focus areas: 136 (60%) specialized in formulations, 37 (16.3%) in active pharmaceutical ingredients (API), 19 (8.3%) in contract research and manufacturing services (CRAMS), and 35 (15.4%) in other pharmaceutical segments. The majority of the respondents are unlisted on Indian stock exchanges and are primarily involved in pharmaceutical formulations.

Measurement Model

To ascertain the validity of the questionnaire's content, it was evaluated by a panel of four academic experts. Following their suggestions, minor adjustments were

implemented, and a pilot survey was carried out with 10 respondents to validate the content. Unidimensionality was ensured through exploratory factor analysis, with a threshold of 0.5 for factor loadings, as recommended by Hair et al. (2017). The SCMP construct had 28 items over five dimensions. The items that failed to meet the threshold or had cross-loadings were deleted. The CA construct had 17 items spread across five dimensions, while both OP and SCMA had 7 and 11 items across two dimensions each. No items were deleted from the CA, OP, and SCMA constructs. The variance inflation factor (VIF) measure was used to identify collinearity issues (García et al., 2015). All the VIF values ranged from 0.1 to 5; hence, no collinearity issues existed. According to Cronbach (1951), reliability is achieved when all the alpha values are equal to or above 0.70. In this case, all the values were above 0.70, confirming an acceptable level of internal consistency. Fornell and Larcker (1981) proposed that the diagonal elements must exceed 0.5 to establish discriminant validity, reflecting each construct's square root of the average variance extracted. Additionally, they emphasized that the highest loadings within each construct should be prioritized, further supporting the distinctiveness of each construct. The given data set satisfied both conditions, thus confirming discriminant validity. Covariance-based structural equation modeling (CB-SEM) exhibited the following values for the goodness of fit: chi-square value (342.22), p-value (.000), RMSEA (0.13), GFI (0.827), AGFI (0.743), SRMR (0.73), NFI (0.865), TLI (0.858), and CFI (0.88). Therefore, according to the framework proposed by Hair et al. (2014), the model displays a satisfactory level of goodness of fit.

Mann–Whitney U Test

Mann–Whitney U test was performed to analyze the differences between listed and unlisted companies holistically.

As evident from Table 1, the p values for all the subconstructs are greater than 0.05, indicating that no significant differences were observed between listed and unlisted companies across the constructs.

Structural Equation Modeling

SEM analysis compared SCMP OP, CA, and SCMA in listed and unlisted companies.

Figure 2 illustrates the SEM analysis diagram, showing the direct and indirect impact of SCMP, SCMA, and CA on OP in listed pharmaceutical companies. SCMP has a direct impact of 21.4% on OP, 39.1% on CA and 68.3% on SCMA. The impact of CA and SCMA on OP is 29.4% and 39.9%, respectively. Finally, SCMA has an impact of 53.1% on CA.

Figure 3 illustrates the SEM analysis diagram, showing the direct and indirect impact of SCMP, SCMA, and CA on OP in unlisted pharmaceutical companies. SCMP has a direct impact of 5.8% on OP, 25.3% on CA, and 67.7% on SCMA. The impact of CA and SCMA on OP is 48% and 34.8%, respectively. Finally, SCMA has an impact of 53.1% on CA.

Table 1. Independent-samples Mann–Whitney *U* Test.

Subconstructs	Test Statistic	P
Strategic supplier partnership (SSP)	0.272	.356
Customer relationship (CR)	0.034	.779
Level of information sharing (IQ)	0.129	.965
Quality of information sharing (IS)	0.066	.203
Postponement (POS)	0.753	.236
Price	0.347	.756
Product quality (QL)	1.951	.857
Delivery dependability (DD)	0.002	.456
Product innovation (PI)	1.737	.231
Time to market (TTM)	0.032	.380
Financial performance (OP_Fp)	1.18	.205
Market performance (OP_Mp)	0.001	.572
Organizational agility (SCMA_OA)	0.025	.529
Supply chain agility (SCMA_SCA)	0.480	.840

Source: Authors' analysis using SPSS 26.

Figure 2. SEM Analysis for Listed Companies.
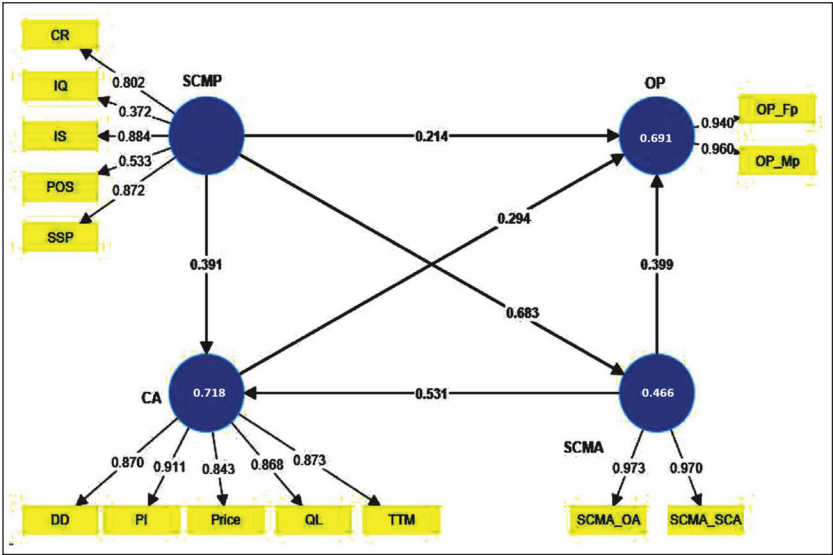
Source: Authors' analysis using SmartPLS 4.

In Table 2, no significant difference was observed in the regression coefficients of SCMP, CA, OP, and SCMA between the listed and unlisted companies in the second-order SEM analysis.

Kruskal–Wallis Test

The Kruskal–Wallis test was used to analyze the differences between large-cap, mid-cap, small-cap, and unlisted companies.
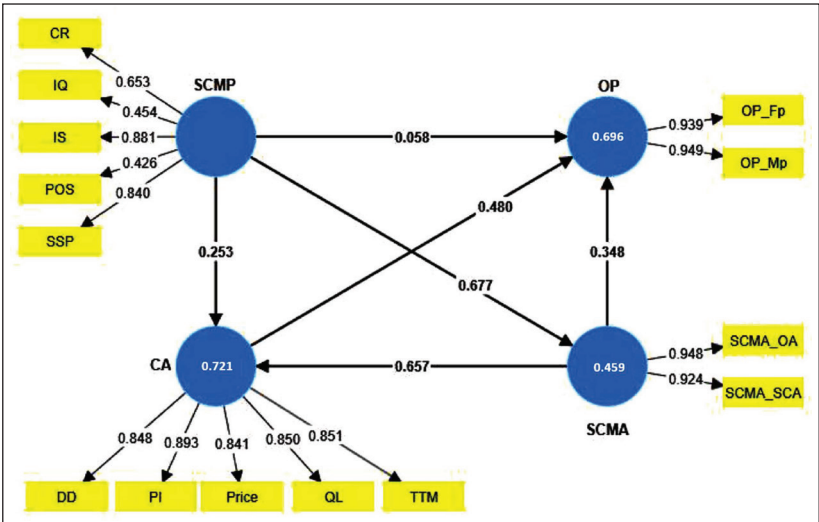
Figure 3. SEM Analysis for Unlisted Companies.

Source: Authors' analysis using SmartPLS 4.

Table 2. Regression Coefficients for Listed and Unlisted Companies Through SEM Analysis.

Construct	Subconstruct	Regression Coefficients (Listed)	Regression Coefficients (Unlisted)
SCMP	Strategic supplier partnership (SSP)	0.872	0.840
	Customer relationship (CR)	0.802	0.653
	Quality of information sharing (IS)	0.884	0.881
	Level of information sharing (IQ)	0.372	0.454
	Postponement (POS)	0.533	0.426
CA	Price	0.843	0.841
	Quality (QL)	0.868	0.850
	Time to market (TTM)	0.873	0.851
	Product innovation (PI)	0.911	0.893
	Delivery dependability (DD)	0.870	0.848
OP	Financial performance (OP_Fp)	0.940	0.939
	Market performance (OP_Mp)	0.960	0.949
SCMA	Organizational agility (SCMA_OA)	0.973	0.948
	Supply chain agility (SCMA_SCA)	0.970	0.924

Source: Authors' analysis from SEM analysis.

Table 3 indicates significant differences in SSP, Price, DD, PI, and TTM, as the p-value is less than .05 at a 95% confidence interval. To further explore these differences, pairwise comparisons were conducted.

As seen in Table 4, large and small-cap companies exhibit significant differences in terms of SSP with test statistics (56.979) and p-value (.005). Large-cap and unlisted companies also exhibit differences in SSP with test statistics (39.260) and p-value (.044). The differences have been presented graphically below.

Table 3. Independent-samples Kruskal–Wallis Test.

Subconstructs	Test Statistic	Sig.	Decision on the Null Hypothesis (H_{02})
Strategic supplier partnership (SSP)	8.694	0.034*	Reject
Customer relationship (CR)	5.122	0.163	Retain
Level of information sharing (IQ)	5.893	0.117	Retain
Quality of information sharing (IS)	4.823	0.185	Retain
Postponement (POS)	4.022	0.259	Retain
Price	11.098	0.011*	Reject
Product quality (QL)	2.658	0.447	Retain
Delivery dependability (DD)	8.062	0.045*	Reject
Product innovation (PI)	8.932	0.030*	Reject
Time to market (TTM)	11.288	0.010*	Reject
Financial performance (OP_Fp)	5.564	0.135	Retain
Market performance (OP_Mp)	5.42	0.143	Retain
Organizational agility (SCMA_OA)	5.703	0.127	Retain
Supply chain agility (SCMA_SCA)	5.774	0.123	Retain

Source: Authors' analysis using SPSS 26.

Table 4. Pairwise Comparison of Listing Status on SCMP.

	SSP	
Sample 1–Sample 2	Test Statistic	Sig.
Small cap–Mid cap	12.594	0.487
Small cap–Unlisted	−17.719	0.072
Small cap–Large cap	56.979	0.005
Mid cap–Unlisted	−5.125	0.765
Mid Cap–Large cap	44.385	0.073
Unlisted–Large cap	39.260	0.044

Source: Authors' analysis using SPSS 26.

Box plots indicate independent-samples Kruskal–Wallis test for various subconstructs.

As evident in Figure 4, SSP has the highest median in large-cap companies, followed by equal importance in mid-cap and unlisted, and finally, the small-cap companies.

In Table 5, differences in price, DD, PI, and TTM as a measure of CA were observed in large-cap, small-cap, and unlisted companies, as the *p*-value is less than .05. As evident in Figure 5, price variations are least in large-cap, followed by mid-cap and small-cap. Unlisted companies are seen to have the highest variations in their prices. The median price for mid-cap, small-cap, and unlisted companies is equal. In Figure 6, large-cap and mid-cap companies have the highest DD, while small-cap and unlisted companies have the same median in DD with higher variations in the unlisted companies. As seen in Figure 7, large-cap companies, followed by mid-cap companies, are the pioneers of PI, followed by
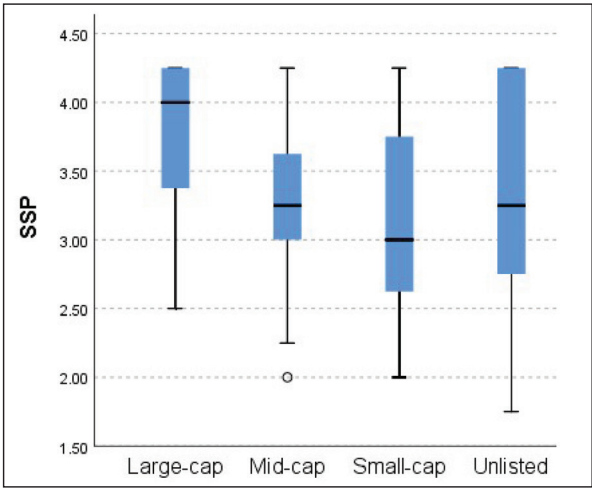
Figure 4. Strategic Supplier Partnership.

Source: Authors' analysis using SPSS 26.

Table 5. Pairwise Comparison of Listing Status on Competitive Advantage.

	Competitive Advantage							
	Price		DD		PI		TTM	
Sample 1–Sample 2	Test Statistic	Sig.	Test Statistic	Sig.	Test Statistic	Sig.	Test Statistic	Sig.
Small Cap–Unlisted	−9.08	0.29	−5.21	0.60	−1.75	0.86	−5.72	0.56
Small Cap–Mid cap	25.88	0.14	30.50	0.09	40.07	0.05	30.95	0.09
Small cap–Large cap	61.91	**0.00**	49.14	**0.02**	40.65	**0.03**	61.98	**0.00**
Unlisted–Mid cap	15.87	0.33	25.29	0.14	38.32	0.05	25.23	0.14
Unlisted–Large cap	51.93	**0.01**	43.93	**0.02**	38.90	**0.02**	56.27	**0.00**
Mid cap–Large cap	36.03	0.13	18.64	0.45	−0.58	0.98	31.03	0.21

Source: Authors' analysis as per the above box plots.

unlisted and small-cap companies, which display wide and similar levels of variation. In Figure 8, large-cap followed by mid-cap companies are the fastest in TTM, while the unlisted and small-cap companies exhibit similar medians and variations throughout the journey from pharmaceutical product development to commercialization.

Results and Discussion

The study aimed to identify any notable differences in SCMP, SCMA, OP, and CA between listed and unlisted Indian pharmaceutical companies and to explain the reasons for these differences. Initially, the Mann–Whitney U test revealed no
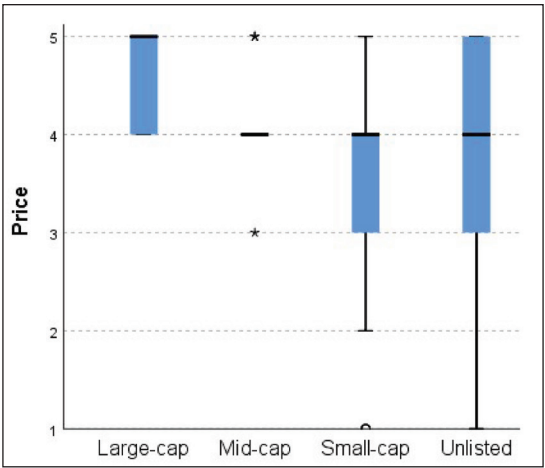
Figure 5. Price.
Source: Authors' analysis using SPSS 26.
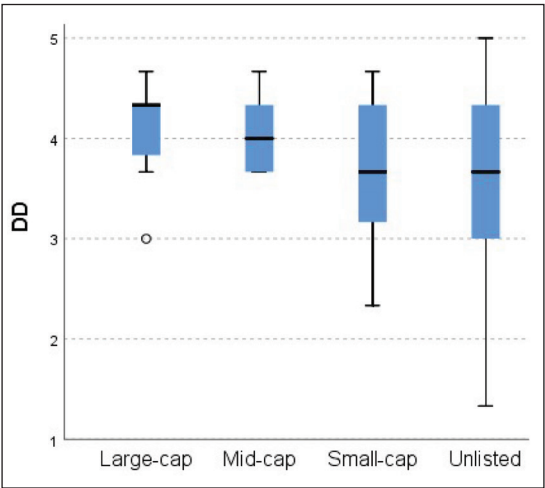
Figure 6. Delivery Dependability.
Source: Authors' analysis using SPSS 26.

significant differences between listed and unlisted companies in SCMP, SCMA, CA, and OP. Consequently, further analysis was conducted by categorizing the listed companies into large-cap, mid-cap, and small-cap companies according to the BSE market capitalization and using the Kruskal–Wallis test.

Upon performing the Mann–Whitney U test, the p-value for all the subconstructs was more significant than .05. At the same time, no significant difference was observed among the regression coefficients between the listed and unlisted companies in the second-order SEM analysis. Therefore, H_{01} was found to be significant and, thus, accepted. Therefore, we conclude that no significant
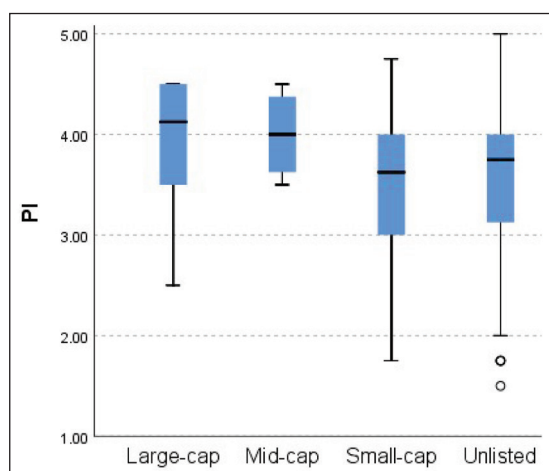
Figure 7. Product Innovation.

Source: Authors' analysis using SPSS 26.
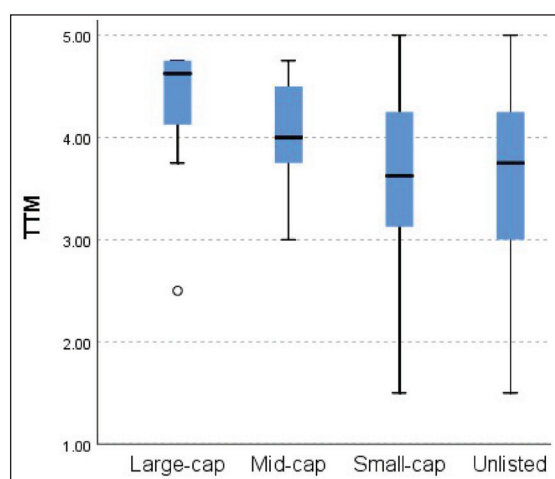
Figure 8. Time to Market.

Source: Authors' analysis using SPSS 26.

difference exists between listed and unlisted companies in SCMP, SCMA, CA, and OP when the two groups were compared holistically.

The data were further analyzed by grouping it into large-cap, mid-cap, small-cap and unlisted companies for analysis through the Kruskal–Wallis test. On performing the Kruskal–Wallis test, the *p* values for SSP (.034), price (.011), DD (.045), PI (.030) and TTM (.010) were found to be less than .05 at a 95% confidence interval indicating significant differences between large-cap, small-cap, and unlisted companies. H_{02} is not significant and, thus, not supported. Significant

differences exist between SSP, price, DD, PI, and TTM among large-cap, small-cap, and unlisted companies.

In SCMP, differences exist in SSP among large-cap, small-cap, and unlisted companies. Large-cap and unlisted companies have higher SSP levels followed by mid-cap and small-cap companies. Unlisted companies, followed by small- and mid-cap, exhibit the highest variation, with large-cap having the lowest variations in SSP.

For CA, price, DD, PI, and TTM differences exist among large-cap, small-cap, and unlisted pharmaceutical companies. The box plot shows that large-cap companies have the highest median prices, while mid-cap, small-cap, and unlisted companies have similar median prices. Unlisted companies exhibit greater price variability, while large-cap companies have a similar price range. Large-cap companies display the highest median DD value, followed by mid-caps, while small-cap and unlisted companies display similar levels of DD. Unlisted companies are ranked highest, while all the other categories show moderate variability in DD. All the companies display similar levels of PI, with the large-cap having the highest PI and the small cap the lowest. The highest variations in PI are seen in small-cap and unlisted companies. Large-caps lead the race in TTM followed by the mid-caps, unlisted and small-cap companies. The highest variation is seen in small-cap and unlisted companies.

Conclusion and Managerial Implications

The study finds that (a) there are no significant differences in SCMP, SCMA, CA, and OP between listed and unlisted Indian pharmaceutical companies when examined comprehensively. The results of the Mann–Whitney U test and second-order SEM analysis corroborate this, with p values and regression coefficients showing no substantial variation between the two groups. Both listed and unlisted companies exhibit uniformity in these areas. (b) Notable differences were identified in SCMP and CA across large-cap, small-cap, and unlisted pharmaceutical companies. Large-cap companies are ranked highest in SSP, price, DD, PI, and TTM, followed by mid-cap, unlisted, and small-cap companies. While unlisted and small-cap companies exhibited the greatest variability in these metrics, large-cap companies showed greater stability, with mid-cap companies falling between large-cap and unlisted firms.

The findings of this study provide key managerial insights for pharmaceutical companies. Notably, large-cap companies capitalize on economies of scale to optimize pricing, foster product innovation, and ensure timely delivery, thus securing a competitive edge. Smaller companies, on the other hand, may need to concentrate on forming strategic partnerships and strengthening their supply chain capabilities to compete with the performance of larger firms.

For mid-cap and small-cap companies, investing in research and development (R&D) and adopting advanced supply chain technologies can improve product offerings and boost operational efficiency. Additionally, it was observed that the implementation of DD and PI strategies is crucial for achieving CA. Managers

should focus on refining SCMP, pricing strategies, and innovation efforts to improve OP.

The limitations of this study include its cross-sectional design, which captures data at a single point in time, thus limiting the ability to track trends or changes over time. Additionally, integrating qualitative methods, such as case studies or interviews, could provide a deeper understanding of the contextual factors influencing these variables. Future research could further explore the impact of emerging technologies, regulatory changes, and market disruptions on the pharmaceutical sector's supply chain and competitive strategies.

Declaration of Conflicting Interests

Funding

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Appendix

A. Questionnaire instrument for SCMP, SCMA, CA, and OP

Please tick the option that most precisely reflects your organization's present conditions concerning SCM wherein '1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly agree.'	

I. Supply Chain Management Practices

1. Strategic supplier partnership (SSP)

SCMP_SSP1*	We value quality as an essential criterion in supplier selection.
SCMP_SSP2	We resolve queries/issues with suppliers regularly.
SCMP_SSP3	We support our suppliers to improve product quality.
SCMP_SSP4	We organize continuous improvement programs to help our key suppliers.
SCMP_SSP5*	We allow our key suppliers to participate in organizational planning and goal-setting activities.
SCMP _SSP6	We encourage the involvement of key suppliers in new product development processes/decisions.

2. Customer relationship (CR)

SCMP_CR1	We include our customers in our planning.
SCMP_CR2	We regularly interact with customers to set reliability, responsiveness, and other organizational standards.
SCMP_CR3	We frequently measure and evaluate customer satisfaction on repeated intervals.

(Appendix continued)

(Appendix continued)

Please tick the option that most precisely reflects your organization's present conditions concerning SCM wherein '1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly agree.'

SCMP_CR4	We take feedback from our customers to improve the quality of our products.
SCMP_CR5	We encourage customers to seek assistance from the organization.
SCMP_CR6*	We have a dedicated system for handling customer complaints.
SCMP_CR7*	We try to build long-term relationships with our customers.

3. Level of information sharing (IS)

SCMP_IS1	Our trading partners and we discuss any changing needs in advance.
SCMP_IS2	Our trading partners provide all types of information which affect our business.
SCMP_IS3	Our trading partners ensure that shared information helps in developing business processes.
SCMP_IS4	We exchange information with trading partners that helps in business planning.
SCMP_IS5	We share information about events or changes that may affect our business (trading) partners.
SCMP_IS6	Our internal processes are integrated with our partners to ensure smoother operations.

4. Level of information quality (IQ)

SCMP_IQ1	Timely
SCMP_IQ2*	Accurate
SCMP_IQ3*	Complete
SCMP_IQ4*	Adequate
SCMP_IQ5*	Reliable

5. Postponement (POS)

SCMP_POS1	We go for utilization of modular assembly as far as possible.
SCMP_POS2*	We go for final product assembly/manufacturing only on receipt of customer order.
SCMP_POS3*	We delay final product manufacturing until the nearest customer position in the supply chain.
SCMP_POS4	'Our supply chain postponement strategies enable customization of products.'

II. Competitive advantage

1. Price

CA_Price1	We offer products at competitive prices.
CA_Price2	We offer products at prices that are lower than our competitors.

2. Quality

CA_QL1	We are able to compete based on quality.
CA_QL2	We offer highly reliable products.
CA_QL3	The products we offer are highly durable.
CA_QL4	We offer high-quality products.

(Appendix continued)

Please tick the option that most precisely reflects your organization's present conditions concerning SCM wherein '1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly agree.'

3. Delivery dependability

CA_DD1	We manufacture and deliver the kind of products as needed by our customers.
CA_DD2	We are dependable as we ensure order delivery within the specified time.
CA_DD3	We accept and deliver ad-hoc orders.

4. Product innovation

CA_PI1	We provide customized products depending on customer needs.
CA_PI2	We alter our products according to customer requirements.
CA_PI3	We respond well to customer demand for new potential features.
CA_PI4	We select and involve key suppliers to maintain innovativeness.

5. Time to market

CA_TTM1	We quickly deliver products to market.
CA_TTM2	We are first to introduce new products in the market.
CA_TTM3	We offer lower time to market than our competitors.
CA_TTM4	We are faster in product development than our competitors.

III. Organizational Performance

OP_Fp1	We fetch a decent return on investment.
OP_Fp2	We manage a decent return on investment growth.
OP_Fp3	We ensure improvement in our profit margin.
OP_Mp1	We are able to achieve a defined market share every time.
OP_Mp2	Our market share growth is in accordance with our expectations.
OP_Mp3	We ensure our sales growth every quarter.
OP_Mp4	We dominate the market in terms of overall competitive position.

IV. Supply Chain Agility

SCMA_OA1	We timely capture market information.
SCMA_OA2	We embrace change and learning through continuous improvement, top management support, and staff empowerment.
SCMA_OA3	We take decisions quickly using the available information.
SCMA_OA4	We implement decisions quickly.
SCMA_OA5	We quickly detect changes, opportunities, threats, and seize competitive market opportunities.
SCMA_OA6	We are flexible in responding rapidly and cost-effectively to customer needs by information sharing.
SCMA_SCA1	We enhance our operational capabilities through production planning, process integration, inventory management, and postponement.
SCMA_SCA2	We make use of technology that reduces overall time required.
SCMA_SCA3	Our processes are highly integrated.
SCMA_SCA4	Our supply chain uses rapid response initiatives.
SCMA_SCA5	Our supply chain is capable of responding to real market demand.

*Marked questions were deleted from the final questionnaire

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Impact of E-commerce on Online Purchase Intentions Among Banking Professionals: Mediating Role of Personal Factors

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Abstract

This study examines how e-commerce influences the online shopping habits of banking professionals, with a particular focus on the mediating role of personal factors. A quantitative approach was employed, using a cross-sectional survey to collect primary data from 496 banking professionals across South Indian states. The data were analyzed using partial least squares structural equation modeling (PLS-SEM) with SmartPLS 4.0 software. The findings indicate that e-commerce positively affects online purchase intentions, with personal factors—such as individual values, occupation, lifestyle, income, societal trends, cultural influences, and social recommendations—significantly mediating this relationship. Additionally, e-commerce has a positive impact on personal factors. The study provides actionable insights for e-commerce platforms and digital marketers to develop tailored strategies for banking professionals addressing their needs and preferences. Policymakers may also leverage these findings to enhance digital consumer protection initiatives. By focusing on this unique demographic, the study contributes to the academic discourse on digital consumer behavior and offers practical implications for future research.

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Introduction

The swift rise of e-commerce has significantly transformed how consumers behave, especially regarding their intentions to purchase online. E-commerce platforms have become vital to the modern marketplace, offering consumers unparalleled convenience, variety, and accessibility. This transformation is driven by many factors, ranging from technological advancements to shifts in societal trends and personal preferences (Rosenbloom, 2000). However, the effect of e-commerce on specific professional groups, such as banking professionals, remains underexplored. Banking professionals represent a financially literate and tech-savvy segment of the workforce whose purchase intentions may differ from others due to their unique professional responsibilities, financial stability, and exposure to digital marketing platforms. This study seeks to examine how e-commerce influences the online purchase intentions of banking professionals, with a particular focus on the mediating role of personal factors such as values, occupation, lifestyle, income, societal trends, cultural influences, and social recommendations, all play pivotal roles in shaping purchasing decisions on digital media platforms (Dwivedi et al., 2021). As consumers navigate many online options, these factors can significantly impact their preferences and buying behaviors. Personal values are intrinsic beliefs that guide individuals' behavior and decision-making processes (Lichtenstein et al., 2017; Vinson et al., 1977). In e-commerce, these values can influence preferences for specific brands, products, or ethical considerations. Occupation, particularly among professionals like bankers, can also substantially impact. The nature of their work, income levels, and professional responsibilities can shape their online shopping habits and preferences. Lifestyle encompasses the activities, interests, and opinions that characterize an individual's way of living (González & Bello, 2002). It directly affects how consumers engage with e-commerce platforms, dictating their shopping frequency and product types.

Similarly, income levels determine purchasing power, influencing the scope and scale of online shopping activities. High-income individuals may prioritize convenience and premium products, while those with limited budgets might seek value-for-money deals and discounts (Shergill & Chen, 2004). Societal trends and cultural influences are critical in shaping consumer behavior. These macrolevel factors encompass prevailing social norms, cultural values, and widespread trends that affect consumer preferences on a broad scale. Additionally, family, friends, and colleagues' recommendations (social proof) are crucial in the decision-making process (Hu et al., 2019). In the digital age, social media and e-WOM (electronic word-of-mouth) have amplified the impact of these recommendations, often guiding consumers toward or away from specific products and services. The personalization of digital marketing content has emerged as a powerful tool in influencing online purchase intentions. Tailored advertisements, personalized recommendations, and targeted marketing campaigns can create a sense of relevance and engagement,

driving consumers toward impulsive purchases. Moreover, the role of influencers on digital platforms has grown significantly, with many consumers willing to purchase products recommended by trusted influencers.

This study examines these multifaceted factors within the specific context of banking professionals. By analyzing how personal factors (i.e., personal values, occupation, lifestyle, income, societal trends, cultural influences, and social recommendations) mediate the relationship between e-commerce platforms and online purchase intentions, this research seeks to provide a comprehensive understanding of digital consumer behavior. The unique focus on bankers offers insights into a financially literate and tech-savvy demographic, providing a nuanced perspective on the interplay between personal factors and e-commerce usage. By investigating this specific demographic, the research aims to fill a gap in the literature regarding how personal factors mediate online purchase behavior within the context of financially literate professionals. The findings will offer insights for e-commerce platforms and marketers aiming to target specialized professional groups more effectively. Businesses can develop effective marketing strategies tailored to specific consumer segments by identifying the critical personal factors influencing online purchase intentions.

Furthermore, this study contributes to the academic discourse on consumer behavior in the digital age, offering valuable insights for future research. This research seeks to connect theory and practice, providing insights into the complex factors influencing online purchasing decisions among banking professionals. The insights gained will enhance our knowledge of digital consumer behavior and inform strategies to optimize the e-commerce experience for diverse consumer groups.

Literature Review and Hypothesis Development

The rapid growth of e-commerce has fundamentally transformed consumer behavior, particularly in the context of online purchase intentions. This transformation is driven by many factors ranging from technological advancements to shifts in societal trends and personal preferences. The following literature review synthesizes existing research on these factors and their impact on online purchase behavior, providing a foundation for the hypotheses tested in this study. Existing research has examined how various factors, such as technological advancements, societal trends, and personal values, influence consumers' purchasing decisions on digital platforms (González & Bello, 2002; Mukhtar et al., 2023). This section synthesizes key findings from the existing literature, with each hypothesis emerging from a critical review of the theoretical and empirical studies, offering a well-grounded basis for the research model.

E-Commerce and Personal Factors

E-commerce platforms offer unparalleled convenience and accessibility, fundamentally altering how consumers engage with the marketplace. The rise of e-commerce has led to significant changes in consumer purchasing behavior, with

many studies highlighting the various factors influencing these changes. Based on existing research, e-commerce influences personal factors such as lifestyle and occupation, which in turn shape online purchase intentions (González & Bello, 2002). Given that banking professionals possess unique work habits and financial expertise, they may exhibit different responses to e-commerce platforms compared to other consumer groups. These platforms allow for personalized interactions, fostering a tailored shopping experience that enhances customer satisfaction and purchase intention (Pappas et al., 2014). Specifically, personal factors—such as lifestyle, occupation, and income—are critical in shaping how consumers interact with e-commerce platforms.

Hypothesis 1: E-commerce has a positive impact on personal factors.

This hypothesis is grounded in the idea that e-commerce not only provides convenience but also influences how individuals align their lifestyle and purchasing behavior with digital trends. For instance, González & Bello (2002) suggest that individuals in professional roles, such as banking, often exhibit specific purchasing patterns influenced by their occupational demands and income levels. E-commerce platforms' ability to offer highly personalized experiences is directly related to these personal factors, as consumers seek efficient and relevant shopping options (Sweeney & Soutar, 2001).

Personal Values and Online Purchase Intentions

Personal values are fundamental drivers of consumer decision-making processes, especially in an online environment. Consumers tend to align their purchases with brands or products that reflect their core beliefs and values, making personal values a strong predictor of purchase intention. Carrington et al. (2014) found that consumers with strong ethical considerations are more likely to purchase from brands that align with their social or environmental values. This alignment between values and e-commerce offerings often translates into higher online purchase intentions. The influence of personal factors—such as values, lifestyle, and occupation—on online purchase behavior has been extensively studied. For instance, banking professionals, who are typically financially literate and technologically adept, may have specific purchasing preferences that are informed by their professional and personal values (Hughes et al., 2019). As these personal factors drive a consumer's approach to e-commerce, we posit that personal factors have a direct and positive influence on online purchase intentions.

Hypothesis 2: Personal factors have a positive impact on online purchase intentions.

E-Commerce and Online Purchase Intentions

The convenience and personalization afforded by e-commerce platforms have a direct impact on consumers' purchasing intentions. Personalization, in particular, has been

shown to be a powerful driver of purchase decisions in the online marketplace. Setyani et al. (2019) argue that personalized marketing campaigns significantly increase the likelihood of impulsive purchases, as consumers perceive these offerings as relevant to their specific needs and preferences. Similarly, Dabholkar and Sheng (2012) noted that e-commerce platforms' ability to customize content for individual users plays a key role in driving purchase intentions. E-commerce's impact on online purchase intentions is well supported by existing research, with studies showing that personalized digital marketing strategies effectively influence consumers' decisions. Banking professionals, in particular, may respond positively to these tailored experiences due to their need for convenience and efficiency in managing time and resources. This hypothesis builds on the understanding that e-commerce fosters a direct, positive relationship between the platform's offerings and the user's intention to make purchases (Babić Rosario et al., 2020).

> **Hypothesis 3:** E-commerce has a positive impact on online purchase intentions.

The Mediating Role of Personal Factors

While e-commerce significantly influences purchase intentions, the role of personal factors as mediators in this relationship is equally critical. Personal factors such as lifestyle, occupation, and social recommendations serve as intermediaries between a consumer's engagement with e-commerce platforms and their ultimate decision to purchase. Pappas et al. (2014) emphasized that experienced online shoppers exhibit different purchasing behaviors compared to novices, suggesting that personal experience and values play a mediating role in shaping consumer outcomes.

> **Hypothesis 4:** Personal factors mediate the relationship between e-commerce and online purchase intentions.

This hypothesis is derived from the argument that personal factors—such as occupation, lifestyle, and values—intervene in the relationship between e-commerce and online purchase intentions. For banking professionals, the interaction between their professional responsibilities and personal lifestyle choices influences how they engage with e-commerce platforms and, subsequently, their purchasing decisions (Wagner Mainardes et al., 2019). Given that these factors mediate the consumer's interaction with the e-commerce environment, this hypothesis highlights the nuanced role personal characteristics play in shaping the final purchase decision.

Social Influence and e-WOM

In today's digital era, social recommendations, particularly through e-WOM, have become essential in influencing consumer purchasing decisions. Research by Kwahk and Kim (2017) and Yan et al. (2018) suggests that consumers are highly

influenced by recommendations from peers, family, and colleagues, with these influences often amplified through social media platforms. E-commerce environments have leveraged this phenomenon to enhance their impact on consumer behavior, as consumers frequently rely on social proof to validate their purchase decisions. As personal factors mediate the impact of e-commerce on purchase behavior, social influences—such as e-WOM—can reinforce or shape the decisions banking professionals make when engaging with online platforms (Babić Rosario et al., 2020). These influences are particularly important in the context of this research, as banking professionals may seek credibility and reliability in the products they choose, relying on recommendations from trusted networks.

Conceptual Framework

The conceptual framework for this study integrates these variables, illustrating the relationships between e-commerce, personal factors, and online purchase intentions. This framework is grounded in the theoretical understanding that personal factors mediate the influence of e-commerce on purchase intentions. The conceptual framework for this study examines how e-commerce influences the online purchase intentions of banking professionals, with personal factors acting as mediators (Figure 1). E-commerce platforms have revolutionized the consumer experience by providing convenience, personalization, and access to various products and services, significantly influencing consumer purchase intentions (Pappas et al., 2014). However, the role of personal factors—such as values, occupation, lifestyle, income, and social influences—in shaping online purchase decisions is underexplored in the context of banking professionals. Banking professionals, being financially literate and technologically proficient, exhibit unique purchasing patterns shaped by their professional responsibilities and financial standing (González & Bello, 2002; Servon & Kaestner, 2008). Personal values, for instance, guide individuals' preferences and behaviors, aligning them with brands or products that reflect their
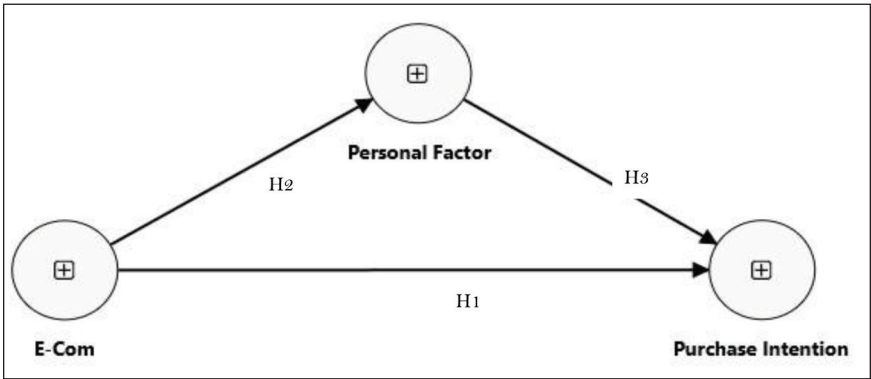

Figure 1. Proposed Conceptual Model.

ethical or social beliefs (Carrington et al., 2014). Similarly, the occupational demands of banking professionals influence their engagement with e-commerce platforms, as their work schedules and income levels often lead to a preference for convenient and time-saving shopping solutions (Hughes et al., 2019). Lifestyle and income further shape the frequency and scope of online purchases, while societal trends, cultural norms, and e-WOM amplify the impact of peer recommendations on purchasing decisions (Dang & Raska, 2022; Hernández et al., 2011; Hu et al., 2019; Swinyard & Smith, 2003).

This framework posits that personal factors mediate the relationship between e-commerce and purchase intentions, as these individual characteristics influence how banking professionals interact with digital marketing content and platforms. By focusing on this financially literate demographic, the study aims to bridge the gap in existing literature regarding the role of personal factors in e-commerce behavior, providing insights that could inform targeted marketing strategies for professional groups (Ben Belgacem et al., 2024; Hernández et al., 2011; Setyani et al., 2019). Thus, the study contributes to a deeper understanding of digital consumer behavior, emphasizing the need for personalized marketing approaches that resonate with individual values and professional lifestyles.

Research Methodology

Research Design

This study uses a quantitative approach to examine the effects of e-commerce on the online purchase intentions of bank professionals, with a specific focus on the mediating role of personal factors. The research adopts a cross-sectional survey method to collect primary data from respondents in South Indian states, providing a snapshot of e-commerce and consumer purchase intention.

Sample and Data Collection

We collected primary data from 496 respondents residing in South Indian states, including Tamil Nadu, Telangana, and Karnataka. The sample was selected using a non-probability sampling technique to ensure that participants were bank professionals who frequently engaged with digital marketing platforms and made online purchases. We contacted participants online, such as social media, professional networks, and email invitations. To make our study practical, we used a nonprobability sampling method that combined convenience and snowball sampling. The data collection involved the researcher personally visiting employees and distributing the questionnaire, allowing individuals to participate voluntarily. We also shared the questionnaire via email and LinkedIn, asking recipients to complete it and forward it to others. This approach was suitable because our target audience comprised working professionals with reputable educational backgrounds recognized as digitally active users.

Our sample consisted of professionals who knew about digital marketing and digital platforms. We retained 496 valid responses. We analyzed the valid responses' reliability, validity, and suitability for hypothesis testing. Our final sample included 266 (53.63%) male and 230 (46.37%) female respondents, reflecting balanced and active participation from both genders (Table 1). The IT professionals from different age groups, sectors, and profiles provide an actual representation and active participation across various categories. This diversity in the sample enhances the ability of the study to draw more generalizable conclusions.

Measures

We adapted various constructs from existing research, making slight adjustments as required by the study. To gather data for the study, we asked participants to rate each statement on a five-point Likert scale, where "strongly disagree" represented 1 and "strongly agree" represented 5. All the detailed constructs and items can be found in the study. At the end of the survey, we also included questions about demographic factors, such as age, sex, education, income, and occupation. The instruments used in this study were derived from validated measurement items utilized in prior analyses (Table 2). The measured parameters depended on several

Table 1. Demographic Information of Respondents.

Variables		Frequency	Per Cent
Age	18–24 years	122	24.60
	25–34 years	175	35.30
	35–44 years	127	25.60
	45–54 years	54	10.90
	55 and above years	18	03.60
Gender	Male	266	53.60
	Female	230	46.40
Education	Bachelor's degree	232	46.80
	Master's degree or professional degree	224	45.16
	Doctorate (PhD)	18	03.63
	Other	22	04.43
Working industry	Private	298	60.00
	Government	198	40.00
Experience	0–2 years	154	31.00
	3–5 years	105	21.20
	6–8 years	127	25.60
	9 and above years	110	22.20
Income (monthly)	Less than ₹25,000	87	17.54
	₹25,001–₹50,000	225	45.36
	₹50,001–₹100,000	122	24.60
	₹100,001–₹150,000	48	09.70
	₹150,001 and above	14	02.80

Source: Questionnaire.

Table 2. Research Instruments.

Variables	Statements	Items Code	Source
E-commerce (E-Com)	I frequently engage in online shopping on e-commerce platforms.	E-Com 1	(Hernández et al., 2010; Wagner Mainardes et al., 2019)
	E-commerce platforms are convenient in managing personal purchases for a better work–life balance.	E-Com 2	
	The variety of products offered on the e-commerce platform affects my decision to buy from it instead of elsewhere.	E-Com 3	
	The availability of exclusive deals like discounts on e-commerce websites impacts my purchasing decisions.	E-Com 4	
Personal Factors (PF)	Personal values influence my purchasing decisions on digital media platforms.	PF1	(Das & Mishra, 2022; Forghani et al., 2022)
	My occupation (exhausting job role) led to my decision to make purchases on digital media platforms.	PF2	
	Lifestyle (e.g., work–life balance, hobbies, and social activities) affects my online purchasing behavior.	PF3	
	My income (salary/savings) led me to shop online.	PF4	
	Easy access and availability of a wide variety of products influence my preference for digital platforms when shopping.	PF5	
	Societal trends and cultural influences impact my online purchase intention.	PF6	
	The recommendations of family, friends, and colleagues influence my purchasing.	PF7	
Purchase intention (PI)	My purchase intention is influenced by the personalization of digital marketing content.	PI1	(Chen & Yang, 2021; Dabholkar & Sheng, 2012; van der Heijden et al., 2003)
	Digital marketing campaigns have led me to make impulsive purchases.	PI2	
	Job role or profession impact my online purchasing decisions.	PI3	
	Social media marketing influences my purchase intentions on digital media platforms.	PI4	
	Willing to buy a product that an influencer recommends on digital media platforms	PI5	
	Online advertising on digital media platforms influences the decision to make a purchase.	PI6	
	Online reviews and recommendations (e-WOM) impact my buying decisions on digital platforms.	PI7	

Source: Compiled and modified by the authors.

conditions, such as the composite reliability value, which must be more than 0.6 (Chin, 1995); the average variance extracted (AVE) value must be more than 0.6 (Fornell & Larcker, 1981; J. Hair et al., 2017). The loading factor measurement forms the primary formers of the variable. The Cronbach's alpha value should be >0.5.

Methodology

We analyzed the data using PLS-SEM with SmartPLS 4.0 software. PLS-SEM is ideal for this research because it effectively manages complex models and works well with smaller sample sizes (Dash & Paul, 2021; Hair et al., 2019), making it an ideal choice for exploratory research. We used a measurement model and conducted structural model analysis under PLS-SEM to establish the reliability and validity of instruments and to test the association between various factors (Hair et al., 2017).

Table 3 shows the preferences of 496 respondents for various online retailers' platforms, rated on a scale from 1 (not preferred) to 5 (most preferred). The data indicate the following trends: Amazon is found to be the most preferred platform, with 218 respondents rating it as "Most Preferred" and 195 as "Preferred." Only 8 respondents rated it as "Not Preferred," and Flipkart is Also favored, with 198 respondents marking it as "Preferred" and 149 as "Most Preferred." However, it has more "Not Preferred" and "Least Preferred" ratings compared to Amazon. On the other hand, Myntra Shows a more balanced distribution across categories, with a higher count of neutral ratings (113). Mobile shopping apps are less preferred, with the highest number of "Not Preferred" ratings (147) and lower "Preferred" and "Most Preferred" ratings, while social media platforms are generally less favored, with significant numbers in the "Not Preferred" and "Least Preferred" categories.

Table 4 displays the preferred types of products purchased from e-commerce platforms by 496 respondents. The respondents were allowed to select multiple categories, reflecting diverse shopping preferences:

Table 3. Preferences for Online Retailers' Platforms (*N* = 496).

Online Retailers' Platforms for Shopping	1. Not Preferred	2. Least Preferred	3. Neutral	4. Preferred	5. Most Preferred
Amazon	8	21	54	195	218
Flipkart	22	35	92	198	149
Myntra	79	75	113	132	97
Mobile shopping app	147	84	128	86	51
Social media platforms	132	122	118	75	49

Source: Authors calculation.

Table 4. Preferred Types of Products Purchased from E-Commerce Platforms (*N* = 496).

Product Category	Number of Responses
Electronics and gadgets	156
Clothing and fashion items	180
Books and media	108
Food and groceries	99
Home goods and furniture	80
Beauty and personal care products	116
All of the above	147

Source: Authors' calculation.

- **Clothing and fashion items**: The most preferred category, with 180 respondents indicating a preference.
- **Electronics and gadgets**: Also highly preferred, selected by 156 respondents.
- **Beauty and personal care products**: Chosen by 116 respondents, indicating significant interest in this category.
- **Books and media**: Preferred by 108 respondents, showing a moderate level of interest.
- **Food and Groceries**: Selected by 99 respondents, reflecting a considerable interest in purchasing everyday necessities online.
- **Home goods and furniture**: The least preferred category, with 80 respondents.
- **All of the above**: A substantial number, 147 respondents, indicated that they prefer to purchase all types of products listed, showing a tendency toward comprehensive online shopping habits.

The data reveal a strong preference for purchasing clothing, fashion, electronics, and beauty and personal care products from e-commerce platforms. The notable selection of "All of the above" indicates that a significant portion of respondents utilize e-commerce platforms for a wide range of products, reflecting the versatility and broad appeal of online shopping.

Data Analysis

Collinearity affects outer loading estimation and statistical significance. We use Variance Inflation Factors (VIF) to check for multicollinearity in our model. If the VIF values exceed 5, it suggests that there might be a problem with collinearity among the variables (Hair et al., 2017, 2019). Table 5 indicates that the VIF of all the factors falls within the range of 1.684–2.641. The VIF results were precisely under the prescribed threshold. Thus, the collinearity issue does not exist.

Table 5. VIF Scores (Multicollinearity Tests).

Items	VIF
E-Com1	1.684
E-Com2	2.217
E-Com3	2.438
E-Com4	2.034
PF1	1.944
PF2	2.410
PF3	2.439
PF4	2.051
PF5	2.203
PF6	2.011
PF7	2.320
PI1	2.088
PI2	2.365
PI3	2.438
PI4	2.641
PI5	2.277
PI6	2.432

Source: Authors' calculation.
Notes: VIF = variance inflation factor.

Measurement Model Evaluation

We analyzed the reliability and validity of the survey tools through a measurement model. When assessing validity, researchers consider both convergent and discriminant validity. Convergent validity denotes the degree of correlation observed among measures that purport to determine a shared construct. The AVE and outer loading values assess convergence. Fornell and Larcker (1981) suggest AVE values for each dimension above 0.50 to evaluate convergent validity. Hair et al. (2019) recommend that the construct's item outer loadings exceed 0.70. Table 6 shows AVE values ranged between 0.622 and 0.690; the outer loading values ranged from 0.749 to 0.861. Thus, the convergent validity of the model was established. Cronbach's alpha and composite reliability (CR) are two statistical measures that assess items' reliability within a context. Values above 0.60 are considered satisfactory reliability (Razi-ur-Rahim & Uddin, 2021). We also checked discriminant validity using the criteria proposed by Fornell and Larcker, as well as the heterotrait–monotrait method (Henseler et al., 2015). The results of both tests are reported in Tables 7 and 8. All the values met this criterion. An item's ability to distinguish between variables is measured regarding discriminant validity. When the square root of AVE exceeds the correlation of the latent variables, discriminant validity is established (Fornell & Larcker, 1981; Hair et al., 2017). Table 7 shows that the square root of AVE values of all the constructs was more significant than the inter-construct correlations; also, the latent variable correlation value should not be greater than 0.9 (Lee et al., 2015). The results uncover that the highest inter-item correlation value is 0.745 (i.e., between PI and PF). Thus, the discriminant validity of the measurement model is established.

Table 6. Measurement Model Analysis.

Constructs	Items	Loading	Cronbach's Alpha	Composite Reliability (rho_a)	Composite Reliability (rho_c)	(AVE)
E-commerce	E-Com1	0.798	0.851	0.854	0.899	0.690
	E-Com2	0.861				
	E-Com3	0.853				
	E-Com4	0.810				
Personal factor	PF1	0.762	0.899	0.900	0.920	0.622
	PF2	0.808				
	PF3	0.817				
	PF4	0.793				
	PF5	0.802				
	PF6	0.749				
	PF7	0.787				
Purchase intention	PI1	0.828	0.907	0.907	0.928	0.682
	PI2	0.831				
	PI3	0.847				
	PI4	0.819				
	PI5	0.838				
	PI6	0.828				
	PI7	0.792				

Source: Authors' calculation.
Note: $p < .001$, CR = composite reliability; AVE = average value extracted.

Table 7. Discriminant Validity Estimations (Fornell–Larcker Criterion).

Constructs	E-Com	Personal Factor	Purchase Intention
E-Com	*0.831*		
Personal factor	0.673	*0.789*	
Purchase intention	0.550	0.745	*0.826*

Source: Authors' calculation.
Notes: The square roots of the AVEs are the bold italic elements.

Table 8. Discriminant Validity Estimations—Heterotrait–Monotrait Ratio (HTMT): Matrix.

Constructs	E-Com	Personal Factor	Purchase Intention
E-Com			
Personal factor	0.764		
Purchase intention	0.621	0.824	

Source: Authors' calculation.

Structural Model Evaluation

Table 9 provides the outcomes of the structural model testing, showcasing the hypothesized relationships between the constructs: e-commerce (E-Com),

Table 9. The Results of the Structural Model Testing.

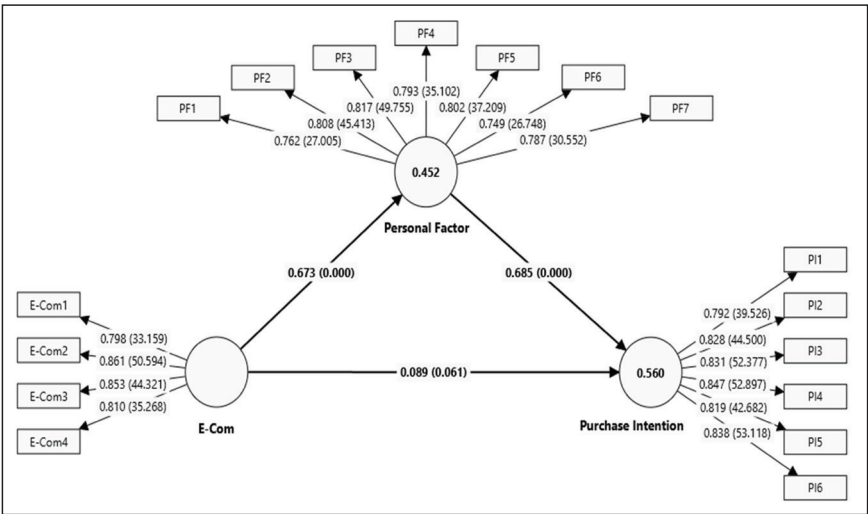| Constructs Path	Path Coefficient	Sample Mean (M)	SD	T Statistics	P Values	Result
E-Com → Personal factor	0.673	0.673	0.032	21.262	0.000	Supported
E-Com → Purchase intention	0.089	0.089	0.048	1.873	0.061	Not supported
Personal factor → Purchase intention	0.685	0.687	0.043	15.760	0.000	Supported

Figure 2. Path Coefficient and P-value and Outer Weights/Loadings and T-value.

personal factor, and online purchase intention. We evaluated the adequacy of the hypothesized model by assessing the value of R^2. The table includes path coefficients, sample means, standard deviations, T statistics, P values, and the result of hypothesis testing for each relationship. Figure 2 shows the result of the partial least squares analysis.

The path coefficient ($\beta = 0.673$) indicates a strong positive relationship between e-commerce and personal factor. The t-statistic ($t = 21.262$) is significantly high, and the P-value ($p = .000$) is well below the .05 threshold. Therefore, the hypothesis that e-commerce positively influences personal factor is strongly supported. Additionally, the results of the hypothesis testing showed that the path coefficient ($\beta = 0.089$) suggests a weak positive relationship between e-commerce and purchase intention. The t-statistic of ($t = 1.873$) is below the typical threshold for

significance, and the *P*-value ($p = .061$) is above the .05 cutoff. Hence, the hypothesis that e-commerce directly influences purchase intention is not supported. The path coefficient ($\beta = 0.685$) indicates a strong positive relationship between personal factor and purchase intention. The *t*-statistic ($t = 15.760$) is significantly high, and the *P*-value ($p = .000$) indicates strong statistical significance. Therefore, the hypothesis that personal factors positively influence purchase intention is well supported. These findings suggest that the influence of e-commerce on purchase intention is mediated through personal factors. Therefore, personal factors play a crucial role in translating the influence of e-commerce into purchase intention.

Mediation Analysis

Table 10 illustrates the total effects and indirect effects of e-commerce on purchase intention. The mediation effects of personal factors are also examined.

Mediation analysis assessed the mediating role of PF on the linkage between E-com and PI. The results (Table 10) revealed that the total effect of e-commerce on purchase intention was significant (H: $\beta = 0.550$, $t = 13.301$, $p = .000$) with the inclusion of the mediating variable PF. The indirect effect of E-com on PI through PF was found to be significant (E-com>PF>PI: $\beta = 0.461$, $t = 12.262$, $p = .000$). This confirms our hypothesis. It indicates that personal factors play a key role in mediating the relationship between e-commerce and purchase intentions.

Discussion and Implication

The findings of this study reveal significant insights into the impact of digital marketing on online purchase intentions among banking professionals, mediated by personal factors. The discussion section delves into the interpretations of these results, connecting them with existing literature and emphasizing their implications for practitioners and policymakers. The study confirmed that e-commerce significantly influences personal factors such as personal values, occupation, lifestyle, income, societal trends, cultural influences, and social recommendations. These findings align with previous studies by Hernández et al. (2010) and Wagner Mainardes et al. (2019), highlighting the role of e-commerce in shaping consumer behavior through convenience and variety. Personal factors were found to have a substantial impact on online purchase intentions. This supports the work of Das and Mishra (2022) and Forghani et al. (2022), who noted that personal values and lifestyle significantly dictate online shopping behavior. The influence of occupation and income on purchase intentions underscores the nuanced preferences of banking professionals as they balance professional responsibilities with personal shopping needs. This study shows that e-commerce platforms do not have a direct positive impact on online purchase intentions, which confirms the hypotheses developed based on prior literature. Personal factors mediated the relationship between e-commerce and online purchase intentions. This mediation effect suggests that digital marketing strategies must

Table 10. Mediation Analysis with Total Effect.

Total Effect DM>PI			Indirect Effect of DM on PI							
								Percentile Bootstrap 2.5%–97.5% Confidence Level		
Coefficient	T-value	P-value		Coefficient	SD	T-value (Bootstrap)	P-value	Lower	Upper	Result
0.550	13.301	.000	**H:** E-com → Personal factor → Purchase intention	0.461	0.038	12.262	.000	0.389	0.537	Supported

consider these factors to target and influence consumer behavior effectively. The study's findings resonate with the theoretical framework proposed by Chen and Yang (2021) and Dabholkar and Sheng (2012), who emphasized the importance of personal factors in the digital marketing context.

Implications

E-commerce platforms need to tailor their marketing strategies to address the personal values, occupational needs, and lifestyle preferences of banking professionals. Understanding these factors can help design personalized marketing campaigns that resonate more effectively with this demographic. Enhancing the convenience and variety of products and offering exclusive deals can further boost purchase intentions among banking professionals. Platforms should leverage data analytics to gain insights into consumer preferences and optimize their offerings accordingly. Digital marketers should focus on creating personalized and targeted marketing content that aligns with the personal factors influencing purchase intentions. This includes leveraging social media influencers and e-WOM to enhance credibility and trust among consumers. The role of social recommendations and cultural influences should be emphasized in marketing strategies. Marketers can harness these elements to create a sense of community and belonging, thereby driving impulsive purchases and strengthening customer loyalty. Policymakers should consider the implications of digital marketing and e-commerce on consumer behavior, particularly regarding consumer protection and data privacy. Ensuring that consumers' personal information is safeguarded while providing personalized shopping experiences is crucial. Regulations that promote fair and ethical digital marketing practices can help maintain a balance between consumer interests and business growth. This includes guidelines on transparent advertising, data usage, and influencer marketing.

Conclusion

The study provides a comprehensive analysis of the impact of digital marketing on online purchase intentions among banking professionals, highlighting the mediating role of personal factors. The findings underscore the importance of e-commerce platforms and digital marketers in understanding and addressing the unique preferences and needs of this demographic. Businesses can enhance their engagement with banking professionals by tailoring marketing strategies to personal values, occupational needs, and lifestyle preferences, ultimately driving higher online purchase intentions. The implications for policymakers emphasize the need for balanced regulations that protect consumer interests while fostering a thriving digital marketplace. This research contributes to the academic discourse on digital consumer behavior and offers valuable insights for future studies. The focus on banking professionals provides a nuanced understanding of how digital marketing influences purchase intentions in a specific professional context, paving the way for further exploration of other demographic segments.

Declaration of Conflicting Interests

Funding

Data Availability

Data may be made available on request.

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Can Firm–Farm Associations Solve the Crisis in Indian Agriculture? Observations from North India

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Abstract

Contract farming (CF) is considered as a tool to advance agriculture through commercialisation in many developing nations. Although a substantial body of literature shows the impacts of CF on farmers' welfare, its effect on resource-usage efficiency is ignored. Using cross-sectional data from 754 wheat farmers, this study finds that farmers who collaborate with contracting firms are highly efficient than those who are working in non-contract farming (NCF). Furthermore, CF adopters are taking benefits in terms of better resource use efficiency and minimum market risk. However, the participation of marginal and small-scale farmers in CF is almost negligible. Thus, it is suggested that contracting firms should bring these farmers into the ambit of contracting system to uplift their well-being.

Keywords

Contract farming, efficiency, risk, Haryana

Introduction

The issue of small farmers' returns from participation in agro-food supply chains, particularly in contract farming (CF) agreements, in developing nations, has significantly risen in recent years (Barrett et al., 2012; Reardon & Gulati, 2008;

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Swinnen, 2007). CF is a mechanisation of producing and supplying farm products under an advanced agreement. The essence of such an agreement is to provide a specific type of agricultural or horticultural products at a particular time and price in a pre-fixed quantity demanded by the contracting firm. The contract terms can vary from crop to crop and region to region (Eaton & Shepherd, 2001).

Most authors (Bellemare, 2012; Bijman, 2008; Kaur & Singla, 2018; Sharma, 2016) agree that CF is a product innovation for agricultural development in emerging nations. It enhances the welfare of farmers by providing them with improved technology, related farming information and higher-end markets for their final products (Barrett et al., 2012; Miyata et al., 2009; Ton et al., 2018). However, there is substantial doubt whether these arrangements benefit the farmers. According to Singh (2002), Kalamkar (2012) and Sharma (2016), farmers face constraints, mainly when they grow new crops, as the risks of production and market failure always remain with them. Inefficient supervision or production risk leads to a situation where contracts are manipulated and all contracted production is not bought by sponsoring firms.

Many Indian studies have examined the factors influencing farmers' willingness to adopt CF. In addition, many authors have also explored its welfare impacts (Birthal et al., 2005; Swain, 2012, 2018). As most of them asserted that CF is emerging as a significant tool to enhance farmers' welfare, consequently, it needs a detailed study of whether the corporate sector's involvement in agriculture is actually beneficial for farmers via expanding income level and diminishing production risk and price uncertainty. But, recently, enough attention has not been paid either to compare the efficiency level of significant farm inputs or to estimate the yield and price uncertainties under CF and non-contract farming (NCF) scenarios. Thus, this study attempts to bridge this research gap by exploring the CF system with the help of marginal factor cost and marginal value productivity of wheat growers in Haryana. It looks at how CF affects the wheat production with a special focus on (a) the resource-usage efficiency of key inputs and their influences on crop yield and returns, and (b) the estimation of yield and price uncertainties involved in wheat production at the prevailing pattern of resources and technology embraced by farmers.

This article is structured in different sections. After giving a brief introduction, a critical literature review is discussed in the second section. The third section explains the privileged framework of contract farming in the study area, while the fourth section describes the data and methodology of the study. The fifth section discusses the results of the study. Conclusion and policy suggestions are offered in the last section of the article.

Production Contract and Farmers' Welfare: A Review

The role and effects of contract farming mechanism in the developing nations constitute a hotly debated ground (Masakure & Henson, 2005; Oya, 2012; Winters et al., 2005). In the initial years of the 21st century, Birthal et al. (2005), Tripathi et al. (2005) and Ramaswami et al. (2006) examined the CF scenario under milk,

vegetable and poultry production in Northern India and found that CF adopters enjoy higher earnings, improved market efficiency and low business risk. CF also enhances the supply chain efficiency in the economy (Wang et al., 2014). Contracting agencies offer higher prices for their produce, which makes a remarkable difference between the profit of CF adopters and non-adopters. Likewise, Sharma (2016), Mishra et al. (2018) and Saroj et al. (2023) in India; Simmons et al. (2005) in Indonesia; Bolwig et al. (2009) in Uganda; and Kumar et al. (2019) in Nepal detected that contract growers earn higher income and produce advanced quality yield with a better resource usage efficiency as compare to their counterparts. It raises farmers' living standard, creates more employment and develops new cropping technologies that expand inclusive welfare of farmers, especially smallholders (Cahyadi & Waibel, 2013; Chand et al., 2017; Mishra et al., 2018).

Indeed, CF improves the farmers' welfare, but many studies interpreted it as a tool for agribusiness organisations to fraud growers for their own proceeds (Porter et al., 1997; Singh, 2002). Small holders are exploited by large agribusiness firms due to their limited bargaining power (Singh, 2002). In Punjab and Haryana, marginal and small farmers are excluded from contracting system on the bases of their assets holding size. This discrimination exists because agribusiness firms are not willing to involve in contracts with those farmers who actually need this to cope up with the competitive international market (Dileep et al., 2002; Kaur & Singla, 2018; Sharma, 2016). Generally, farmers find that the contracts are biased and imposed strictly. Firms provide poor extension services and overpriced input facilities, pass on the risk to the farmers, offer low prices of products, favour large farmers, delay payments and do not compensate for natural calamity loss (Kalamkar, 2012). However, farmers adopt CF if their adopting expected returns are higher than non-adopting returns (Barrett et al., 2012). Bogetoft and Olesen (2004) claim that the majority of small-scale growers adopt CF to diversify the production risk rather than to lift the output level.

Table 1 focusses on the impacts of CF on the farmers' welfare in various aspects, both developed and developing. The table includes the studies from 2010 to 2024, including numerous agricultural goods. The contracting impacts on farmers' income is multifaceted. The majority of data from the preceding research indicates that contract farming has a beneficial influence on farmers' income. Contract farming provides price certainty, access to markets, technical support and various extension services. However, one study by Mwambi et al. (2016) shows opposite results that CF is insufficient to increase the revenue of households and farms.

Production Contract Framework in the Study Area

CF nature depends on many factors, that is, types and varieties of crops, the firm's aims and resources, and the farmers' experience (Eaton & Shepherd, 2001). This study mainly identifies two models: (a) the direct formal model and (b) the partial formal model. Different contracting models have different arrangements for pricing and other farming factors, depending primarily on the types and varieties

Table 1. Studies on Contract Farming and Farmers' Welfare.

Author, Year and Product	Findings	Impacts
Olomola (2010) Cotton, ginger, rice, soyabean and tobacco in Nigeria	Contract farming has favourable impacts on per capita income. Farmers' productivity and profitability rise when they adopt contract farming.	+
Meshesha and Gardebroek (2011) Honey in Ethiopia	Contract farming increases beekeepers' yearly income substantially.	+
Jones et al. (2011) Organic cocoa in Uganda	Contracting system demonstrates rising trend of farm productivity.	+
Minot (2011) Tea, coffee, tabacco, sugarcane, cotton in Sub Saharan Africa	Contract farming is more profitable for farmers who participate in it.	+
Cahyadi and Waibel (2013) Oil palm in Indonesia	Contract farming has a huge favourable impact on small landholders' income. They produce higher and better-quality yield under contract farming.	+
Wang et al. (2014) China	Contract farming effectively increases the farmers' returns. Contract farming has been found effective in increasing production.	+
Girma et al. (2015) Honey in Ethiopia	Contract farming increases total income of growers.	+
Mwambi et al. (2016) Avocado in Kenya	Contract farming is not sufficient to increase farmers' income.	−
Swain (2016) Hybrid paddy in India	In the case of labour-intensive crops, there is high involvement of small farmers in contract farming.	+
Chand et al. (2017) India	Considerable rural employment is offered by contract farming.	+
Kumar et al. (2018) Tomato in Nepal	Profits earned by contract farmers is significantly higher than those of non-contract farmers. Contract farming leads to significantly high yield.	+
Kaur and Singla (2018) Chicory and sugar beet in India	Contract farmer may earn double returns from high-value crops than traditional crops through contract farming. But it excludes the smallholder participation.	+ −
Mishra et al. (2018) Basmati rice in India	Contract farming leads high level of yield. Contract farmers tend to hire more workers, so it also increases employment.	+
Swain (2018) Gherkin and hybrid paddy in India	Compared to non-contract farmers, farmers engaged in contract farming employ more family labour.	+
Kumar et al. (2019) Paddy in Nepal	Farmers earn higher profit when they grow under contract farming. They get access to improved paddy seeds through contract farming, which leads production enhancement.	+
Saroj et al. (2023) Wheat in India	Earning higher profit is an important stimulus for contract farmers. Contractual strategy improves crop productivity and returns.	+
Mohapatra et al. (2024) Rice in India	Contract farming develops the social culture and spatial collaboration of farmers	+
Saroj and Paltasingh (2024) Wheat in India	Contract farming lifts farm income, productivity as well as efficiency.	+

Note: + and − indicate the positive and negative impacts, respectively.

of crops. In Figure 1(a), the direct formal model is shown, where the contracting firm directly trades with farmers through a written formal agreement between both. Figure 1(b) presents the partial formal model, under which some large farmers purchase inputs from the firm in a bulk amount and distribute them to marginal and small farmers who directly cannot contact the contracting firm because of their less landholding area and limited bargaining power. These marginal and small farmers sell back their final production to these large farmers and then pass it to the firm. In short, these large farmers work as middlemen between the contracting firm and a band of marginal and small farmers. However, there does not exist any formal written agreement between large farmers and groups of marginal and small farmers, but between the contracting firm and these large farmers, it exists. In the second case, because there is no direct contact between the contracting firm and small farmers, large farmers are responsible for overseeing the whole production process, including distributing seeds and other
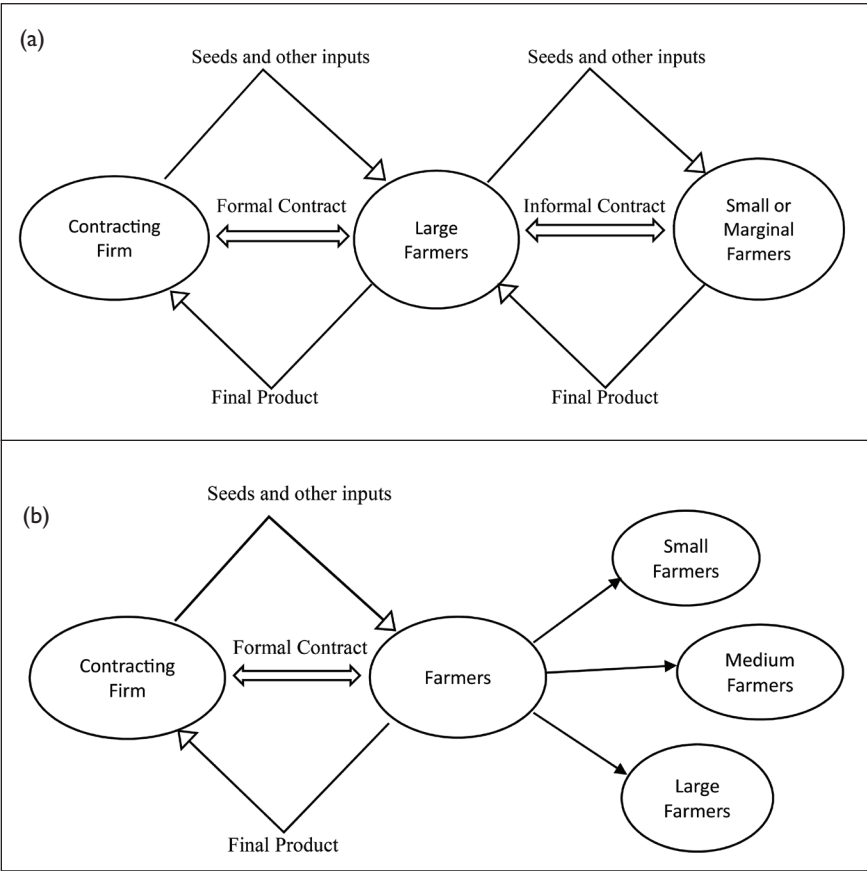

Figure 1. Models of CF: (a) Direct Formal Model (b) Partial Formal Model.

Source: Firm's records and author's field survey, 2019–2020.

inputs, providing all technical and extension services, and assisting financially. They also visit the farm for inspections.

To maximise wheat production, the concerned processing corporation provides hybrid-certified/foundation seeds to farmers. The firm charges a sum of ₹1,550 per 40 kg (on average) as wheat seeds cost from farmers is 36% higher than the open market seed cost. Farmers are being introduced to enhanced farming technology through extension supports provided by the firm's staff (field executives), who regularly visit the farms during production. The processing firm fixes the procurement price by adding an 18% price premium on the minimum support price or privileged market price, which is higher. The contract farmers have to transport their pre-decided production quantity to the processing plant of firms. Within 30 days following the procurement, payment is made to the respective account of farmers. According to the category-wise distribution of the surveyed farmers, around 5%, 43% and 52% of contract farmers belong to small, medium and larger farmers categories, respectively. As a result, it may be argued that processing firms preferred to join medium and large farmers.

Data and Method

For this study, the data was collected from a field survey under two districts (Sirsa and Hisar) of Haryana during 2019–2020. For data collection, these districts were selected purposively since these contribute the maximum share of total wheat production in Haryana (GoH, 2019). A total of 754 wheat growers were surveyed. Out of the total samples, 323 were CF adopters, collected using a multistage purposive sampling procedure, where a farmers' list was initially collected from the contracting firms. This list included general information about the farmers. With its help, the final unit of study (farmers) was surveyed under the contracting system. The remaining 431 samples of CF non-adopters growing traditional wheat seeds were collected through the simple random sampling process. A pre-tested standardised questionnaire was adopted to collect the required quantitative and qualitative data about the farm and farming-specific characteristics of both adopters and non-adopters. Econometric techniques are used to analyse resource-use efficiency and to measure risk in terms of price and yield uncertainty under CF and NCF. The Cobb–Douglas production function is adopted to examine the impact of inputs on the gross income of CF adopters and non-adopters. But the linear production function approach is finalised. Moreover, the ordinary least square method is adopted to estimate and compare the resource-use efficiency of CF adopters and non-adopters under wheat production.

The following log-linear production function approach is used to describe the impact of CF technology on input utilising efficiency:

$$lnY_i = \alpha + \beta_1 lnW_i + \beta_2 lnM_i + \beta_3 \ln F_i + \beta_4 lnP_I + \beta_5 lnI_i + \theta_i + \varepsilon_i$$

In the above given equation; Y is gross income earned by wheat growers (₹/acres); W stands for wages paid to human labour (₹/acre); M is expenditure paid on

machine power (₹/acre); F is expenditure paid on fertilisers and manures (₹/acre); P is expenditure paid on plant protection measures (₹/acre); I is irrigation charges (₹/acre); $\beta_1 \ldots \beta_5$ are regression coefficients, which indicate the elasticities; α is intercept; ε is error term; and θ is village fixed effect.

The marginal value productivity (MVP) and marginal factor cost (MFC) of a specific input can be used to calculate resource-use efficiency. MVP shows the increase in gross return from adding one unit of a given input while keeping the other inputs constant. Similarly, MFC is calculated for input factor cost. As a result, the resource-usage efficiency is calculated by comparing MVP to the corresponding MFC.

The following formulas are used to estimate the yield uncertainty ratio and the price uncertainty ratio (Dileep et al., 2002):

$$\text{Yield uncertainty ratio} = \frac{\text{Average highest expected yield} - \text{average lowest expected yield}}{\text{Average most frequent expected yield}}$$

$$\text{Price uncertainty ratio} = \frac{\text{Average highest expected price} - \text{average lowest expected price}}{\text{Average most frequent expected price}}$$

Result and Discussion

Resource-use Efficiency

Table 2 presents the estimated results of the linear production function of CF and NCF for wheat production. The estimated result for CF and NCF did not confirm significant multicollinearity among independent variables; therefore, the regression equation includes all five important variables, that is, cost of human labour, machine power, manure and fertilisers, plant protection measures and irrigation. The R^2 values suggest that independent variables of the production function explain 65% and 64% variations in the gross income of wheat production under CF and NCF, respectively. The coefficient (β_i) of human labour, as well as those of manure and fertilisers, is positively significant at a 5% level, indicating a

Table 2. Estimated Production Function for Wheat Crop on Sample Farms.

Particulars	CF	NCF
Intercept (α)	10.564*** (1.15)	5.945*** (0.596)
Human labour cost (₹/acres)	0.031** (0.012)	−0.031** (0.013)
Machine power cost (₹/acres)	−0.054 (0.046)	0.055 (0.034)
Fertilisers and manure cost (₹/acre)	0.0345** (0.098)	0.402*** (0.035)
Plant protection measures (₹/acre)	0.116 (0.033)	0.089*** (0.012)
Irrigation charges (₹/acre)	−0.019*** (0.025)	0.023 (0.018)
Coefficient of multiple determination (R^2)	0.65	0.64

Note: Figures given in parentheses are standard errors. The asterisks (***) and (**) indicate 1% and 5% levels of significance.

Table 3. Marginal Value Product and Marginal Factor Cost Ratios of the Used Inputs.

	MVP:MFC	
Particulars	CF	NCF
Human labour	12.45	−8.147
Machine power	−10.924	1.212
Manure and fertilisers	4.921	4.415
Plant protection measures	19.906	12.132
Irrigation	−7.286	4.741

notable impact on the return of wheat grown under CF. The coefficient value of irrigation is negatively significant at a 1% level, depicting excessive use of irrigation in contracting crops may reduce the returns from CF. However, in NCF, the values of coefficients of manure and fertiliser and plant protection measure are positively significant at 1% level, implying that there is an appropriate use of these inputs, resulting in a higher return of wheat production. But the negatively significant coefficient of human labour implies that excessive labour use in non-commercial farming may reduce returns.

The resource-use efficiency is measured in terms of the ratio of MVP and MFC of significant inputs used under CF and NCF. The ratio of MVP and MFC describes the economic performance of quality inputs. The analysis results are given in Table 3, presenting that the MVP–MFC ratio of plant protection is the maximum among all the inputs used for wheat production under both CF and NCF. It is 19.9 for CF and 12.13 for NCF, indicating enough possibility to enhance the returns by taking more plant protection measures. The MVP–MFC ratios of manure and fertilisers for both CF and NCF are almost the same and show a considerable favourable impact on the return from wheat production. The MVP–MFC ratio of human labour is largely positive under CF but negative under NCF. It also shows enough possibility to improve the return level by increasing the use of human labour at the existing technology level, but in NCF, the labour distribution must be reorganised at the prevailing resource-use pattern. Similarly, the MVP–MFC ratios for machine power and irrigation under CF are negative and suggest that there is a need to mitigate their excessive usage.

Yield and Price Uncertainty in Wheat Farming

It is difficult to measure the risk or uncertainty in the production and price of agricultural products since future events cannot be predicted empirically and are affected by various factors such as weather, natural disasters, socioeconomic conditions and other factors that occur in a particular zone. The yield uncertainty ratio is calculated to estimate the uncertainty in crop yield and the results are given in Table 4. The estimated yield uncertainty ratio is 0.22 for CF and 0.35 for NCF, implying that the yield uncertainty under CF is lesser than NCF for wheat farming. It could be because the contracted farmers grow high-quality seeds, follow the specified farming techniques and have access to consistent direction and timely

Table 4. Estimation of Yield Uncertainty in Wheat Production.

| | Average Expected Yield (Quintal/Acre) | | | Yield |
Particulars	Highest Probable Yield	Lowest Probable Yield	Most Frequent Probable Yield	Uncertainty Ratio
Contract farmers	25	20	22	0.22
Non-contract farmers	23	16	20	0.35

Table 5. Estimation of Price Uncertainty in Wheat Production.

| | Average Expected Price (₹/Quintal) | | | Price |
Particulars	Highest Probable Price	Lowest Probable Price	Most Frequent Probable Price	Uncertainty Ratio
Contract farmers	2,170.00	2,170.00	2,170.00	0.00
Non-contract farmers	1,830.00	1,400.00	1,640.00	0.26

supervision from the firm's team, who visits their fields many times throughout the whole production season.

Similarly, the price uncertainty is estimated for CF and NCF by employing the formula of price uncertainty ratio. The results are shown in Table 5, indicating that there is no pricing uncertainty in CF; it is because the contracting firm purchases the whole production from farmers at a pre-decided price. In the contract agreement, the purchasing norms, that is, quantity, quality, price, etc., are defined by the firm and farmers mutually, and both (contracting firm and farmers) are obliged to trade according to that mutual agreement. The price uncertainty ratio for NCF is 0.26, indicating that the price of wheat in the local market varies significantly based on crop quality, quantity supplied, selling site and location, and modes of transportation and communication, among other factors. These findings clearly prove that the CF system is advantageous over traditional NCF in terms of reduced yield and price uncertainty in wheat farming. These findings are consistent with the study of Dileep et al. (2002), Dhillon et al. (2006), Tripathi et al. (2005) and Key (2013) in different areas where CF is practiced.

Conclusion and Policy Suggestions

Some important conclusions can be drawn by using statistical analysis on 754 wheat growers in Sirsa and Hisar districts of Haryana. The regression analysis of CF production function reveals that human labour and manure and fertilisers have positively significant impacts while irrigation has negatively significant impacts on crop return. Similarly, under NCF production function, plant protection

measures and manure and fertilisers are found positively significant, while human labour is found negatively significant with the returns from wheat production.

The MVP–MFC ratio is greatly higher for human labour and plant protection measures in CF, which indicates the appropriate scope of rising returns from wheat production by increasing the utilisation of these inputs at privileged technology level and resource-use pattern. The rational use of irrigation and machine power in CF and human labour in NCF can boost the profitability of wheat growers. NCF has been proven to have more risk in terms of yield and price uncertainty than CF. Moreover, financial constraints are observed to be more prevalent than technological, extension and situational constraints. This might be because contracting firms are effectively offering technical support and extension services to all the contracted farmers on a regular basis to ensure maximum yield with superior quality. Concisely, CF adoption in wheat production has been shown to improve resource utilisation efficiency, reduce yield uncertainty and eliminate price uncertainty, which directly contributes to the development of farming sector.

It is noted that marginal and small farmers are involved under CF in a very negligible percentage as compared to medium and larger farmers. From a long-term perspective in terms of agricultural market involvement, their exclusion from contracting technology cannot be overlooked as around 80% of total farmers' population in India belong to these categories. So, the policy recommendation of this study suggests that contracting firms should bring the marginal and small-scale farmers into the ambit of the contract to uplift their well-being. Institutional and structural barriers to the CF adoption by these farmers should be eliminated on both supply (farmers) and demand (contracting firms) sides.

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