

Management Matters



Loyola
Institute of
Business
Administration
(LIBA)
A Jesuit Business School

Management Matters is the official journal of Loyola Institute of Business Administration, Chennai published biannually. The Aim of the journal is to focus on the contemporary issues and developments in all the major fields of management. The journal follows a double-blind, peer-review process as per Committee on Publication Ethics (COPE) and it covers a broad range of interdisciplinary topics under the contemporary management paradigm. The journal covers the multidisciplinary functional areas of management, including and not limited to:

- General Management
- Strategic Management
- Marketing & Advertising
- Operations Management
- Logistics & Supply Chain Management
- Financial Management & Accounting
- Human Resource Management
- AI and Analytics in Management
- Quality management
- Organizational studies
- Business ethics and Economics
- International Business
- Entrepreneurship
- Consumer Behavior
- Corporate Social Responsibility and Sustainability

Homepage: <https://www.emeraldgroupublishing.com/journal/manm>

EDITOR-IN-CHIEF

Fr. Dr. C Joe Arun SJ

Loyola Institute of Business Administration, Chennai, Tamilnadu, India

CO-EDITOR

Dr. Deepak Mathivathanan

Loyola Institute of Business Administration, Chennai, Tamilnadu, India
E-mail deepak.mathivathanan@liba.edu

ASSISTANT EDITOR

Dr. Sivakumar K

Loyola Institute of Business Administration, Chennai, Tamilnadu, India
E-mail sivakumar.kirubanandan@liba.edu

EDITORIAL BOARD

Prof. MJ Xavier

Loyola Institute of Business Administration, Chennai, Tamilnadu, India

Prof. PC Lakshmi Narayanan

Loyola Institute of Business Administration, Chennai, Tamilnadu, India

Prof. P Chandiran

Loyola Institute of Business Administration, Chennai, Tamilnadu, India

Dr. B Aiswarya

Loyola Institute of Business Administration, Chennai, Tamilnadu, India

Prof. Slawomir Wycislak

Jagiellonian University, Poland

Prof. Narayanan Janakiraman

University of Texas at Arlington, United States

Prof. Mario Marco Molteni

Catholic University of the Sacred Heart, Milan

Dr. M Ramasubramaniam

Loyola Institute of Business Administration, Chennai, Tamilnadu, India

Dr. Deepa Ittimani Tholath

Loyola Institute of Business Administration, Chennai, Tamilnadu, India

Dr. Andrea Appolloni

University of Rome Tor Vergata, Italy

Dr. Andrea Patrucco

Florida International University, Miami, United States

Prof. Atour Taghipour

Université Le Havre Normandie, France

Dr. Marcos Dieste

University of Padova, Italy

Dr. Ginevra Gravili

University of Bari, Italy

Dr. Sandeep Jagtap

Lund University, Sweden

Dr. Syed Mithun Ali

Bangladesh University of Engineering and Technology, Bangladesh

Dr. Kamalakanta Muduli

Papua New Guinea University of Technology, Papua New Guinea

Dr. Simon Peter Nadeem

University of Derby, United Kingdom

Prof. Tarik Saikouk

Excellia Business School, France

Dr. V Raja Sreedharan

Cardiff Metropolitan University, United Kingdom

Dr. Shilpa Taneja

University of Sheffield, United Kingdom

Dr. Santosh Venugopal

Brest Business School, France

Prof. Asif Mahbub Karim

Binary University of Management and Entrepreneurship, Malaysia

Prof. VG Venkatesh

EM Normandie Business School, France

e-ISSN 2752-8359

p-ISSN 2279-0187

© Loyola Institute of Business Administration

Emerald Publishing Limited

Floor 5, Northspring, 21–23 Wellington Street,

Leeds LS1 4DL, UK

Tel +44 (0) 113 3231381

E-mail emerald@emerald.com

For more information about Emerald's regional offices please go to
<http://www.emeraldgroupublishing.com/offices>

Customer helpdesk:

<https://emeraldpublishinggroup.freshdesk.com/support/solutions>

Tel +44 (0) 113 3231381

E-mail support@emerald.com

The Publisher and Editors cannot be held responsible for errors or any consequences arising from the use of information contained in this journal; the views and opinions expressed do not necessarily reflect those of the Publisher and Editors, neither does the publication of advertisements constitute any endorsement by the Publisher and Editors of the products advertised.

Emerald is a trading name of Emerald Publishing Limited



The current issue and full text archive of this journal is available on Emerald Insight at:
<https://www.emerald.com/insight/2279-0187.htm>

Adoption of EdTech products among college students: a conceptual study

Bargavi Ravichandran and Kavitha Shanmugam

*Faculty of Management,
SRM Institute of Science and Technology (Deemed to be University),
Chengalpattu, India*

Adoption of
EdTech
products

1

Received 3 July 2023
Revised 2 August 2023
30 September 2023
23 October 2023
Accepted 8 November 2023

Abstract

Purpose – This conceptual study investigates the adoption of education technology (EdTech) products among college students, focusing on identifying the key factors influencing the adoption process within educational institutions. Technology integration in education has rapidly gained prominence, with EdTech offering innovative solutions to enhance teaching and learning experiences. However, understanding the determinants that affect EdTech adoption remains critical for its successful implementation and impact. This paper aims (1) to identify the factors influencing the adoption of EdTech by college students (2) to create a conceptual model that shows the connections between the elements that lead to college students adopting EdTech.

Design/methodology/approach – The research employed a mixed-methods approach, combining qualitative data analysis and conceptual modeling to achieve the objectives. The underlying knowledge required to create a qualitative data gathering tool was obtained through a thorough literature analysis on innovation dissemination, educational psychology and technology adoption. College students, teachers and administrators participated in semi-structured interviews, focus groups and surveys to provide detailed perspectives on their attitudes about and experiences with EdTech. The Scopus and Web of Science databases are searched for relevant information in an organized manner in order to determine the factors influencing the adoption of EdTech. Second, an extended version of the technology adoption model is adopted to develop a qualitative data-based conceptual framework to analyze EdTech adoption in the Indian context.

Findings – Overall, by highlighting the critical components that emotionally influence college students' adoption of EdTech products in educational institutions, this course adds to the body of information already in existence. The conceptual framework model serves as a roadmap for educational stakeholders seeking to leverage EdTech effectively to enrich the learning environment and improve educational outcomes. By recognizing the significance of the identified factors, academic institutions can make informed decisions to foster a climate conducive to successful EdTech integration.

Research limitations/implications – A comprehensive conceptual framework model was developed based on qualitative data analysis to illustrate the interrelationships between the identified factors influencing EdTech adoption. This model presents a valuable tool for educational institutions, policymakers and EdTech developers to comprehend the complex dynamics of implementing these technological solutions.

© Bargavi Ravichandran and Kavitha Shanmugam. Published in *Management Matters*. Published by Emerald Publishing Limited. This article is published under the Creative Commons Attribution (CC BY 4.0) licence. Anyone may reproduce, distribute, translate and create derivative works of this article (for both commercial and non-commercial purposes), subject to full attribution to the original publication and authors. The full terms of this licence may be seen at <http://creativecommons.org/licenses/by/4.0/legalcode>

The authors would like to thank SRM Institute of Science and Technology, Kattankulathur Campus, for supplying the required research infrastructure.

Since submission of this article, the following authors have updated their affiliations: Bargavi Ravichandran and Kavitha Shanmugam are at the Department of Management Studies, College of Engineering, Anna University, Chennai, India.

Funding information: The authors declare that no funds, grants or other support were received during the preparation of this manuscript.

Declaration of conflicting interests: No potential conflict of interest was declared.

Data availability: All data were used in the article.



Management Matters
Vol. 21 No. 1, 2024
pp. 1-19
Emerald Publishing Limited
e-ISSN: 2752-8359
p-ISSN: 2279-0187
DOI 10.1108/MANM-07-2023-0026

Originality/value – The findings of this study demonstrated a number of important variables that affect the uptake of EdTech products in educational settings. These factors encompassed technological infrastructure, ease of use, perceived usefulness, compatibility with existing academic practices, institutional support, financial constraints and individual attitudes towards technology. Additionally, the research explored the significance of institutional preparation for embracing technological advancements as well as the influence of socio-cultural elements.

Keywords EdTech, Educational institutions, Technology adoption model (TAM) model, Online learning

Paper type Research paper

1. Introduction

Education technology (EdTech) includes hardware, software, pedagogical theory, and practice to enhance learning. Today's educational setup requires a combination of digital learning applications, software, and hardware. EdTech is one solution that offers different forms of e-learning software, platforms, or even mobile learning devices designed for the modern teaching-learning environment. The world of business and consumers is experiencing a digital revolution, and EdTech is pushing the boundaries of traditional education. Companies that create educational technology are often referred to as EdTech companies. Educators today must integrate new EdTech tools and services into their classrooms for effective knowledge transfer. Learning in school has improved through transitions from rote learning methods to learner-centeredness. EdTech platforms are tools helpful in improving access, reducing costs, and improving academic quality, improving institutions' capability to cater to the needs of the current student community (Andreyanova *et al.*, 2021). In 2004, the beginning of satellite education and intelligent classrooms marked the start of India's EdTech journey. The first online course taken by prospective players was Extramarks in 2008. In 2022, Khan Academy began offering online instruction (EdTech Story, Nasscom, n.d). The creation and promotion of educational technology is changing in a contemporary manner thanks to the Internet, mobile technologies and devices, big data analytics, artificial intelligence, and digitally delivered services and apps (Daniel, 2015). Technology has advanced so quickly in recent years that it has transformed many aspects of education. Worldwide, educational institutions are seeing a major increase in the adoption of new educational technologies including m-learning and e-learning apps. These technologies offer diverse opportunities for enhancing teaching and learning experiences, providing flexible learning environments, and enabling access to various educational resources (Eppard *et al.*, 2021). In this context, understanding the factors influencing the successful implementation and usage of these technologies becomes crucial for educational institutions aiming to leverage their potential benefits.

There have been several studies on the usage of mobile learning (m-learning) apps and e-learning platforms in schools and universities. In order to determine the crucial factors influencing a university's choice to move toward adopting mobile learning apps, Peruzzo *et al.* (2022) performed a research in which they compared institutions that had embraced these applications with those that had not. The present study elucidated the distinctions between educational institutions that have implemented mobile learning and those that have not, therefore highlighting the significance of several elements in shaping their decisions. In addition, a conceptual framework identifying the elements required for an e-learning system's successful implementation was developed using the Delphi approach. Through the sharing of their experience and perspectives, subject-matter experts were able to identify critical components that impact the successful deployment of e-learning systems in educational settings (El-Bakry and Mastorakis, 2009). Studies on students' perceptions of mobile learning services have also provided valuable information on how students interact with and use m-learning applications. Customizing these technologies to successfully fulfill the requirements and preferences of students requires an understanding of their perspectives (Aginako and Guraya, 2021; Alzahrani *et al.*, 2012; Kagawa, 2007). Additionally, studies have

examined the effects of different factors at various stages of usage on the expansion of mobile learning applications. This research helped identify critical challenges and opportunities during different implementation phases, aiding in the refinement and optimization of M-learning applications (Huang and Chiu, 2015). To further comprehend the challenges and activities surrounding mobile learning systems, researchers conducted a preliminary study in a specific context, examining the significant difficulties and activities in a mobile learning system case study conducted in Jordan. This provides valuable insights into the localized challenges and potential solutions educational institutions may encounter when implementing mobile learning technologies. Furthermore, studies on the COVID-19 pandemic's exceptional consequences have driven the variables affecting the development of mobile learning apps at Jordanian institutions during this crisis. Understanding how external factors, such as the pandemic, influence technology adoption can inform strategies to enhance technology readiness and utilization (Diez-Gutiérrez, 2021).

In addition, during the COVID-19 epidemic, researchers developed a novel mobile learning success model specifically designed for higher education institutions. This methodology was designed to help administrators and educators navigate the pandemic's hurdles and use mobile learning tools as effectively as possible. Technology acceptance model (TAM), which employs the structural equation modeling (SEM) method, was used to assess the preparedness of m-learning system usage. As a result, a thorough grasp of the attitudes and preparedness of students to use mobile learning technology was made possible. Furthermore, the Madrasati Platform was used for virtual learning during the COVID-19 pandemic, and the elements influencing students' perceptions of its use were investigated. This research contributed to understanding online learning adoption during unprecedented circumstances and its impact on student attitudes and engagement. Thus, educational institutions have both possibilities and obstacles when implementing new educational technologies like m-learning and e-learning apps. The research mentioned above have given important new perspectives on the variables affecting the uptake of technology, the difficulties that arise in its use, and the success elements that support efficient use. This study aims to contribute to the existing literature by examining these concerns and providing guidance to educational institutions on how to optimize the use of EdTech to enhance learning outcomes and process quality. Previous studies have highlighted how important it is to include modern educational technology to increase learning assurance. According to the Jordanian perspective, resistance to change and worries about security and privacy are only a few of the issues that seriously hinder users' ability to embrace mobile learning.

In their 2019 study, Almaiah and Al Mulhem examined eleven variables that influence college students' propensity to use mobile learning tools. According to adopters in Jordan, factors including reluctance to adapt and worries about security and privacy are major obstacles to the uptake of mobile learning. Almaiah and Mulhem (2018) used a Delphi analysis to classify the critical success criteria for the successful deployment of e-learning in Saudi Arabia into four main categories: management, technology, quality, and awareness. The study involved 91 University Malaysia Terengganu undergraduate computer science students. It was evident from the results that students thought mobile learning was useful, engaging, and practical. The versatility of mobile learning, which let them learn whenever and anywhere they wanted, was something else they valued. The students also said they would like to use mobile devices for administrative tasks, including accessing library resources, registering for classes, and checking grades. The results of the study imply that mobile learning has the potential to enhance the educational experience for students and increase accessibility and flexibility. Still, further study is required to determine the most effective ways to create and execute mobile learning initiatives. Almaiah and Jalil (2014) developed a new model to examine how various aspects affect the creation of mobile learning apps in the three primary usage stages of transaction, interaction, and static. The study

results demonstrate that requirements for information quality, awareness, security, self-efficacy, system compatibility, perceived functional benefit, perceived image, availability of resources, and trust vary depending on the stage. The authors discovered significant differences in the perceptions and requirements of users about the adoption and usage of mobile learning applications in each of the three stages. In Jordanian institutions, this research examined mobile learning technologies' potential advantages and difficulties. The study determined that the primary obstacles are related to service quality, accessibility of educational materials, technological and design problems, and student needs. Accessing course materials, turning in assignments, and taking quizzes are the three main functions that students would like to be able to do on a mobile learning platform (Almaayah *et al.*, 2016). Mohammed Almaiah and Omar Almomani explore how students used mobile learning tools during the COVID-19 pandemic. The model pinpoints awareness, IT infrastructure, and top management support as the three main factors influencing the adoption of M-learning. To ensure successful M-learning adoption, the authors' findings advise institutions to concentrate on increasing awareness of the benefits of M-learning, making IT infrastructure investments to support M-learning, and securing top management support for M-learning initiatives.

Utilizing the TAM and SEM, this study examined the preparedness of M-learning system utilization. The findings demonstrate that M-learning readiness is favorably and significantly impacted by perceived utility, perceived simplicity of use, awareness, IT infrastructure, and top management support (Almaayah *et al.*, 2022). This study by Almaiah *et al.* (2023) looks into the factors influencing students' attitudes toward using the Madrasati Platform during COVID-19. The amount of time students spent utilizing the Madrasati Platform during the pandemic was shown to be considerably boosted by awareness, university management support, system quality, service quality, content quality, technical infrastructure, security concerns, and training. In their paper, Almaiah and Al Mulhem (2019) use thematic analysis with NVivo to determine the primary obstacles and variables impacting the effective deployment of e-learning platforms. They discovered 20 elements, including trust, self-efficacy, culture, e-learning system quality, financial assistance, and change management challenges. This study contributes significantly to our understanding of the factors that need to be considered in order to ensure that e-learning platforms are deployed effectively. A solid foundation for comprehending the significance of educational technology and the different elements influencing its acceptance and effectiveness in educational institutions is provided by our introduction, which incorporates this research.

Even if previous research shows that new educational technologies may be an effective tool for improving learning and teaching in educational backgrounds, it's crucial to understand the difficulties and success criteria involved in using these technologies. Educational institutions must navigate a complicated set of hurdles and success factors in order to successfully integrate new educational technology. When deciding which new technology to implement, educational leaders must carefully weigh these considerations. Instructional institutions may boost the likelihood that new instructional technologies will be successfully adopted by offering leadership support, teacher training, and student engagement in the classroom.

1.1 EdTech industry during Covid

An outbreak of COVID-19 has had a lasting impact on the world's education. Several facilities were closed by government authorities in order to ensure social distancing. Several countries have adopted a "Schools of Education" policy in response to the pandemic to ensure that the educational process is not interrupted due to extended school closures. A majority of

countries around the world have embraced distance learning, and India was no exception. Across the globe, universities in Asian countries and America and Africa provide vocation-focused tertiary education through EdTech platforms (Price and Ronnie, 2021). EdTech thus allows learners to acquire knowledge from sources that provide exciting and useful content. Education establishments such as colleges, universities, coaching centers, etc. must take action to stop the COVID-19 epidemic from spreading, were operating virtually as the government had implemented lockdown measures that prevented them from being physically open. During these difficult times, educational institutions at a global level have been closed. During the pandemic, statistics provided by UNESCO reveal that 157 crore students were enrolled in 191 countries (Higher Education | *UNESCO UIS*, 2020). Worldwide, there are 32mn students, considering all school, college, and university levels. Lockdown regulations imposed to curb the spread of COVID-19 infections affected colleges, universities, and recruiters' ability to train and hire students on time (Education: From Disruption to Recovery, n.d.). EdTech turned out to be the solution to overcome the difficulties during the lockdown scenario. Eventually, students and educational institutions benefited from the transfer of knowledge. More e-learning businesses are rising, and the companies need more educators and other employees. Due to this, India's skilled youth have several opportunities to earn a living by both learning and teaching from home. There will be seven EdTech unicorns in India by June 2022, according to market potential. Based on fast-digitalizing markets as well as uncertainty related to the pandemic, the Indian EdTech industry is expected to be valued at US\$30bn in the future. Also, there were several disruptive technologies and applications developed that enabled and enhanced the easier functioning of EdTech. The EdTech platforms could offer ecosystem-based business models such as Netflix and Airbnb and lead to higher returns in terms of business.

1.2 EdTech product

It is possible to categorize EdTech products according to their primary purpose. The following are some of the major categories:

1.2.1 Management systems for learning (including remote learning). These companies provide course management tools. Staff and students can access and share learning resources through these cloud-based portals, also known as virtual learning environments. There are several significant players in the market, including Blackboard, Moodle, Google Classroom, and Microsoft Teams. A variety of educational content, such as videos, quizzes, and lessons, can be found in this category.

1.2.2 Management information system. Education institutions must have a database, which is one of the most important pieces of software. Students' information, timetables, assessment data, and other data are usually stored on these cloud-based, modular platforms. In some cases, parents can access their alumni data through parent portals. It is common for product vendors to align with their regions of operation. Popular providers include PowerSchool and Alma, the US market is flooded with companies. The UK, for example, also has a competitive market in this area.

1.2.3 STEM products. Recent years have seen an increase in schools' use of STEM and STEAM products. Often, these tools allow children to create code. Examples of robots include LEGO Mindstorms, Arduino, Raspberry Pi, littleBits, and Sphero.

1.2.4 Online tutoring. In recent years, this category has experienced significant growth, particularly in Asia. Tutors are available to help students with their homework and studies. There are several examples, such as Yuanfudao, Byju's, and Zuoyebang.

1.2.5 Language learning. Over the past few years, apps that support the learning of new languages have seen exponential growth. Duolingo and Babbel are popular examples. The rapid advancement of technology has revolutionized the education sector, enabling the

adoption of various EdTech products in classrooms and online learning environments. While the benefits of EdTech in enhancing student engagement, collaboration, and personalized learning are widely acknowledged, the effective utilization and adoption of these tools among college students remain a significant concern. To design successful interventions and foster supportive settings, educators, administrators, and EdTech developers must thoroughly understand the factors influencing college students' acceptance of EdTech products. In order to understand how these elements interact and affect the adoption process, this article offers conceptual research that attempts to identify and investigate the significant drivers of EdTech adoption among college students.

The purpose of this study is to determine the factors that affect EdTech product uptake. In the process, we provided answers to the following queries:

- (1) What factors influence the adoption of EdTech products by college students in an Indian context?
- (2) What is the link between the elements influencing college students' use of EdTech products?

This paper's remaining sections are organized as follows: Examining the research on educational technology, Section 2 highlights the elements that contribute to technology adoption success. Section 3 details the application of the TAM and the implications of this research. Section 4 presents the conclusion, while Section 5 highlights the limitations and elaborates on the potential for future growth of research.

1.3 Objectives of research

This study is focused on the following objectives:

- (1) To identify the factors influencing the adoption of EdTech by college students.
- (2) To create a conceptual model that shows the connections between the elements that lead to college students adopting EdTech

2. Review of literature

2.1 Literature review process for adoption of education technology

The literature review offers a summary of previous studies on the adoption of EdTech with an emphasis on college students' viewpoints. It looks at several theoretical frameworks and models. The suggested conceptual model is based on theories such as the Diffusion of Innovations theory, the unified theory of acceptance and use of technology (UTAUT), and the TAM. To appreciate the complexities of EdTech adoption among college students, the study highlights research gaps and emphasizes the need for a comprehensive framework that integrates human, institutional, and technological factors. The role of technology in education is growing, and there is constant discussion regarding its application in higher education. But how education technology is embraced will determine whether or not it succeeds in a chain reaction. Adoption of EdTech is defined by a number of qualitative characteristics. Research from ScienceDirect, SCOPUS, Web of Science, EBSCO, Emerald, and Springer was used in this review. Using terms like "education," "education technology," "technological capability," "social networking," "application," and "perceived benefits," these papers were found through database searches. A list of challenges in EdTech adoption was identified and compiled from reputable journal articles, books, and reports and the above search databases. We reviewed and studied EdTech papers and reports to discover themes and features of businesses. Out of all the publications that were gathered, 76 have been taken into consideration for this study.

The literature evaluation procedure for implementing educational technology is depicted in Figure 1. Seven main themes have emerged from the introduction of technology in education. The following sections provide descriptions of these concepts.

2.2 Research methodology

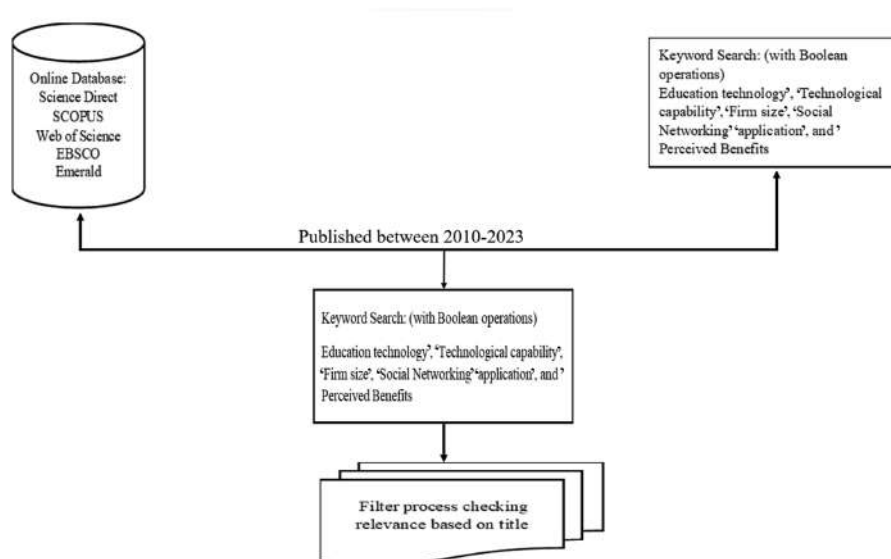
This study investigates college students' adoption of EdTech products using a qualitative research methodology. A qualitative study is deemed appropriate as it allows for an in-depth exploration of the factors influencing technology adoption within the educational context. The research methodology is designed to gain rich insights and understanding of the participants' perspectives and experiences related to EdTech adoption.

The qualitative research methodology will provide valuable insights into the adoption of EdTech products among college students, contributing to a conceptual understanding of the factors shaping technology integration in educational institutions. The secondary techniques employed to evaluate the data collected for this study from several sources were a content review and a thorough examination. The analytical sample's qualitative components have been considered. Only this report's secondary data has been used. This literature was thoroughly and methodically examined. The following are examples of secondary data sources: (1) academic publications and journals; (2) reports; (3) search engines; (4) corporate websites; (5) research papers; and (6) scholarly pieces. First, a structured literature review is conducted to identify the factors influencing EdTech adoptions in Scopus. Second, an extended version of the TAM is adopted to develop a qualitative data-based conceptual framework to analyze EdTech adoption in the Indian context and identify the critical success factors for EdTech students.

3. Factors of EdTech product and hypotheses development

3.1 Technological capability

Technical competency is the ability to create and innovate new products and procedures, advance one's understanding of the physical world via original research and application, and



Source(s): Figure by authors

Figure 1.
Literature review process

convert that knowledge into plans and guidelines that accomplish intended outcomes (Marchiori *et al.*, 2014). Technology capability is defined by Parasuraman (2000) as “people’s willingness to use new technologies to accomplish goals in their personal and professional lives”. To overcome the limitations of technical requirements, EdTech products need technologically solid capabilities. Additionally, solid technological capabilities strengthen the ability of organizations to adopt digital technologies, such as educational technology and application-based marketing models, to improve their performance in the market (Kirkwood and Price, 2016). Similarly, studies have shown that innovation in commerce and electronics in the EdTech line of business results from companies’ technological capacity and adoption (Chao, 2003). Technology advancements require different personal characteristics for the creation and launch of innovations. In other words, the administrator’s qualification level in business education significantly impacts whether an entrepreneur with only knowledge and technology-based abilities can get promoted to the managerial level (Camisón-Haba *et al.*, 2019). Likewise, payment processing technology and digital banking services are accelerating EdTech products to develop their activity (Grabar *et al.*, 2019).

Two factors that contribute to technology capability are optimism and innovativeness. In addition to technology readiness, the other two dimensions are “discomfort” and “security”, which may suppress technology capability (Mick and Fournier, 1998). Technology optimism refers to a positive view of technology and the belief that technology will enhance efficiency and improve people’s work and personal lives. Innovativeness refers to how confident a person feels that they are developing new technology-based products and services. The term discomfort describes a sense of being out of control over technology and hesitant to use it effectively. Technology-based transactions are perceived as insecure if users doubt their ability to work correctly.

H1. Technological Capability can be affected positively by EdTech Products.

Student mindset: The term “student mindset” describes a person’s self-perception of their abilities (Dweck, 2006). According to our observations, the majority of pupils possess both a fixed and a development mentality. Students who believe they can improve their skill level with hard work and persistence are said to have a growth mindset. Students who think they can’t become better at anything no matter how hard they try, are considered to have a fixed or unchanging attitude. A person who has a development mentality is more adaptable to adversity and receptive to new experiences. On the other hand, a person with a fixed attitude shies away from difficulties and pays little attention to criticism (Mansouri and Mhunpiew, 2016). Observing instruction or participating in constructive discussion may enable students to learn new things. Learning is more effective when knowledge is constructed by contributing and participating rather than simply absorbing information (Benson Soong *et al.*, 2001).

H2. Student mindsets are adopted based on their EdTech product

3.2 Student collaboration

Students can interact and collaborate within an online educational environment through discussions and debates. Students can better comprehend topics if they collaborate than if they are taught traditionally. Spinuzzi (1997) highlighted in his critique of cooperative learning that students would only learn successfully and profitably if they gained relevant and intelligible knowledge. An essential characteristic of students in the e-learning setting is their ability to collaborate. It is essential, however, to design course content to encourage collaboration.

H3. Student Collaboration sets are adopted based on their EdTech product

3.3 Government policy and initiatives

The government plays a role through efforts to provide subsidized educational technology inputs, incentives, consulting, and technology services, as well as electronic distribution of market statistics, access to electronic markets, and the establishment of incubators. To encourage enterprises to use and adopt digital technologies. Establishing digital innovation centers with good broadband infrastructure across India would address the problems companies face in adopting new technologies. This would ensure the connection between technologies of information and communication (ICT) updates and student communities. A student-focused innovation hub can provide a one-stop-shop solution where students and products can access the latest technologies and skills. The construct variable is policy (Bahaddin Acat, 2008) and learning communities (Akbulut and Kesim, 2016) developing reliable and valid measurement tools.

H4. Government initiatives and policies play a positive role in the adoption of EdTech products.

3.4 Social networking

According to Hamid *et al.* (2010), Social media and websites that facilitate social networking are examples of digital platforms used for networking. Because of social networking sites, blogs, YouTube channels, instant messaging, Internet forums, and blogs, people may learn from the networks (Lippert and Ph, 2006). Individuals and businesses can adopt technologies to market themselves, thanks to learning and networking among students (Tosun, 2018). A particular research study examined the impact of social media on industry-level early adoption choices (Ahamat *et al.*, 2017). When companies lack information and adoption and use of technology are hindered, effective networking allows early adopters to communicate their potential with one another (Zolkepli and Kamarulzaman, 2011). According to Venkatesh *et al.* (2003), social networking is defined as a way to adjust or change people's behavior to conform to societal norms. It significantly impacts an individual's technology use and is corroborated by previous studies on technology adoption. According to a recent study, young people rely on family, friends, and peers for advice when it comes to online learning.

H5. Utilizing social networks promotes the adoption of educational technology Products.

3.5 Perceived benefits

Technology acceptance is a fascinating study topic because of the shift in how users perceive technology's role in identifying new business opportunities. The advantages of technology usage are what influence a firm's willingness to embrace it, but very few research have looked at the link between firm-level views of technology use and its acquired benefits (Domingo and Garganté, 2016). EdTech integrates social media apps with contemporary marketing communication technologies to extend the product and reach prospective customers (Piotrowski, 2015; Jayaram *et al.*, 2015). Many researchers have frequently used perceived benefits. For example, students' perceptions of the electronic medium's usefulness in delivering courses were believed to enhance their opinion of the course experience and encourage them to take the course online (Lu and Lin, 2012). We included both PU and PE in the study to examine perceived benefits. The level of user perception (PU) in the context of e-learning refers to how much users believe using an EdTech product would improve their knowledge and enable them to achieve their goals. Customers can contend that utilizing an ed-tech product is more advantageous than expensive. Depending on the source (Lu and Lin, 2012), PU has been considered a significant determinant of PE. The method for addressing perceived utility in the context of e-learning systems focuses on assessing the construct's applicability as a benchmark for EdTech products.

H6. Perceived benefits are adopted based on their EdTech product.

3.6 EdTech products

Several respondents commented that student and parent product endorsements were significant; however, they felt that teacher endorsements were the most critical. One respondent pointed out that they might be critical of anything new entering their environment: “And they are quite right to be critical of it”. Thus, they will be viewed negatively if they endorse low quality. Schools typically embrace your product quite strongly once they trust it. Educators will consider teachers not only essential for their classrooms, but if the teachers widely adopt the products, it will also open the door for a wider adoption of EdTech products. The respondent from another EdTech technical person explains how things can go wrong when teachers do not fully embrace the product: “We must engage the teachers at the beginning of this journey. Otherwise, it will fail.’ We may also have one teacher who is very knowledgeable about technology but is not going to sign off on the checks. Hence, you need to coordinate with every one of the teachers. Getting a start-up to work with the government is very difficult since they will just throw scale at you while trying to figure everything out. The value proposition should be understood, and you should be mature if you have built up your system. The moment you can take advantage of economies of scale because of their size, then it is a win-win situation for everybody. When creating a business model for students, the following factors are recommended by earlier research and are highly relevant to this e-learning issue.

4. Theoretical background of study

Since the TAM is so good at describing and forecasting consumers’ acceptance and uptake of new technologies, it has been included extensively into the suggested model. Davis introduced TAM in 1989 and has since been extensively applied and extended to various domains, including mobile learning, e-government services, digital technologies, Internet banking, and mobile payment systems. Several studies have leveraged TAM to explore users’ attitudes and intentions towards technology adoption and the factors that influence their acceptance of these technologies (Scherer *et al.*, 2019). To investigate the impact of quality characteristics on mobile learning acceptability, researchers have expanded the TAM in the context of mobile learning. Based on TAM, these studies investigated at how factors including usability, system performance, and content quality impact students’ adoption of mobile learning applications. Similarly, the UTAUT has been used to study how college students use mobile learning platforms. UTAUT, a well-liked paradigm for understanding technology adoption, combines elements from several technology acceptance theories to provide a comprehensive framework (Nicholas Omoregbe *et al.*, 2016; Sitar-Taut and Mican, 2021). Researchers were able to examine how performance expectations, effort expectations, social influence, and enabling variables affect students’ behavioral intents to use mobile learning systems by applying it to the setting of mobile learning. An expanded UTAUT model has also been used to investigate the viability of mobile learning applications as a teaching aid. The goal of this research was to look at how technical factors affected people’s willingness to keep using mobile devices for learning. Using UTAUT in conjunction with other aspects of technology, researchers were able to get more insight on the long-term sustainability of mobile learning uptake.

Technology acceptance models such as TAM and UTAUT have found applications in a variety of sectors outside of education. For instance, in the context of e-government services, TAM has been used to identify the factors influencing the adoption of such services among citizens in Jordan (Yakubu and Dasuki, 2019). Additionally, the combination of TAM and the government adoption model (GAM) has been used to develop a mobile government adoption model, providing a comprehensive understanding of the factors influencing the adoption of mobile government services. Technology adoption models have been used to investigate

factors impacting students' ongoing desire to utilize digital technologies in higher education (Granić and Marangunić, 2019). These studies have sought to understand the determinants that drive sustained usage of digital technologies in the academic context. Moreover, in e-commerce adoption, TAM has been utilized to investigate the effect of privacy concerns on consumers' willingness to adopt e-commerce platforms, shedding light on the importance of addressing privacy-related issues to promote adoption. In the financial sector, adopting digital information technologies, Internet banking, and mobile payment systems has been explored using technology acceptance models, such as TAM and information system success model (ISSM), along with other relevant factors like perceived risk and perceived value. Researchers have also examined how information quality, perceived security, and perceived trust affect people's adoption of near-field communication (NFC) for mobile payments using TAM. This research has clarified these factors impacting customers' adoption of mobile payment technology.

According to Lacasa *et al.* (2021), technology acceptance models such as TAM and UTAUT are widely used in several fields because of their ability to explain users' acceptance and adoption of new technologies. We found that these models are resilient and versatile. In order to assist organizations and governments in making more informed decisions on how best to install and improve the usability of technology, these models provide a strong basis for researchers to investigate and comprehend the many aspects impacting technology adoption. Examining relevant studies that have used the TAM and related models in a variety of fields helps justify the model's use of TAM. A popular approach for analyzing and forecasting user adoption of technology is TAM. The incorporation of this technology into your model offers a strong basis for evaluating the uptake of mobile learning technologies in academic settings. Almaiah *et al.* (2016) use the expanded TAM to examine how quality attributes affect students' perceptions about adopting mobile learning. The results of the study suggested that responsiveness, interactivity, functionality, accessibility, customization, and high-quality learning materials had a positive impact on students' opinions of the usefulness and usability of mobile learning apps.

Almaiah *et al.* (2019) use the UTAUT paradigm to study how college students use mobile learning platforms. The study found that perceived security, self-efficacy, perceived compatibility, perceived trust, perceived awareness, and perceived material quality are the primary elements affecting students' adoption of mobile learning systems. Stated differently, students are more likely to use mobile learning systems if they perceive the information as reliable and valuable, if the system works with their current devices and learning styles, if they trust the system and its creators, if they are aware of the advantages of using the system, if they have access to the resources they need to use it successfully, if they think they can use it successfully, and if they perceive the system as secure. Similar to the previous study, this research extends UTAUT and demonstrates that the TAM's core constructs continue to play a crucial role in understanding technology acceptance, even within complex, extended models. In order to investigate the impact of technological aspects on the use of mobile devices as a learning tool, Alghazi *et al.* (2021) expand upon the UTAUT model. The researchers found that several characteristics, including device connectivity, compatibility, memory, performance, network coverage, and network speed, had a substantial and positive impact on students' intentions to utilize mobile learning. The findings show that website quality, confidence in the Internet, trust in the government, performance expectancy, effort expectancy, and facilitating conditions all positively affect behavioral intention to use e-government services. However, social influence was found to be insignificant. These findings suggest that the Jordanian government should focus on improving the quality of its e-government websites, building trust with citizens, and making it easy for citizens to use e-government services. The TAM and UTAUT models are used in Almaayah *et al.* (2020)'s mobile government adoption model to describe the variables

influencing consumers' acceptance of mobile government services. The study revealed a number of crucial variables, including performance expectations, effort expectations, social influence, enabling circumstances, habit, trust, and perceived utility. Scholars and decision-makers may use the model to create plans for encouraging the use of mobile government services. It has been noted that students' continual desire to utilize digital technologies is positively impacted by technological readiness, uncertainty avoidance, digital information flow, instructor quality, and learning pleasure (Fink *et al.*, 2023).

Althunibat *et al.* (2021) separate the adoption of smart-government services into three primary phases: static, interaction, and transaction. The model outlines several factors, such as resource accessibility, perceived image, security, system compatibility, information quality, awareness, perceived functional benefit, self-efficacy, and trust, that affect adoption at each stage. Over the course of the three phases, there is a discernible movement in user needs and attitudes toward the adoption and utilization of smart government services, according to the poll. Using a conceptual model, Akour *et al.* (2022) investigate how privacy concerns affect the adoption of e-commerce in the United Arab Emirates. The four components in the model are perceived Internet safety, transaction willingness, acceptability of e-commerce, and privacy concerns. The authors discovered that although perceived Internet safety and e-commerce acceptability moderate this effect, privacy concerns harm e-commerce uptake. Digital information technology (DIT) usage in higher education was examined by Almaiah *et al.* in 2022a, b, c, d. They used a TAM-based survey with 485 Chinese college students. The findings showed that students' opinions on the usefulness, convenience, and experience of the tools had a significant impact on their likelihood to utilize DITs. The way that material was presented and the caliber of the tutor had a significant influence on how well pupils understood DITs.

The authors conclude that higher education institutions should focus on improving the perceived convenience of use, perceived usefulness and perceived experience of DITs to promote student acceptance. This study provides a detailed discussion of the variables influencing the use of DITs in higher education. Organizations can utilize the results to create plans that encourage teachers and students to use DITs. In order to create a model of online banking adoption, Almaiah *et al.* (2022a, b, c, d) combined the UTAUT with perceived risk and price value. All criteria were shown to be significant predictors of the adoption of online banking by the model, with the perceived risk being the most significant. Almaiah *et al.*'s (2022a, b, c, d) study examines the variables affecting Saudi Arabia's use of Near-Field Communication (NFC) for mobile payments. The authors discovered that mobile payment usage is favorably impacted by perceived security, perceived trust and information quality. Accordingly, consumers with access to high-quality information regarding NFC mobile payments, trust the technology and the firms involved, and think their payments are safe are likelier to use NFC mobile payments. The rationale behind including the TAM in your suggested model is its adaptability and efficiency as a fundamental structure for comprehending technology adoption. The studies mentioned show that TAM ideas are still applicable and flexible in various contexts, such as e-government, e-commerce, mobile learning, and more. The application of TAMs in the planned study on college students' adoption of EdTech goods is further supported by their use in other fields. Application of TAM in several technical environments is possible due to its general-purpose nature. In general, the technology acceptance paradigm (TAP) is a widely recognized and validated paradigm that is very appropriate for the proposed investigation into college students' adoption of EdTech products. Strategies to encourage college students to embrace EdTech products may be developed using the information provided by TAM, It may help to clarify the factors influencing these students' behavioral intention to utilize these items.

4.1 Different model theories approaches in TAM to adoption of EdTech

Reasoned action theory, TAMs, extended TAM models, the theory of planned behavior, technological organization (TOE), social identification theory, social learning theory, and social network theories are just a few of the many theories that have been proposed to explain how people adopt new technologies. Rural extension services mostly employ the technology acceptance model and TOE models to help people adopt ICT. The combination of TOE and TAM, however, has not been widely used in research to gauge consumers' intentions to use mobile devices to get market data (Amiel and Reeves, 2008). Students production of marketable surpluses has been made easier by adopting EdTech products, which facilitates students' access to market information by enabling them to produce surpluses (Arrasyid *et al.*, 2020). Similar to how ICT use in marketing, production, and education technology benefits small businesses' ability to compete on the market against large businesses. Education technology helps knowledge gain access to new sales territories, opening up a new market for potential customers. Developing countries are increasingly in need of digital capabilities. Few studies have been conducted on how digital technologies are employed in education to produce and market goods.

On the other side, a TOE model clarifies a company's motivation for using new technology. Technologies, organizations, and environments all play a role in how new technologies are adopted. Business technology includes both internal and external technologies, such as infrastructure and processes (HOTI, 2015) are among the environmental factors. In addition to TOE factors, some researchers have suggested that social networks (Dwivedi *et al.*, 2012), Studies on the adoption of technology also take into account individual aspects and work characteristics (Kraemer, 2019). Networking has an impact on an invention's acceptance, user base, and other factors. When an organization adopts an innovation, it often creates interdependencies with other firms' goods in the utilization of related resources (Mattsson and Andersson, 2019). Perceived utility (Davis, 1989) is "the degree to which a person thinks that using a particular technology would improve business performance". Company level (Dincer and Dincer, 2016; Mailizar *et al.*, 2021). Therefore, this study focused on bridging the knowledge gap on the adoption of EdTech in education through the use of product marketing and promotion. Furthermore, generation-technology-organization-environment (T-O-E) is adopted in this study by Tornatzky and Fleischer (1990). This paper provides a comprehensive framework for measuring and evaluating technological adoption of EdTech products, integrating the existing theoretical review shown in Figure 2.

5. Research findings

Based on an investigation of EdTech adoption in the Indian setting, a number of literature evaluations served as the basis for this study's conclusions and identify the critical success factors for EdTech entrepreneurs. A framework is presented in this paper for performance practitioners to evaluate, plan, and develop impactful technological solutions for advertising and marketing EdTech products. As a result, there could be a more incredible opportunity for empirical research to evaluate and validate the suggested variant.

5.1 Implications of future research

The findings of this study will broaden the body of information previously accessible on the use of EdTech. Among college students and provide practical implications for educators, policymakers, and EdTech developers. Understanding the complex interplay between individual, institutional, and technological factors will enable stakeholders to design effective strategies to promote the successful adoption and integration of EdTech products in higher education. Ultimately, this research aims to enhance student learning outcomes, improve educational practices, and support the ongoing evolution of technology-enhanced education.

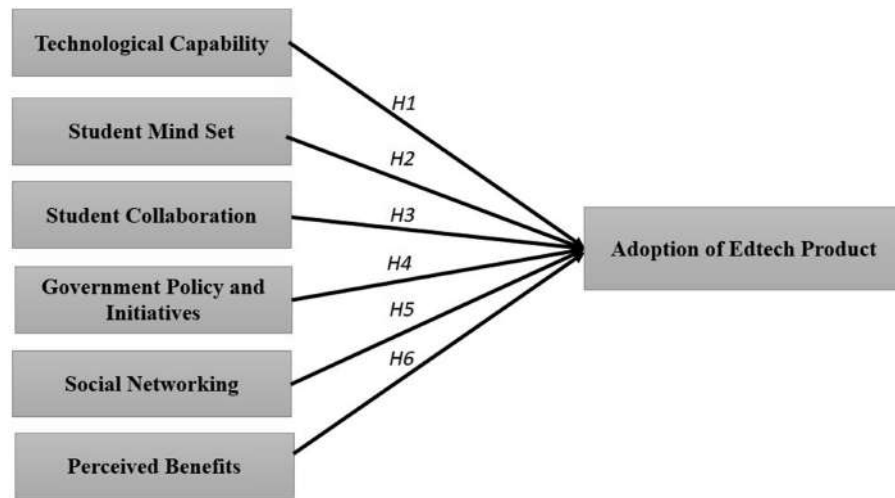


Figure 2.
Conceptual model for
adoption of EdTech
product

Source(s): Figure by authors

6. Conclusion

The educational technology sector is quickly evolving, and small technology products have an opportunity to capitalize on these changes. To reach their intended audience, one of these firms' top priorities is to find the best digital solution. There are many options available for education, but it's not always easy to know which one will provide the best return on investment. Additionally, I want to emphasize that technology is only a tool and not the answer in and of itself. Reaching your objectives won't come from just possessing it; you also need to make sure that it's being used to its full potential. The products with the best marketing abilities will benefit as more and more products use technology to build their networks, EdTech product is not just for students. More than ever, teachers and professors are using technology in the classroom to create engaging and interactive learning experiences. However, this trend has led to a growing concern that students who don't have access to technology at home are being left behind. In order to promote the commercialization of educational technology products, this paper offers development professionals an integrated framework for evaluating, organizing, and carrying out effective technological interventions in the classroom.

7. Limitations and future research avenues

Digital technology offers unique opportunities to empower EdTech products along the way. They should improve their skills at advertising their products. The fact is that there is no one perfect virtual solution for every situation, notwithstanding these options. In addition, the often-used term "digital answer" refers to a piece of technology that may be utilized as a backup to assist achieve the firm's goals rather than the only solution. As more and more education product applications extend their networks via generational adoption, people with the most delicate advertising competencies will in all likelihood gain greater advantages than those without. providing students with technical assistance on marketing and advertising skills, consequently extra study possibilities exist in the talent improvement region of Education Technology's A framework is presented in this paper for performance practitioners to evaluate, plan, and develop impactful technological solutions for advertising and marketing EdTech products. As a result, there may be greater scope for challenging and certifying the proposed version with empirical study.

References

- Aginako, Z. and Guraya, T. (2021), "Students' perception about sustainability in the engineering school of bilbao (University of the basque country): insertion level and importance", *Sustainability (Switzerland)*, Vol. 13 No. 15, doi: 10.3390/su13158673.
- Ahamat, A., Shahkat Ali and Hamid, N. (2017), "Factors influencing the adoption of social media in small and medium enterprises (Smes)", *IJASOS- International E-Journal of Advances in Social Sciences*, No. 8, pp. 338-348, doi: 10.18769/ijasos.336544.
- Akbulut, Y. and Kesim, M. (2016), "Construct validation of ICT indicators measurement scale (ICTIMS) construct validation of ICT indicators measurement scale (ICTIMS) Yavuz Akbulut , Mehmet Kesim and Ferhan Odabasi", February 2017, pp. 2011-2014.
- Akour, I., Alnazzawi, N., Alshurideh, M., Almaiah, M.A., Al Kurdi, B., Alfaisal, R.M. and Salloum, S. (2022), "A conceptual model for investigating the effect of privacy concerns on E-commerce adoption: a study on United Arab Emirates consumers", *Electronics*, Vol. 11 No. 22, doi: 10.3390/electronics11223648.
- Alghazi, S., Kamsin, A. and Almaayah, D. (2021), "For sustainable application of mobile learning: an extended UTAUT model to examine the effect of technical factors on the usage of mobile devices as a learning tool", *Sustainability*, Vol. 13, doi: 10.3390/su13041856.
- Almaayah, D., Jalil, M. and Man, M. (2016), "Preliminary study for exploring the major problems and activities of mobile learning system: a case study of Jordan", Vol. 93, pp. 580-594.
- Almaayah, D., Al-Khasawneh, A., Thunibat, A. and Khawatreh, S. (2020), "Mobile government adoption model based on combining GAM and UTAUT to explain factors according to adoption of mobile government services", *International Journal of Interactive Mobile Technologies (IJIM)*, Vol. 14, doi: 10.3991/ijim.v14i03.11264.
- Almaayah, D., Alotaibi, S., Lutfi, A., Almomani, O., Awajan, A., Saaidah, A., Alrawad, M. and Awad, A. (2022), "Employing the TAM model to investigate the readiness of M-learning system usage using SEM technique", *Electronics*, Vol. 11, p. 1259, doi: 10.3390/electronics11081259.
- Almaiah, M.A. and Al Mulhem, A. (2019), "Analysis of the essential factors affecting of intention to use of mobile learning applications: a comparison between universities adopters and non-adopters", *Education and Information Technologies*, Vol. 24 No. 2, pp. 1433-1468, doi: 10.1007/s10639-018-9840-1.
- Almaiah, M.A. and Jalil, M.A. (2014), "Investigating students' perceptions on mobile learning services", *International Journal of Interactive Mobile Technologies*, Vol. 8 No. 4, pp. 31-36, doi: 10.3991/ijim.v8i4.3965.
- Almaiah, D.R.M.A. and Mulhem, D.R.A.A.L. (2018), "A conceptual framework for determining the success factors of e-learning system implementation using delphi technique", available at: <https://api.semanticscholar.org/CorpusID:210172103>
- Almaiah, M.A., Jalil, M.A. and Man, M. (2016), "Extending the TAM to examine the effects of quality features on mobile learning acceptance", *Journal of Computers in Education*, Vol. 3 No. 4, pp. 453-485, doi: 10.1007/s40692-016-0074-1.
- Almaiah, M.A., Alamri, M.M. and Al-Rahmi, W. (2019), "Applying the UTAUT model to explain the students' acceptance of mobile learning system in higher education", *IEEE Access*, Vol. 7, pp. 174673-174686, doi: 10.1109/ACCESS.2019.2957206.
- Almaiah, M.A., Al-Rahmi, A., Alturise, F., Hassan, L., Lutfi, A., Alrawad, M., Alkhalaf, S., Al-Rahmi, W.M., Al-sharaieh, S. and Aldhyani, T.H.H. (2022a), "Investigating the effect of perceived security, perceived trust, and information quality on mobile payment usage through near-field communication (NFC) in Saudi Arabia", *Electronics*, Vol. 11 No. 23, doi: 10.3390/electronics11233926.
- Almaiah, M.A., Al-Rahmi, A.M., Alturise, F., Alrawad, M., Alkhalaf, S., Lutfi, A., Al-Rahmi, W.M. and Awad, A.B. (2022b), "Factors influencing the adoption of internet banking: an integration of ISSM and UTAUT with price value and perceived risk", *Frontiers in Psychology*, Vol. 13, doi: 10.3389/fpsyg.2022.919198.

- Almaiah, M.A., Alhumaid, K., Aldhuhoori, A., Alnazzawi, N., Aburayya, A., Alfaisal, R., Salloum, S.A., Lutfi, A., Al Mulhem, A., Alkhdour, T., Awad, A.B. and Shehab, R. (2022c), "Factors affecting the adoption of digital information technologies in higher education: an empirical study", *Electronics*, Vol. 11 No. 21, doi: 10.3390/electronics11213572.
- Almaiah, M.A., Ayouni, S., Hajje, F., Lutfi, A., Almomani, O. and Awad, A.B. (2022d), "Smart mobile learning success model for higher educational institutions in the context of the COVID-19 pandemic", *Electronics*, Vol. 11 No. 8, doi: 10.3390/electronics11081278.
- Althunibat, A., Binsawad, M., Almaiah, M.A., Almomani, O., Alsaaidah, A., Al-Rahmi, W. and Seliaman, M.E. (2021), "Sustainable applications of smart-government services: a model to understand smart-government adoption", *Sustainability (Switzerland)*, Vol. 13 No. 6, pp. 1-28, doi: 10.3390/su13063028.
- Alzahrani, I., Woollard, J., Ibraheem, A. and John, W. (2012), *The Potential of Wiki Technology as an E-Learning Tool in Science and Education; Perspectives of Undergraduate Students in Al-Baha University*, Saudi Arabia, Online Submission, July, available at: <http://eprints.soton.ac.uk/338878/>
- Amiel, T. and Reeves, T.C. (2008), "Design-based research and educational technology: rethinking technology and the research agenda", *Educational Technology and Society*, Vol. 11 No. 4, pp. 29-40.
- Andreyanova, I.V., Serebryakova, A.A., Kuklev, S.E. and Serova, O.A. (2021), "Regional university in the EdTech market of educational services", *Proceedings of International Scientific and Practical Conference "Russia 2020 - a New Reality: Economy and Society" (ISPCR 2020)*, Vol. 164, Ispcr 2020, pp. 63-67, doi: 10.2991/aebmr.k.210222.013.
- Arrasyid, R., Ruhimat, M., Abdullah, C.U., Suwandi, A., Darsiharjo and Raka, H. (2020), "Design, development, and evaluation of a mobile learning application for tourism education", *Journal of Engineering Science and Technology*, Vol. 15 No. 6, pp. 3859-3875.
- Bahaddin Acat, M. (2008), "Effectiveness of concept maps in vocabulary instruction", *Egitim Arastirmalari - Eurasian Journal of Educational Research*, Vol. 33, pp. 1-16.
- Benson Soong, M.H., Chuan Chan, H., Chai Chua, B. and Fong Loh, K. (2001), "Critical success factors for on-line course resources", *Computers and Education*, Vol. 36 No. 2, pp. 101-120, doi: 10.1016/S0360-1315(00)00044-0.
- Camisón-Haba, S., Clemente-Almendros, J.A. and Gonzalez-Cruz, T. (2019), "How technology-based firms become also highly innovative firms? The role of knowledge, technological and managerial capabilities, and entrepreneurs' background", *Journal of Innovation and Knowledge*, Vol. 4 No. 3, pp. 162-170, doi: 10.1016/j.jik.2018.12.001.
- Chao, W. (2003), "Self-efficacy toward educational technology: the application in Taiwan teacher education", *Journal of Educational Media and Library Sciences*, Vol. 40 No. 4, pp. 409-416.
- Daniel, B. (2015), "Big Data and analytics in higher education: opportunities and challenges", *British Journal of Educational Technology*, Vol. 46 No. 5, pp. 904-920, doi: 10.1111/bjet.12230.
- Díez-Gutiérrez, E.-J. (2021), "Hybrid Digital Governance and EdTech Capitalism: the COVID-19 Crisis as a Threat | Gobernanza híbrida digital y Capitalismo EdTech: la crisis del COVID-19 como amenaza", *Foro de Educacion*, Vol. 19 No. 1, pp. 105-133, doi: 10.14516/fde.860.
- Dincer, B. and Dincer, C. (2016), "Literature review on the use of technology and information systems in SMEs", *International Journal of Academic Research in Business and Social Sciences*, Vol. 6 No. 12, pp. 678-684, doi: 10.6007/ijarbss/v6-i12/2528.
- Domingo, M.G. and Garganté, A.B. (2016), "Exploring the use of educational technology in primary education: teachers' perception of mobile technology learning impacts and applications' use in the classroom", *Computers in Human Behavior*, Vol. 56, pp. 21-28, doi: 10.1016/j.chb.2015.11.023.
- Dweck, C.S. (2006), "Mindset : the new psychology of", *Gifted Children*, Vol. 1 No. 2, pp. 2006-2008.
- Dwivedi, Y., Wade, M. and Schneberger, S. (2012), *Information Systems Theory: Explaining and Predicting Our Digital Society*, Vol. 1, doi: 10.1007/978-1-4419-6108-2.

- Education: From disruption to recovery (n.d.), available at: <https://en.unesco.org/covid19/educationresponse> (accessed 17 June 2022).
- El-Bakry, H.M. and Mastorakis, N. (2009), "E-learning and management information systems for E-universities", *Proceedings of the 13th WSEAS International Conference on Computers - Held as Part of the 13th WSEAS CSCC Multiconference*, July, pp. 555-565.
- Eppard, J., Kaviani, A., Bowles, M. and Johnson, J. (2021), "EdTech cultururation: integrating a culturally relevant pedagogy into educational technology", *Electronic Journal of E-Learning*, Vol. 19 No. 6, pp. 516-530, doi: 10.34190/ejel.19.6.2065.
- Fink, A., Spoden, C. and Frey, A. (2023), "Determinants of higher education teachers' intention to use technology-based exams", *Education and Information Technologies*, Vol. 28 No. 6, pp. 6485-6513, doi: 10.1007/s10639-022-11435-4.
- Grabar, A.A., Koykova, T.L., Prokopenko, L.K. and Shchinova, R.A. (2019), "The innovative mechanism of government support for the investment activities of digital universities for provision of region's investment attractiveness in the conditions of Industry 4.0", *On the Horizon*, Vol. 27 Nos 3-4, pp. 159-165, doi: 10.1108/OTH-07-2019-0041.
- Granić, A. and Marangunić, N. (2019), "Technology acceptance model in educational context: a systematic literature review", *British Journal of Educational Technology*, Vol. 50 No. 5, pp. 2572-2593, doi: 10.1111/bjet.12864.
- Hamid, S., Waycott, J., Kurnia, S. and Chang, S. (2010), "The use of online social networking for higher education from an activity theory perspective", *PACIS 2010 - 14th Pacific Asia Conference on Information Systems*, March 2014, pp. 1414-1425.
- Higher Education | UNESCO UIS (n.d.), available at: <http://uis.unesco.org/en/topic/higher-education> (accessed 17 June 2022).
- Hoti, E. (2015), "The technological, organizational and environmental framework of IS innovation adaption in small and medium enterprises. Evidence from research over the last 10 years", *International Journal of Business and Management*, Vol. III No. 4, pp. 1-14, doi: 10.20472/bm.2015.3.4.001.
- Huang, Y.M. and Chiu, P.S. (2015), "The effectiveness of a meaningful learning-based evaluation model for context-aware mobile learning", *British Journal of Educational Technology*, Vol. 46 No. 2, pp. 437-447, doi: 10.1111/bjet.12147.
- Jayaram, D., Manrai, A.K. and Manrai, L.A. (2015), "Effective use of marketing technology in Eastern Europe: web analytics, social media, customer analytics, digital campaigns and mobile applications", *Journal of Economics, Finance and Administrative Science*, Vol. 20 No. 39, pp. 118-132, doi: 10.1016/j.jefas.2015.07.001.
- Kagawa, F. (2007), "Dissonance in students' perceptions of sustainable development and sustainability: implications for curriculum change", *International Journal of Sustainability in Higher Education*, Vol. 8 No. 3, pp. 317-338, doi: 10.1108/14676370710817174.
- Kirkwood, A. and Price, L. (2016), "Technology-enabled learning implementation handbook", July, pp. 1-13, available at: http://oasis.col.org/bitstream/handle/11599/2363/2016_TELI-Handbook.pdf?sequence=1&isAllowed=y
- Kraemer, K. (2019), "V III ^ rLwl 1 V MISQREV . EW review: information technology and organizational performance: an integrative model of", Vol. 28 No. 2, pp. 283-322.
- Lacasa, P., Nieto, J.J., Radanliev, P., Vladova, G., Ullrich, A., Bender, B. and Gronau, N. (2021), "Students' acceptance of technology-mediated teaching – how it was influenced during the COVID-19 pandemic in 2020: a study from Germany". doi: 10.3389/fpsyg.2021.636086.
- Lippert, S.K. and Ph, D. (2006), "Technological , organizational , and environmental antecedents to Web services adoption", Vol. 6 No. 1.
- Lu, H.P. and Lin, K.Y. (2012), "Factors influencing online auction sellers' intention to pay: an empirical study integrating network externalities with perceived value", *Journal of Electronic Commerce Research*, Vol. 13 No. 3, pp. 238-254.

- Mailizar, M., Almanthari, A. and Maulina, S. (2021), "Examining teachers' behavioral intention to use e-learning in teaching of mathematics: an extended tam model", *Contemporary Educational Technology*, Vol. 13 No. 2, pp. 1-16, doi: 10.30935/CEDETECH/9709.
- Mansouri, S. and Mhunpiew, N. (2016), "Leadership is skin deep: a new way of being through inside-out effect of leadership and its strategies in teaching", *Journal of Advances in Humanities and Social Sciences*, Vol. 2 No. 3, doi: 10.20474/jahss-2.3.2.
- Marchiori, B.E., Carraher, C.E. and Stiles, K. (2014), "Journal of technology management in China company article title page", *Journal of Technology Management in China*, Vol. 9 No. 3, pp. 274-288, available at: <http://www.emeraldinsight.com.ezproxy.liberty.edu:2048/doi/pdfplus/10.1108/JTMC-08-2014-0045>
- Mattsson, L.G. and Andersson, P. (2019), "Private-public interaction in public service innovation processes- business model challenges for a start-up EdTech firm", *Journal of Business and Industrial Marketing*, Vol. 34 No. 5, pp. 1106-1118, doi: 10.1108/JBIM-10-2018-0297.
- Mick, D.G. and Fournier, S. (1998), "Paradoxes of technology: consumer cognizance, emotions, and coping strategies", *Journal of Consumer Research*, Vol. 25 No. 2, pp. 123-143, doi: 10.1086/209531.
- Nicholas Omoregbe, S., Chizor, I., Azeta, A. and George, T. (2016), "Extending the unified theory of acceptance and use of technology (utaut) model: the role of technology cultururation", *INTED2016 Proceedings*, Vol. 1, March, pp. 3437-3441, doi: 10.21125/inted.2016.1813.
- Parasuraman, A. (2000), "Technology readiness index (tri): a multiple-item scale to measure readiness to embrace new technologies", *Journal of Service Research*, Vol. 2 No. 4, pp. 307-320, doi: 10.1177/109467050024001.
- Peruzzo, F., Ball, S.J. and Grimaldi, E. (2022), "Peopling the crowded education state: heterarchical spaces, EdTech markets and new modes of governing during the COVID-19 pandemic", *International Journal of Educational Research*, Vol. 114, doi: 10.1016/j.ijer.2022.102006.
- Piotrowski, C. (2015), "Emerging research on social media use in education: a study of dissertations", *Research in Higher Education Journal*, Vol. 27, January, pp. 1-12.
- Price, K. and Ronnie, L. (2021), "Contextual factors influencing entrepreneurship education at a South African University of Technology", *Southern African Journal of Entrepreneurship and Small Business Management*, Vol. 13 No. 1, pp. 1-11, doi: 10.4102/sajesbm.v13i1.394.
- Scherer, R., Siddiq, F. and Tondeur, J. (2019), "The technology acceptance model (TAM): a meta-analytic structural equation modeling approach to explaining teachers' adoption of digital technology in education", *Computers and Education*, Vol. 128, pp. 13-35, doi: 10.1016/j.compedu.2018.09.009.
- Sitar-Taut, D.A. and Mican, D. (2021), "Mobile learning acceptance and use in higher education during social distancing circumstances: an expansion and customization of UTAUT2", *Online Information Review*, Vol. 45 No. 5, pp. 1000-1019, doi: 10.1108/OIR-01-2021-0017.
- Spinuzzi, C.I. (1997), "Context and consciousness: activity theory and human-computer interaction", *Computers and Composition*, Vol. 14 No. 2, pp. 301-304, doi: 10.1016/S8755-4615(97)90030-X.
- The Edtech Story #1: The Edtech Landscape: A brief Overview | NASSCOM Community | The Official Community of Indian IT Industry (n.d.), available at: <https://community.nasscom.in/communities/talent/edtech/the-edtech-story-1-the-edtech-landscape-a-brief-overview.html> (accessed 16 March 2022).
- TOE framework (Tornatzky and Fleischer 1990) | Download Scientific Diagram (n.d.), available at: https://www.researchgate.net/figure/TOE-framework-Tornatzky-and-Fleischer-1990_fig3_284395845 (accessed 28 February 2022).
- Tosun, N. (2018), "Social networks as a learning and teaching environment and security in social networks", *Journal of Education and Training Studies*, Vol. 6 No. 11a, p. 194, doi: 10.11114/jets.v6i11a.3817.
- Venkatesh, V., Morris, M.G., Davis, G.B. and Davis, F.D. (2003), *Quarterly*, Vol. 27 No. 3, pp. 425-478.

- Yakubu, M.N. and Dasuki, S.I. (2019), "Factors affecting the adoption of e-learning technologies among higher education students in Nigeria: a structural equation modelling approach", *Information Development*, Vol. 35 No. 3, pp. 492-502, doi: 10.1177/0266666918765907.
- Zolkepli, I.A. and Kamarulzaman, Y. (2011), "Understanding social media adoption: the role of perceived media needs and technology characteristics Zolkepli and Kamarulzaman", *World Journal of Social Sciences*, Vol. 1 No. 1, pp. 188-199.

About the authors

Bargavi Ravichandran is a research scholar at the Faculty of Management at SRM Institute of Science and Technology, Kattankulathur campus pursuing doctoral studies in Educational Technology and Sustainability. Bargavi Ravichandran is the corresponding author and can be contacted at: ravibharkavi@gmail.com

Dr Kavitha Shanmugam is an assistant Professor in the Department of Management at Anna University. Her main research areas are corporate social responsibility, financial markets and ESG.

The current issue and full text archive of this journal is available on Emerald Insight at:
<https://www.emerald.com/insight/2279-0187.htm>

MANM
21,1

20

Received 11 July 2023
Revised 11 October 2023
Accepted 15 December 2023

Promoting transparency and accountability towards anti-corruption in pharmaceutical procurement system: does e-procurement play a significant role?

Leticia Mahuwi and Baraka Israel

Department of Procurement and Supply Management, College of Business Education, Mbeya, United Republic of Tanzania

Abstract

Purpose – Understanding the interplay between transparency, accountability and e-procurement and their collective contribution to anti-corruption efforts in public procurement is crucial for developing effective strategies and policies. This research seeks to investigate whether e-procurement plays a significant role in enhancing transparency and accountability and subsequently reducing corruption risks in the public pharmaceutical procurement system.

Design/methodology/approach – The study employed a cross-sectional questionnaire survey to gather data from 274 procurement personnel and pharmacists working in 28 government-owned hospitals in the Southern Highlands of Tanzania. The collected data were then analysed using confirmatory factor analysis (CFA) and the Hayes PROCESS macro to test the study hypotheses.

Findings – The study findings revealed a negative and significant relationship between transparency and procurement corruption ($\beta = -0.117, p < 0.008$). Moreover, accountability negatively and significantly affects procurement corruption ($\beta = -0.162, p = 0.006$). Furthermore, the findings indicate that, at a high degree of e-procurement system implementation, transparency and accountability have a stronger impact on procurement anti-corruption measures.

Practical implications – Policymakers and decision-makers should implement robust mechanisms that enhance transparency, accountability and anti-corruption efforts. These may include providing clear and accessible information on procurement processes, efficient mechanisms for monitoring and reporting procurement irregularities and continuous improvement of e-procurement systems. By incorporating these measures and nurturing collaboration amongst procurement stakeholders, it becomes possible to foster a procurement environment characterised by integrity, fairness, accountability and reduced corruption.

Originality/value – Whilst previous studies delved into exploring the effect of transparency and accountability on procurement anti-corruption, the novelty of this study is the inclusion of e-procurement as a moderating variable in the relationship between transparency, accountability and anti-corruption. By so doing, this study adds to the existing body of knowledge regarding anti-corruption measures and offers valuable practical insights for policymakers and professionals aiming to enhance transparency, accountability and ethical conduct within the public pharmaceutical procurement system.

Keywords Transparency, Accountability, Pharmaceutical procurement, e-procurement, Anti-Corruption

Paper type Research paper



Management Matters
Vol. 21 No. 1, 2024
pp. 20-37
Emerald Publishing Limited
e-ISSN: 2752-8359
p-ISSN: 2279-0187
DOI 10.1108/MANM-07-2023-0027

© Leticia Mahuwi and Baraka Israel. Published in *Management Matters*. Published by Emerald Publishing Limited. This article is published under the Creative Commons Attribution (CC BY 4.0) licence. Anyone may reproduce, distribute, translate and create derivative works of this article (for both commercial and non-commercial purposes), subject to full attribution to the original publication and authors. The full terms of this licence may be seen at <http://creativecommons.org/licenses/by/4.0/legalcode>

1. Introduction

Pharmaceutical procurement systems encompass the entire lifecycle of procurement, including planning, sourcing, contracting, purchasing and delivery of pharmaceuticals (medicines and medical supplies). This applies to all public healthcare facilities, such as hospitals and clinics, as well as public health programs and initiatives. Corruption in the public pharmaceutical procurement system has long been a critical concern worldwide, leading to increased costs of health services, financial losses, compromised quality of health services and erosion of public trust (Ashraf and Ong, 2021; Oleribe *et al.*, 2019; Littlejohns *et al.*, 2019). In light of this, empirical evidence indicates that corruption leads to an estimated loss of approximately 10–25% of the total value of any given contract (United Nations Office on Drugs and Crime (UNODC), 2013). Several reasons have been put forward for why the pharmaceutical procurement system is more prone to corrupt practices. Studies conducted by Kohler and Dimancesco (2020) and Nguyen *et al.* (2017) assert that the sensitivity, high value and complexity of pharmaceutical products make control measures towards anti-corruption difficult. Moreover, intensive competition, poor documentation and record-keeping, a high level of poverty and greed amongst actors, lack of transparency and inadequate or poorly enforced regulations and oversight mechanisms contribute to the rise of this incidence (Israel, 2021; Wilson, 2022; Zalvand *et al.*, 2022).

Procurement corruption involves various illegal or unethical activities that undermine the principles of competition, transparency and fairness in the procurement process. It is also described as the abuse of power by individuals for private benefits or personal gain in the process of procuring goods, services, or works (Nguyen *et al.*, 2017; UNODC, 2013). Anti-corruption, on the other hand, pertains to the characteristics or actions that serve to monitor or reduce the incidence of corrupt behaviours within the public procurement system. Some common forms of corruption in the pharmaceutical procurement system include informal payments made to suppliers to gain favouritism in the bidding process (bribery and kickbacks), collusion amongst bidders to eliminate competition and manipulate the bidding process (rigging and collusion), false recording, alteration and misrepresentation of information (fraud) and embezzlement of the budget allocated for procurement. Other studies by Israel (2021) and Martinez *et al.* (2017) identified conflict of interest, nepotism and favouritism as other forms of corruption in the public pharmaceutical procurement system. The efforts to combat corruption in this context require comprehensive strategies that address the underlying causes and promote transparency, accountability and good governance throughout the procurement process.

In recent years, e-procurement systems have gained prominence as technological solutions that can contribute to promoting transparency, accountability and reducing the incidences of corrupt practices in public pharmaceutical procurement processes (Alsac, 2007; O'Regan *et al.*, 2022; Fu *et al.*, 2019). E-procurement leverages digital platforms, automated processes and real-time monitoring tools that streamline and standardise procurement activities. More importantly, e-procurement systems enable centralised and easily accessible data, encourage data-driven analysis and improve oversight and control measures. As a result, studies regard e-procurement as a potential and valuable tool that plays a significant role in supporting anti-corruption initiatives within the public healthcare delivery system (Chilunjika *et al.*, 2023; Beaulieu and Bentahar, 2021; Beaulieu and Bentahar, 2021). This is attributed to the fact that the automated procurement process prevents unauthorised or maverick purchases, promotes competition amongst suppliers and reduces the likelihood of cartels, collusion and bid-rigging. Furthermore, e-procurement systems enhance quick access to procurement information and reduce the need for in-person interactions when procuring pharmaceutical products. Additionally, e-procurement operations enhance transparency and accountability, fostering an environment of integrity and fairness that deters corrupt practices and builds public trust in the public pharmaceutical procurement system (Ahmad *et al.*, 2023; Mansilla *et al.*, 2022; Saeed *et al.*, 2022).

Whilst there is a growing body of literature (Kohler and Dimancesco, 2020; Aduwo *et al.*, 2020; Mackey and Cuomo, 2020; Koller *et al.*, 2020; Nunes *et al.*, 2023) exploring the effects of transparency, accountability and e-procurement individually in relation to anti-corruption measures, yet there is a need for research that investigates the combined impact of these factors within the specific context of the pharmaceutical procurement system. Understanding the interplay between transparency, accountability and e-procurement and their collective contribution to anti-corruption efforts in this domain is crucial for developing effective strategies and policies. Therefore, this research addresses this gap by examining the role of transparency, accountability and e-procurement in promoting anti-corruption measures within the pharmaceutical procurement system in Tanzania. The research investigates whether e-procurement plays a significant role in enhancing transparency and accountability and subsequently reducing corruption risks in the public pharmaceutical procurement system. To achieve the study's objectives, this study is guided by three central research questions. These are:

- RQ1. Does transparency have a significant direct effect on procurement anti-corruption?
- RQ2. Does accountability have a significant direct effect on procurement anti-corruption?
- RQ3. Does e-procurement system moderate the relationship between transparency, accountability and procurement anti-corruption?

By exploring the effects and interactions between these factors, the research aims to provide valuable insights and practical recommendations to policymakers, managers and practitioners in the pharmaceutical procurement sector. Ultimately, the goal is to contribute to the development of a more transparent, accountable and corruption-resistant pharmaceutical procurement system, ensuring the delivery of high-quality and affordable pharmaceutical products for the benefit of societies. Following this introduction, the next section presents the literature review, which provides a full spectrum of the theoretical perspective and hypotheses development. Section 3 conveys the research methodology, which includes the research design, study areas, sampling approach, data collection, variables used and data analysis approach. Section 4 presents the results and discussion of findings, including the model's fit and hypothesis testing outcomes. The last part delves into the conclusion, implications, limitations and directions for further studies.

2. Literature review and hypothesis development

2.1 Theoretical underpinnings

The current study adopts the theory of regulatory compliance (TRC) to address the relationships between transparency, accountability, e-procurement and anti-corruption in the pharmaceutical public procurement system. The TRC was proposed in the 1970s to emphasise the significance of complying with established regulations, policies and laws in human service delivery and economic domains. The theory asserts that adopting best practices (regulations, policies and laws) and ensuring compliance with them are key success factors for improving organisational performance (Fiene, 2019). Public pharmaceutical procurement system is subject to operational laws, procedures and regulations, which procurement officials and suppliers are obligated to comply with. Public procurement regulations emphasise the need to promote transparency and accountability as fundamental pillars of improved health service delivery (URT, 2013; Vian *et al.*, 2017; Yang, 2018). Additionally, the regulations and guidelines emphasise the use of e-procurement system as a strategic tool to reduce corruption and enhance transparency and accountability in public procurement (URT, 2013; World Bank, 2014).

The public pharmaceutical procurement system often experiences corrupt practices, poor quality services, delays and increased costs of procured medicines and medical supplies (Martinez *et al.*, 2017; Israel *et al.*, 2019; Vian, 2020; Saeed *et al.*, 2022). This is attributed to the lack of accountability and transparency within the system. It is believed that adhering to specified procurement guidelines and regulations in a transparent and accountable manner significantly reduces corrupt practices in public pharmaceutical procurement (Kohler and Dimancesco, 2020; Paschke *et al.*, 2018). Studies have revealed that transparency and accountability in public pharmaceutical procurement strengthen public officials' ethical behaviour and commitment, serving as the foundation for ethical practices (Sekalala *et al.*, 2020; Vian, 2020). With these regards, the burden of accountability and transparency lies with procurement practitioners, who must act in the public interest and in accordance with principles and regulations. In the context of this research, the TRC provides insights into the influence of transparency and accountability on compliance with anti-corruption and how e-procurement systems can facilitate and promote such compliance.

2.2 Hypothesis formulation

2.2.1 Transparency and corruption in pharmaceutical procurement. Transparency in pharmaceutical procurement refers to the openness and accountability of the processes involved in acquiring medicines and healthcare-related products (Vian, 2020; Paschke *et al.*, 2018). It encompasses making information readily available, ensuring fair and competitive practices and promoting accountability throughout the procurement cycle. Existing literature recognises the positive and significant role of transparency in reducing corruption in public health service delivery (Yang, 2018; Kohler and Dimancesco, 2020; Lega and Castellini, 2022). When pharmaceutical procurement is fair and transparent, it becomes easier to identify and expose corrupt practices or suspicious activities by making procurement processes and decisions visible to stakeholders and the public. This scrutiny acts as a deterrent against corruption and encourages responsible behaviour amongst procurement officials. Studies by Saeed *et al.* (2022) and Alexiadou (2023) have reported that transparent procurement processes enhance public trust by demonstrating accountability and reducing the potential for unethical practices such as favouritism, manipulation, bribery, or fraud based on privileged information. The fear of detection and subsequent consequences serves as a warning against potential corrupt behaviour (Koller *et al.*, 2020). Transparency fosters a culture of integrity and ethical behaviour within the procurement process, thereby creating an environment that discourages corruption. Based on these arguments, the study hypothesises that: -

H1. Transparency is negatively related to procurement corruption.

2.2.2 Accountability and corruption in pharmaceutical procurement. Accountability involves a wide range of practices that hold individuals and entities responsible for their actions and ensure that they are answerable for any misconduct or wrongdoing (Adil and Haliah, 2022; Kohler and Dimancesco, 2020). It entails establishing clear roles and responsibilities for all stakeholders involved in the procurement process and ensuring strict adherence to applicable laws, regulations and ethical standards by procurement officials, evaluators, decision-makers and oversight bodies. Literature emphasises that accountability is a fundamental component in the fight against corruption in the health service system (Vian, 2020; Rahman *et al.*, 2021; Sekalala *et al.*, 2020). When each party understands their responsibilities and held accountable for their actions, it becomes more difficult for corruption to occur unnoticed. Effective oversight mechanisms, such as independent regulatory bodies, audit institutions, or ethics committees, play a crucial role in enhancing accountability in pharmaceutical procurement (Kohler and Dimancesco, 2020; O'Regan *et al.*, 2022; Saeed *et al.*, 2022). These

entities have the responsibility to monitor procurement activities, conduct audits and investigate allegations of corruption. By holding individuals and entities accountable for their misconduct, including initiating disciplinary actions, legal proceedings, or administrative penalties, the risk of corruption in pharmaceutical procurement is reduced (Paschke *et al.*, 2018; Pomegbe *et al.*, 2023; Vian *et al.*, 2017). This leads to more transparent, fair and ethical procurement practices, ultimately safeguarding public health service delivery and ensuring the efficient allocation of public resources. It is thus hypothesised that:

H2. Accountability is negatively related to procurement corruption.

2.2.3 Moderating role of e-procurement system. E-procurement, which refers to the use of electronic systems and technologies in procurement processes, can make significant contributions to transparency, accountability and anti-corruption efforts in pharmaceutical procurement. Previous studies have recognised e-procurement systems as strategic tools for promoting transparency, accountability and anti-corruption in universal health service delivery (Mackey and Cuomo, 2020; Koller *et al.*, 2020; Cholette *et al.*, 2019). E-procurement platforms provide an open, centralised and accessible repository of information related to the procurement process for all suppliers. This includes published tender notices, bid evaluations, contract awards and supplier performance evaluations in digital format. Of greater significance, e-procurement systems offer suppliers equal opportunities to participate in the procurement process, effectively eradicating unfair treatment and biases (Fu *et al.*, 2019; Svidronova and Mikus, 2015). This system fosters consistency in both procurement methods and documentation, ensuring a standardised and transparent approach. Through e-procurement, all stakeholders gain convenient access to standardised procurement tender documents and assessment criteria, thereby lessening the possibility of manipulation or concealed information. This transparency serves as a strong deterrent against corrupt practices such as bid-rigging or collusion, as any irregularities become easily noticeable to those involved (Spacek and Spackova, 2023; Ratiko and Setiyawati, 2022; Wahyuningsih *et al.*, 2023).

Besides that, studies reveal that robust e-procurement systems enhance the accuracy of record-keeping, tracking capabilities and the auditability of procurement activities (Alsac, 2007; Beaulieu and Bentahar, 2021; Koggalage *et al.*, 2021). This guarantees the availability of relevant documents and accurate information for auditing purposes that capture all steps within the procurement process, including document revisions, approvals and communications. Moreover, these audit trails provide a complete historical record of procurement processes, thus enabling effective monitoring, evaluation and accountability. By automating specific steps in pharmaceutical procurement system, e-procurement system reduces the potential for human interference and bias (Pentrakan *et al.*, 2022; Tinali, 2022). This, in turn, helps in mitigating the risk of corruption stemming from personal connections or undue influence. Additionally, e-procurement platforms often support the use of electronic signatures and encryption, ensuring the authenticity and integrity of procurement-related documents (Cholette *et al.*, 2019; Koggalage *et al.*, 2021). This reduces the possibility of document tampering or fraudulent activities. By leveraging electronic technologies, organisations can enhance integrity, reduce corruption risks and ensure a fair and efficient procurement environment in the pharmaceutical sector. In light of this literature, we hypothesised that:

H3. E-procurement significantly moderates the relationship between transparency and procurement corruption.

H4. E-procurement significantly moderates the relationship between accountability and procurement corruption.

2.3 Conceptual framework

The conceptual framework of this study, as shown in Figure 1, was constructed based on the findings of the literature review and the formulated hypotheses. The framework posits that transparency and accountability are significantly associated with anti-corruption within pharmaceutical public procurement system. Additionally, the framework theorises that e-procurement system moderates the relationship between transparency, accountability and procurement anti-corruption.

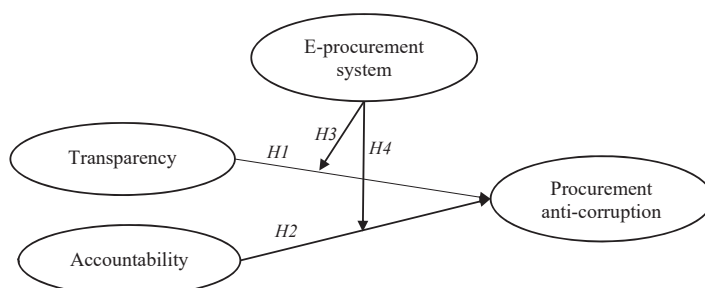
3. Methodology

3.1 Research design and study area

This study employed a cross-sectional research design and an epistemological-positivism research paradigm. According to Eichelberger (1989), the epistemological-positivism research paradigm enables researchers to collect quantitative data and test hypotheses between the variables under investigation. The current study collected and utilised quantitative data to determine the significant effect of the e-procurement system in promoting transparency, accountability and anti-corruption in the pharmaceutical procurement system. Conversely, the use of a cross-sectional research design was considered appropriate because the authors aimed to capture a snapshot and make inferences on the status of variables under study at a single period in time (Saunders *et al.*, 2019). The study was carried out in the Southern Highland zone of Tanzania, specifically in the Rukwa, Songwe, Ruvuma, Njombe, Iringa and Mbeya regions. The analysis encompassed a total of 28 government-owned hospitals, consisting of 1 referral hospital, 5 regional hospitals and 22 district hospitals drawn from the aforementioned regions. The selection of the study areas was based on the considerable number of government-owned hospitals in this zone compared to other zones (URT, 2022). Moreover, the chosen hospitals in the study areas have successfully implemented e-procurement systems for the procurement and distribution of medicines and medical supplies.

3.2 Sampling, sample size and data collection

The unit of analysis in this study comprises 28 government-owned hospitals from the Southern Highland zone in Tanzania. At the outset, a total of 308 respondents, consisting of 142 procurement officers and 166 pharmacists from the selected 28 government-owned hospitals were initially identified. For each hospital, a census approach was utilised, where all procurement officers and pharmacists with sufficient knowledge of public pharmaceutical procurement procedures were included to participate in the study as the units of observation. Data collection took place from September to December 2022. In order to leverage the cost-effectiveness and geographical diversity of the study areas, a self-administered survey



Source(s): Figure by authors

Figure 1.
Conceptual framework

questionnaire with closed questions was employed for data collection. The questionnaire was created using Google Forms and distributed to the 308 pre-identified respondents via email and WhatsApp platforms. However, the final analysis included only 274 responses from the surveyed entities, resulting in an 88.9% effective response rate. Out of the 274 responses received, 151 (55.1%) were from pharmacists, whilst 123 (44.9%) were from procurement officers. The final sample size included in the analysis was deemed adequate for the use of confirmatory factor analysis (CFA) and moderation effects which require a minimum sample size of 200 or more (Wolf *et al.*, 2013; MacKinnon *et al.*, 2002).

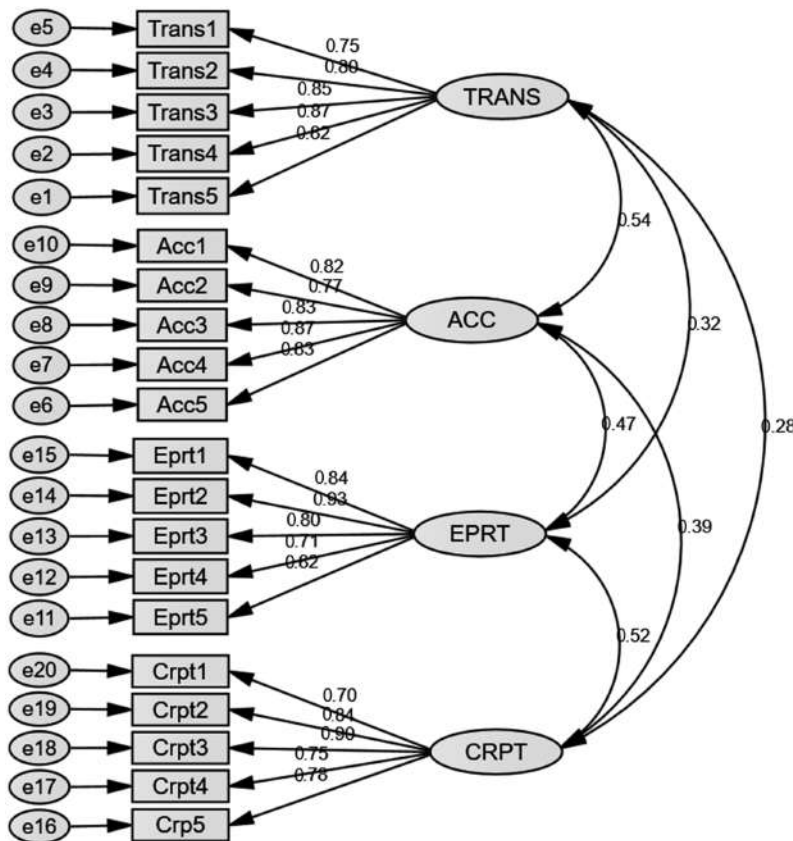
3.3 Measurements, reliability and validity

The items used for the measurement scales in this study were adapted from relevant literature and previous works on transparency, accountability, e-procurement and anti-corruption in the public pharmaceutical procurement system (Adil and Haliah, 2022; Kohler and Dimancesco, 2020; Mackey and Cuomo, 2020; Koller *et al.*, 2020; Nunes *et al.*, 2023; Rahman *et al.*, 2021; Martinez *et al.*, 2017; Paschke *et al.*, 2018). To assess face validity, the questionnaire was reviewed by six procurement managers and five pharmacists with adequate knowledge and experience in the public pharmaceutical procurement system. Refinements were made based on the comments received. During the data collection process, respondents were requested to assess the extent to which government-owned hospitals adopt the e-procurement system to enhance transparency, accountability and reduce corruption in the public pharmaceutical procurement system. Each item relating to the observable constructs was measured using a 5-point Likert-type scale labelled with “5 = to a very great extent” and “1 = not at all” to test the relevance of TRC in examining the effect of transparency and accountability on anti-corruption with a moderating role of e-procurement. In particular, TRC emphasises the importance of observing and complying with established regulations, policies and laws as a key driver to improved organisational performance (Fiene, 2019).

To assess the convergent validity and unidimensionality of constructs, validity tests were performed on the measurement scales and the model's fit using CFA. The results presented in Figure 2 and Table 1 provide sufficient evidence for the unidimensionality of the measurement scales in this study, with all observed items demonstrating factor loadings (λ) greater than 0.7 (Hair *et al.*, 2020). Furthermore, the study successfully met the criteria for convergent validity, as the average variance extracted (AVE) values for all constructs surpassed the recommended threshold of 0.5 (Fornell and Larcker, 1981). Additionally, both the composite reliability (CR) and Cronbach's alpha (α) values for each of the four constructs used in this study exceeded the suggested threshold of 0.70, indicating that the measures exhibit internal consistency, reliability and credibility (Fornell and Larcker, 1981; Hair *et al.*, 2020). Moreover, Table 2 demonstrates the achievement of the model's discriminant validity based on the Fornell-Larcker criterion. The square root of the AVE for each construct is greater than the correlation value with other constructs in the model, further confirming the attainment of discriminant validity (Fornell and Larcker, 1981).

3.4 Data analysis

Confirmatory factor analysis (CFA) was conducted to evaluate the measurement model and determine its fit with the data. CFA enables the identification of the underlying dimensions of latent constructs and how they interrelate (Fan *et al.*, 2016). In this stage, factor loadings were generated for each item of the latent constructs, which were then used to assess the model's fitting indices, as well as the validity and reliability of the data. Furthermore, the moderating effect of e-procurement on the relationship between transparency, accountability and procurement anti-corruption was analysed using Hayes PROCESS macro. The PROCESS macro is a robust and up-to-date tool for performing regression analysis that accommodates additional variables such as moderators, mediators and covariates (Hayes, 2022).



Source(s): Figure by authors

Figure 2.
Measurement model

4. Results

4.1 Measurement model assessment

The overall measurement model for the first-order constructs demonstrated a satisfactory fit. The model's chi-square (χ^2) value was 463.826, with a degree of freedom (df) of 164 at $p < 0.000$. Other model fit measures, including $\chi^2/df = 2.828$, goodness-of-fit index (GFI) = 0.937, Tucker–Lewis index (TLI) = 0.913, comparative fit index (CFI) = 0.925, incremental fit index (IFI) = 0.925, normed fit index (NFI) = 0.939, relative fit index (RFI) = 0.923, standardised root mean square residual (SRMR) = 0.037, root mean square error of approximation (RMSEA) = 0.072 and $P_{close} = 0.109$, collectively demonstrating a good fit between the data and the model. This analysis suggests that the data used in this study align well with the proposed model. Additionally, the correlation values between the construct variables in Figure 2 were all below 0.85, suggesting that multicollinearity was not a significant issue of concern in this study (Sarstedt *et al.*, 2014).

4.2 Hypotheses testing and discussion

We used Hayes PROCESS macro v.4.2 to test the direct effect and moderating effects. The β coefficients and their associated statistical significance values were used to assess and test the four hypotheses. The results in Table 3 demonstrate the direct effect of transparency and

Construct and items	Code	λ	α	CR	AVE
<i>Transparency in pharmaceutical procurement (TRANS)</i>					
• General procurement notes are readily available to all suppliers	TRAS1	0.754	0.766	0.912	0.675
• Suppliers are given equal chances to participate in bidding process	TRAS2	0.802			
• Tender notices are publicly available to all pharmaceutical suppliers	TRAS3	0.850			
• PE carries public bid opening immediately after submission deadline	TRAS4	0.875			
• PE ensures competitive bidding in pharmaceutical procurement	TRAS5	0.821			
<i>Accountability in pharmaceutical procurement (ACC)</i>					
• PE comply with pharmaceutical procurement laws and guidelines	ACC1	0.820	0.853	0.914	0.680
• PE have robust internal controls and transparency mechanisms	ACC2	0.766			
• Officials accept liability to sanctions resulted from corrupt practices	ACC3	0.830			
• PE has clear roles for all stakeholders involved in the procurement	ACC4	0.874			
• PE have efficient procedures for reporting procurement malpractices	ACC5	0.831			
<i>Perceived capabilities of e-procurement system (EPRT)</i>					
• Efficient monitoring of pharmaceutical procurement process	EPRT1	0.842	0.807	0.911	0.674
• Increased transparency in pharmaceutical bidding process	EPRT2	0.925			
• Robust managerial control and audit of procurement process	EPRT3	0.795			
• Reduction of falsifications and alternation of facts	EPRT4	0.709			
• Reduced collusion and bid-rigging practices	EPRT5	0.820			
<i>Extent corrupt practices in pharmaceutical procurement (CRPT)</i>					
• Informal payments (bribery) to gain favouritism in bidding process	CRPT1	0.700	0.766	0.896	0.636
• False recording, alteration and misrepresentation of information	CRPT2	0.841			
• Illicit payment to buyers in return of favouring award of contract	CRPT3	0.899			
• Embezzlement of budget allocated for pharmaceutical products	CRPT4	0.747			
• Collusion amongst bidders to determine the winning bidder	CRPT5	0.784			

Table 1.
Confirmatory factor analysis results

Source(s): Table by authors

	CR	AVE	MSV	ASV	ACC	TRANS	EPRT	CRPT
ACC	0.914	0.680	0.293	0.224	0.825			
TRANS	0.912	0.675	0.293	0.132	0.541	0.821		
EPRT	0.911	0.674	0.223	0.109	0.472	0.322	0.821	
CRPT	0.896	0.636	0.155	0.052	0.394	0.283	0.525	0.797

Table 2.
Discriminant validity based on Fornell–Larcker criterion

Note(s): The square root of AVE is on the diagonal
Source(s): Table by authors

accountability on procurement anti-corruption. Additionally, the results show the moderating effect of the e-procurement system on the relationship between transparency and procurement anti-corruption (Model 1), as well as the moderating effect of the e-procurement system on the relationship between accountability and procurement anti-

Variables	Coefficient	Se	T	p	LLCI	ULCI
<i>Model 1: main effects</i>						
TRANS	-0.117	0.044	-2.669	0.008	-0.203	-0.031
EPRT	0.456	0.058	7.869	0.000	0.342	0.570
TRANS*EPRT	-0.062	0.062	-1.011	0.013	-0.358	-0.184
R ²	0.271					
F(sig.)	33.443			0.000		
R ² change	0.028					
<i>Model 2: main effects</i>						
ACC	-0.162	0.047	-3.451	0.006	-0.254	-0.070
EPRT	0.416	0.062	6.682	0.000	0.294	0.539
ACC*EPRT	-0.084	0.056	-1.151	0.018	-0.301	-0.118
R ²	0.311					
F(sig.)	35.234			0.000		
R ² change	0.039					

Source(s): Table by authors

Table 3.
Regressions results on
the relationships
between study
variables

corruption (Model 2). Model 1 was found to be statistically significant with an R^2 value of 0.271 ($p = 0.000 < 0.05$) and an F value of 33.443, indicating that 27.1% of the variation in anti-corruption was explained by transparency. Furthermore, Model 2 in Table 3 indicates that accountability accounts for 31.1% of the variation in anti-corruption ($R^2 = 0.311$, $p = 0.000 < 0.05$, $F = 35.234$).

4.2.1 Transparency and procurement anti-corruption. In Model 1, H1 stated that “H1: transparency is negatively related to procurement anti-corruption”. The results presented in Table 3 reveal a significant and negative effect of transparency on procurement corruption ($\beta = -0.117$, $p = 0.008 < 0.05$). Therefore, H1 is confirmed, indicating that improved transparency practices contribute to a reduced rate of corruption in the public pharmaceutical procurement system. These findings align with previous studies conducted by Mackey and Cuomo (2020), Rahman *et al.* (2021), Sekalala *et al.* (2020) and Vian (2020), all of whom reported transparency as a potent tool in combating corruption within the domain of public service procurement. These results are consistent with the argument that transparency fosters accountability amongst procurement officials and suppliers by making them aware that their decisions and actions are being monitored. This increased awareness promotes ethical behaviour and adherence to established rules and procedures, thereby reducing the likelihood of corrupt practices such as bid collusion or bid suppression. Moreover, promoting openness and public participation helps to prevent fraudulent activities, ensures fair competition and enhances the overall integrity of the pharmaceutical procurement system (Ahmad *et al.*, 2023; Mahuwi and Israel, 2023; Yang, 2018).

4.2.2 Accountability and procurement anti-corruption. The second hypothesis in Model 2 states that “H2: accountability is negatively related to procurement anti-corruption”. The study findings in Table 3 indicate a negative and statistically significant effect of accountability on procurement corruption ($\beta = -0.162$, $p = 0.006 < 0.05$). Therefore, H2 is supported. This implies that increased accountability practices contribute to the promotion of anti-corruption measures within the public pharmaceutical procurement system. Consistent with existing literature (Kohler and Dimancesco, 2020; Koller *et al.*, 2020; Mackey and Cuomo, 2020), the findings of this study recognise accountability as a fundamental and critical element in enhancing efforts to combat procurement corruption. When effectively enforced and upheld in procurement processes, accountability establishes a system of checks and balances that

acts as a deterrent against corruption and encourages ethical behaviour amongst individuals involved. Through clear delineation of roles and responsibilities, implementation of robust internal control mechanisms such as regular internal audits and independent oversight committees, and the use of sanctions and penalties, deviations or misconduct can be more easily identified and addressed (Paschke *et al.*, 2018; Siwandeti *et al.*, 2023; Saeed *et al.*, 2022).

4.2.3 Testing the moderation effect. The results of the moderating effect are presented for three conditions: one standard deviation below the mean (-1.54), the mean (0.0) and one standard deviation above the mean (1.54). According to Hayes (2022), a value one standard deviation below the mean represents a low degree of the moderating variable, whilst a value one standard deviation above the mean indicates a high degree of the moderating variable. Figure 3 illustrates the results of slope plotting for the interaction effect of e-procurement on transparency and anti-corruption. The results demonstrate that at a high degree of e-procurement system (standard deviation = +1.54), the effect of transparency on procurement anti-corruption is stronger compared to a low degree of e-procurement system (standard deviation = -1.54). Based on the results of Model 1 in Table 3, the interaction term between transparency and e-procurement was found to be negative and statistically significant ($\beta = -0.062, p = 0.013 < 0.05$), with confidence intervals ranging from -0.358 to -0.184. Since the confidence intervals do not include zero, the results suggest that e-procurement significantly moderates the relationship between transparency and procurement anti-corruption, thereby supporting H3, which states that “H3: e-procurement significantly moderates the relationship between transparency and procurement corruption”. Additionally, R^2 in model 1 was improved by 2.8%, indicating that a significant change in the variance of anti-corruption was due to the interaction between e-procurement and transparency.

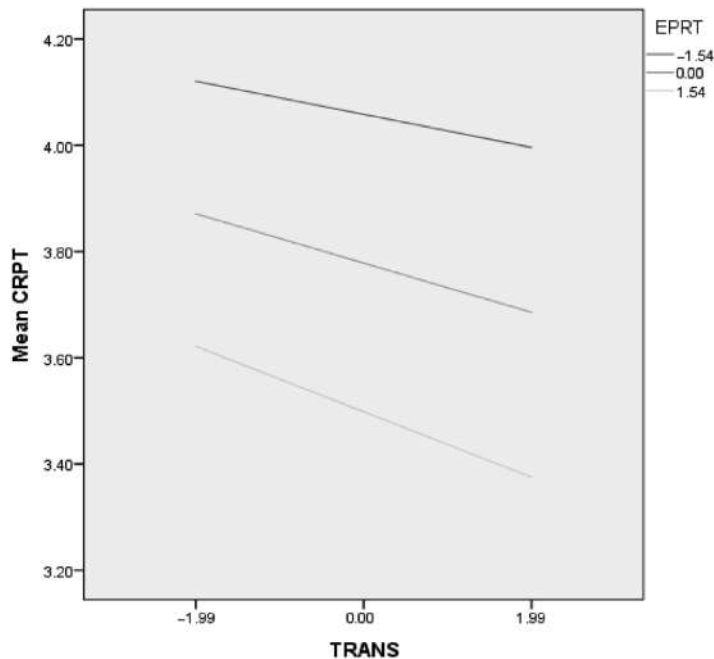
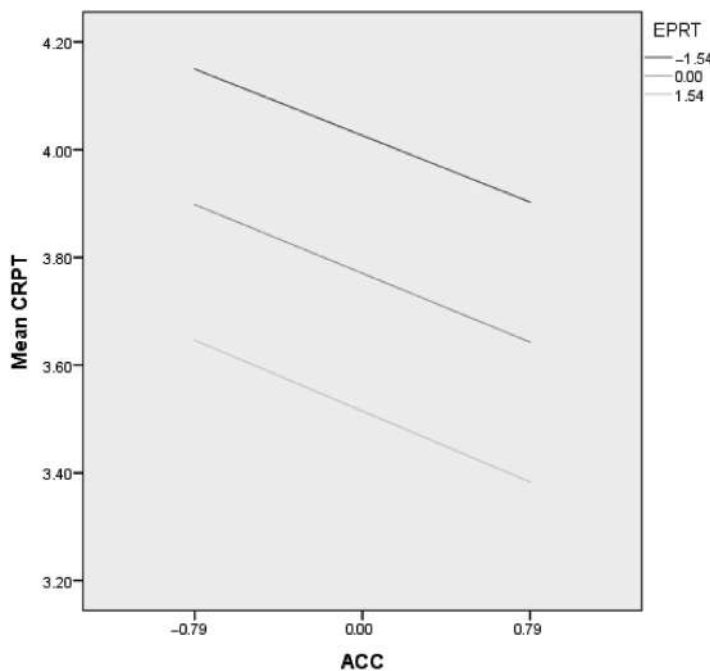


Figure 3.
Moderation effects of
EPRT on TRANS
and CRPT

Source(s): Figure by authors

Lastly, H4, which states that “H4: *e-procurement significantly moderates the relationship between accountability and procurement corruption,*” was also supported. The results in Model 2 of Table 3 reveal a negative and statistically significant interaction term between accountability and e-procurement ($\beta = -0.084, p = 0.018 < 0.05$), with confidence intervals ranging from -0.301 to -0.118 . Since the confidence interval values do not include zero, the results imply that the e-procurement system serves as a significant moderator of the relationship between accountability and procurement anti-corruption. The inclusion of the interaction term increased the R^2 value in Model 2 by 3.9%, which was attributed to the interaction between accountability and the e-procurement system. Subsequently, slope plotting was carried out to illustrate the moderating effect of EPRT on the link between ACC on CRPT at one standard deviation above the mean (+1.54), the mean (0.0) and one standard deviation below the mean (-1.54). The results in Figure 4 illustrate that EPRT enhances the positive relationship between accountability and anti-corruption. Accordingly, when EPRT is at a high level (standard deviation = +1.54), the influence of accountability on anti-corruption is more pronounced compared to when EPRT is at a low level (standard deviation = -1.54). These findings are in line with the perspectives of Alsac (2007), Ali *et al.* (2022) and Svidronova and Mikus (2015), who suggest that e-procurement systems provide a robust framework to combat corruption in procurement and enhance public service delivery. E-procurement contributes to accountability, transparency and anti-corruption efforts by offering centralised platforms, standardised processes, real-time monitoring, automated evaluations, reliable audit trails and data-driven analysis. Therefore, leveraging e-procurement system promotes integrity, reduces human bias and improves the overall efficiency and fairness in pharmaceutical procurement processes (Maran and Lowe, 2022; Tinali, 2022; Israel, 2023; Aduwo *et al.*, 2020).



Source(s): Figure by authors

Figure 4.
Moderation effects of
EPRT on ACC
and CRPT

5. Conclusion, implications and direction for further studies

5.1 Conclusion

This study sought to investigate how the use of e-procurement systems contributes to enhancing transparency and accountability in the fight against corruption in the pharmaceutical procurement system. The study results provide valuable insights into the collective influence of transparency, accountability and e-procurement on anti-corruption efforts. The findings demonstrate that accountability and transparency are complementary principles that mutually strengthen the fight against corruption in the pharmaceutical procurement system. The study reveals that advocating for transparency and accountability encourages openness, responsibility and accessibility to information amongst those involved in the procurement process. In particular, these principles promote fair competition, discourage corrupt behaviour, facilitate the reporting of irregularities, support effective investigations and foster public trust in the pharmaceutical procurement process. Moreover, the study highlights the significant role played by e-procurement in moderating the relationship between transparency and anti-corruption, as well as between accountability and anti-corruption in the pharmaceutical procurement landscape. The results suggest that extensive implementation of e-procurement systems amplifies the impact of transparency and accountability on anti-corruption measures. Through technology utilisation, e-procurement enhances integrity, reduces human biases and improves the overall efficiency and fairness of pharmaceutical procurement procedures. Consequently, this diminishes the likelihood of corrupt practices such as bid collusion, bid suppression, bribery and embezzlement.

5.2 Theoretical implications

Overall, the study contributes to the TRC by providing empirical evidence and theoretical insights into the role of transparency, accountability and e-procurement in promoting compliance with regulations and reducing corruption in the pharmaceutical procurement system. It extends the understanding from previous studies of how these factors can work together to create a conducive environment to reinforce each other and enhance anti-corruption efforts in the pharmaceutical procurement landscape (Sekalala *et al.*, 2020; Nunes *et al.*, 2023; Kohler and Dimancesco, 2020; Koller *et al.*, 2020). The study findings demonstrate that by implementing transparent practices, robust accountability mechanisms and an e-procurement system, organisations can enhance fairness, openness, responsibility and compliance with regulatory requirements, thereby reducing the likelihood of corrupt behaviours. This supports the underlying assumptions of the TRC, which posits that effective regulatory mechanisms and oversight promote adherence to ethical standards and discourage non-compliance behaviour (Fiene, 2019). The study's findings highlight that e-procurement systems provide centralised platforms, standardised processes and real-time monitoring mechanisms, which promote integrity, reduce human bias and enhance efficiency and fairness. It elucidates that the interplay between transparency and accountability when supported by e-procurement systems, creates a more robust framework that encourages reporting and effective investigation of irregular procurement practices. Subsequently, these foster public trust and compliance efforts, thus reducing corruption risks in the public pharmaceutical procurement system, which are one of the core principles of TRC.

5.3 Managerial implications

This research has several important managerial implications. First, procurement managers and policymakers should prioritise initiatives that promote transparency, fairness and openness practices in the course of pharmaceutical procurement processes. These may include providing clear and accessible procurement information, bid evaluations and supplier selection criteria. This creates an environment of trust, integrity and fair competition, thereby reducing opportunities for unethical and corrupt practices. Second, managers should consider

establishing robust mechanisms of accountability practices that clearly define the roles and responsibilities in procurement decision-making processes. These measures could include enforcing robust mechanisms for monitoring and accessible channels for reporting procurement irregularities such as internal control and audit systems, sanctions for any procurement deviations or misconduct. This creates a culture of responsibility and integrity within the organisation by holding individuals accountable for their actions and consequences for unethical behaviour. Besides, it is crucial to establish an independent oversight committee to provide objective assessments of ethical procurement practices and enforce accountability measures.

Furthermore, procurement managers should invest in the adoption and continuous improvement of e-procurement platforms to achieve centralised and standardised procurement processes, automated evaluations and reliable audit trails for monitoring transparency and accountability practices. This can be enhanced by offering adequate training and support to procurement staff and pharmacists to ensure effective utilisation of e-procurement system, compliance to transparency, accountability and anti-corruption measures. Lastly, procurement managers should also foster collaboration and cooperation amongst stakeholders involving in the pharmaceutical procurement system. This could include engaging with suppliers, procurement officials, regulatory bodies and other relevant parties to promote a collective commitment to transparency, accountability and anti-corruption measures. Building strong partnerships and open lines of communication can facilitate the sharing of best practices, knowledge and experiences in combating corruption in the pharmaceutical procurement process.

5.4 Limitations and direction for further studies

The study mainly utilised a cross-sectional questionnaire survey with a sample consisting solely of procurement officers and pharmacists from government-owned hospitals in Tanzania. Other data collection methods, such as interviews and focus group discussions involving various procurement stakeholders, were not considered. Therefore, we recommend conducting longitudinal and in-depth case studies to investigate the long-term sustainability and mediating role of e-procurement on transparency, accountability and anti-corruption in pharmaceutical procurement system across different jurisdictions. Additionally, further studies could explore the perceptions and experiences of various stakeholders, including pharmaceutical suppliers and civil society organisations, to gain insights into their perspectives on the benefits, challenges and potential risks of e-procurement in relation to transparency and accountability. Second, the findings are confined to the moderating role of e-procurement system in promoting transparency, accountability and anti-corruption pharmaceutical procurement system. In order to provide valuable insights into the relative effectiveness of e-procurement in promoting transparency, accountability and anti-corruption, we recommend a comparative analysis studies between e-procurement and traditional systems. By addressing these limitations and exploring these research directions, a comprehensive understanding of the role of e-procurement system in the pharmaceutical procurement system can be achieved.

References

- Adil, M. and Haliah, M. (2022), "Accountability and transparency in the public and private sector", *International Journal of Humanities Education and Social Sciences*, Vol. 1 No. 6, pp. 857-862, doi: 10.55227/ijhess.v1i6.167.
- Aduwo, E.B., Iben, E.O., Afolabi, A.O., Oluwumi, A.O., Tunji-Olayeni, P.F., Ayo-Vaughan, E.A., Uwakonye, U.O. and Oni, A.A. (2020), "Exploring anti-corruption capabilities of e-procurement in construction project delivery in Nigeria", *Construction Economics and Building*, Vol. 20 No. 1, pp. 56-76, doi: 10.5130/ajceb.v20i1.6964.

- Ahmad, H., Abul Hassan, S.H. and Ismail, S. (2023), "Transparency level of the electronic procurement system in Malaysia", *Journal of Financial Reporting and Accounting*, Vol. 21 No. 3, pp. 592-606, doi: 10.1108/jfra-07-2021-0181.
- Alexiadou, E.A. (2023), "Advancing right to health considerations in national responses against health sector corruption: the case for action", *International Journal of Human Rights in Healthcare*, Vol. 16 No. 5, pp. 523-534, doi: 10.1108/IJHRH-06-2022-0054.
- Ali, M., Raza, S.A., Puah, C.H. and Arsalan, T. (2022), "Does e-government control corruption? Evidence from South Asian countries", *Journal of Financial Crime*, Vol. 29 No. 1, pp. 258-271, doi: 10.1108/jfc-01-2021-0003.
- Alsac, U. (2007), "Use of e-procurement in turkey's public health sector", *Journal of Public Procurement*, Vol. 7 No. 3, pp. 333-361, doi: 10.1108/jopp-07-03-2007-b002.
- Ashraf, A. and Ong, S.C. (2021), "Drug price control in Malaysia: a stakeholder analysis", *International Journal of Health Governance*, Vol. 26 No. 4, pp. 333-347, doi: 10.1108/ijhg-02-2021-0014.
- Beaulieu, M. and Bentahar, O. (2021), "Digitalization of the healthcare supply chain: a roadmap to generate benefits and effectively support healthcare delivery", *Technological Forecasting and Social Change*, Vol. 167, pp. 1-12, doi: 10.1016/j.techfore.2021.120717.
- Chilunjika, S.R., Chilunjika, A. and Uwizeyimana, D.E. (2023), "Implementing e-procurement at the Zimbabwe's national pharmaceutical company (NatPharm): challenges and prospects", *Journal of Democracy and Open Government*, Vol. 15 No. 1, pp. 124-143, doi: 10.29379/jedem.v15i1.761.
- Cholette, S., Clark, A.G. and Özlük, Ö. (2019), "Increasing procurement efficiency through optimal e-commerce enablement scheduling", *Journal of Public Procurement*, Vol. 19 No. 2, pp. 90-107, doi: 10.1108/jopp-06-2019-027.
- Eichelberger, R.T. (1989), *Disciplined Inquiry: Understanding and Doing Educational Research*, Addison-Wesley Longman, New York.
- Fan, Y., Chen, J., Shirkey, G., John, R., Wu, S.R., Park, H. and Shao, C. (2016), "Applications of structural equation modelling (SEM) in ecological studies: an updated review", *Ecological Processes*, Vol. 5 No. 1, pp. 1-12.
- Fiene, R.J. (2019), "A treatise on the theory of regulatory compliance", *Journal of Regulatory Science*, Vol. 7, pp. 1-3, doi: 10.21423/jrs-v07fiene.
- Fornell, C. and Larcker, D.F. (1981), "Evaluating structural equation models with unobservable variables and measurement error", *Journal of Marketing Research*, Vol. 18 No. 1, pp. 39-50, doi: 10.2307/3151312.
- Fu, H.P., Chang, T.S., Yeh, H.P. and Chen, Y.X. (2019), "Analysis of factors influencing hospitals' implementation of a green E-procurement system using a cloud model", *International Journal of Environmental Research and Public Health*, Vol. 16 No. 24, pp. 1-16, doi: 10.3390/ijerph16245137.
- Hair, J.F., Howard, M.C. and Nitzl, C. (2020), "Assessing measurement model quality in PLS- SEM using confirmatory composite analysis", *Journal of Business Research*, Vol. 109, pp. 101-110, doi: 10.1016/j.jbusres.2019.11.069.
- Hayes, A.F. (2022), *Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-Based Approach*, 3rd ed., The Guilford Press, New York.
- Israel, B. (2021), "Unlocking public procurement from corruption: examining the role of ethical training and education in selected LGAs, Tanzania", *European Journal of Education Studies*, Vol. 8 No. 1, pp. 51-63.
- Israel, B. (2023), "Mediating effect of integrated health commodities procurement system on the relationship between responsiveness and health service delivery", *International Journal of Health Governance*, Vol. 28 No. 3, pp. 284-298, doi: 10.1108/ijhg-03-2023-0028.

- Israel, B., Kazungu, I. and Mchopa, A. (2019), "Centralised medical supplies procurement and health service delivery in Arusha and Kilimanjaro regions Tanzania", *East African Journal of Social and Applied Sciences*, Vol. 1 No. 1, pp. 70-79.
- Koggalage, P.D., Dassanayake, K.M. and Kulasuriya, P.K. (2021), "Implementation of e- procurement for pharmaceuticals: perspectives of the staff of the State Pharmaceuticals Corporation of Sri Lanka", *International Journal of Procurement Management*, Vol. 15 No. 1, pp. 113-131, doi: 10.1504/ijpm.2022.119841.
- Kohler, J.C. and Dimancesco, D. (2020), "The risk of corruption in public pharmaceutical procurement: how anti-corruption, transparency and accountability measures may reduce this risk", *Global Health Action*, Vol. 13 No. 1, pp. 1-10, doi: 10.1080/16549716.2019.1694745.
- Koller, T., Clarke, D. and Vian, T. (2020), "Promoting anti-corruption, transparency and accountability to achieve universal health coverage", *Global Health Action*, Vol. 13 No. 1, pp. 1-4, doi: 10.1080/16549716.2019.1700660.
- Lega, F. and Castellini, G.C. (2022), *Key Ingredients for a Resilient Health System, Resilient Health Systems (European Health Management in Transition)*, Emerald Publishing, Bingley, pp. 33-89, doi: 10.1108/978-1-80262-273-720221003.
- Littlejohns, P., Kieslich, K., Weale, A., Tumilty, E., Richardson, G., Stokes, T., Gauld, R. and Scuffham, P. (2019), "Creating sustainable health care systems: agreeing social (societal) priorities through public participation", *Journal of Health Organization and Management*, Vol. 33 No. 1, pp. 18-34, doi: 10.1108/jhom-02-2018-0065.
- Mackey, T.K. and Cuomo, R.E. (2020), "An interdisciplinary review of digital technologies to facilitate anti-corruption, transparency and accountability in medicines procurement", *Global Health Action*, Vol. 13 No. 1, pp. 6-13, doi: 10.1080/16549716.2019.1695241.
- MacKinnon, D.P., Lockwood, C.M., Hoffman, J.M., West, S.G. and Sheets, V. (2002), "A comparison of methods to test mediation and other intervening variable effects", *Psychological Methods*, Vol. 7 No. 1, pp. 83-103, doi: 10.1037/1082-989x.7.1.83.
- Mahuwi, L. and Israel, B. (2023), "A review on participation of SMEs in public procurement: opportunities, challenges, and policy implications", *New Applied Studies in Management, Economics and Accounting*, Vol. 6 No. 4, pp. 18-33.
- Mansilla, C., Kuhn-Barrientos, L., Celedón, N., de Ferial, R. and Abelson, J. (2022), "Health technology assessment processes: a North-South comparison of the evaluation and recommendation of health technologies in Canada and Chile", *International Journal of Health Governance*, Vol. 27 No. 3, pp. 312-328, doi: 10.1108/ijhg-10-2021-0108.
- Maran, L. and Lowe, A. (2022), "Competing logics in a hybrid organization: ICT service provision in the Italian health care sector", *Accounting, Auditing and Accountability Journal*, Vol. 35 No. 3, pp. 770-800, doi: 10.1108/aaaj-12-2019-4334.
- Martinez, M.G., Kohler, J.C. and McAlister, H. (2017), "Corruption in the pharmaceutical sector", in Abländer, M.S. and Hudson, S. (Eds), *The Handbook of Business and Corruption*, Emerald Publishing, Bingley, pp. 329-361.
- Nguyen, T.V., Bach, T.N., Le, T.Q. and Le, C.Q. (2017), "Local governance, corruption, and public service quality: evidence from a national survey in Vietnam", *International Journal of Public Sector Management*, Vol. 30 No. 2, pp. 137-153, doi: 10.1108/ijpsm-08-2016-0128.
- Nunes, C., Gomes, P. and Santana, J. (2023), "Transparency, accountability, and governance: a literature review in the context of public hospitals", *Brazilian Journal of Public Administration*, Vol. 57 No. 2, pp. 1-33, doi: 10.1590/0034-761220220238x.
- O'Regan, B., King, R. and Smith, D. (2022), "Combining accountability forms: transparency and "intelligent" accountability in a public service organization", *Accounting, Auditing and Accountability Journal*, Vol. 35 No. 5, pp. 1287-1315, doi: 10.1108/aaaj-03-2020-4473.
- Oleribe, O., Momoh, J., Uzochukwu, B.C., Mbofana, F., Adebisi, A., Barbera, T., Williams, R. and Taylor, S.D. (2019), "Identifying key challenges facing healthcare systems in Africa and

- potential solutions”, *International Journal of General Medicines*, Vol. 12, pp. 395-403, doi: 10.2147/ijgm.s223882.
- Paschke, A., Dimancesco, D., Vian, T., Kohler, J.C. and Forte, G. (2018), “Increasing transparency and accountability in national pharmaceutical systems”, *Policy and Practice*, Vol. 96 No. 11, pp. 782-791, doi: 10.2471/blt.17.206516.
- Pentrahan, A., Lin, K., Sriphon, T., Wang, J.Y. and Wong, W.K. (2022), “The impact of pharmaceutical electronic bidding procurement on prices of medicines: a systematic review”, *Indian Journal of Pharmaceutical Sciences*, Vol. 5, pp. 86-98.
- Pomegbe, W.W.K., Dogbe, C.S.K. and Borah, P.S. (2023), “Pharmaceutical business ecosystem governance and new product development success”, *International Journal of Productivity and Performance Management*, Vol. 72 No. 7, pp. 1942-1961, doi: 10.1108/ijppm-04-2021-0241.
- Rahman, N.A., Mangsor, M.M., Idris, S.H. and Rahmat, N.E. (2021), “Enhancing anti-corruption, accountability and transparency laws in the Malaysia’s health sector”, *International Virtual Colloquium on Multi-disciplinary Research Impact*, Universiti Teknologi Malaysia, 15th Oct 2021.
- Ratiko, B. and Setiyawati, H. (2022), “The effect of transparency principles and e-procurement on the function of the internal control systems and the impact on financial accountability”, *International Journal of Management Studies and Social Science Research*, Vol. 4 No. 2, pp. 161-175.
- Saeed, G., Kohler, J.C., Cuomo, R.C. and Mackey, T.K. (2022), “A systematic review of digital technology and innovation and its potential to address anti-corruption, transparency, and accountability in the pharmaceutical supply chain”, *Expert Opinion on Drug Safety*, Vol. 21 No. 8, pp. 1061-1088, doi: 10.1080/14740338.2022.2091543.
- Sarstedt, M., Ringle, C., Smith, D., Reams, R. and Hair, J.F. (2014), “Partial least squares structural equation modelling (PLS-SEM): a useful tool for family business researchers”, *Journal of Family Business Strategy*, Vol. 5 No. 1, pp. 105-115, doi: 10.1016/j.jfbs.2014.01.002.
- Saunders, M., Lewis, P. and Thornhill, A. (2019), *Research Methods for Business Students*, 8th ed., Pearson Education, Harlow.
- Sekalala, S., Masud, H. and Bosco, R.T. (2020), “Human rights mechanisms for anti-corruption, transparency and accountability: enabling the right to health”, *Global Health Action*, Vol. 13 No. 1, pp. 1-12, doi: 10.1080/16549716.2019.1699343.
- Siwandeti, M., Mahuwi, L. and Israel, B. (2023), “How public procurement can help societies achieve SDGs: a conceptual model”, *Management of Sustainable Development Journal*, Vol. 15 No. 1, pp. 36-46, doi: 10.54989/msd-2023-0006.
- Spacek, D. and Spackova, Z. (2023), “Issues of e-government services quality in the digital-by-default era – the case of the national e-procurement platform in Czechia”, *Journal of Public Procurement*, Vol. 23 No. 1, pp. 1-34, doi: 10.1108/jopp-02-2022-0004.
- Svidronova, M.M. and Mikus, T. (2015), “E-procurement as the ICT innovation in the public services management: case of Slovakia”, *Journal of Public Procurement*, Vol. 15 No. 3, pp. 317-340, doi: 10.1108/jopp-15-03-2015-b003.
- Tinali, G.Z. (2022), “Technology usage and public procurement performance in Tanzania: the moderating role of regulatory pressure”, *University of Dar es Salaam Library Journal*, Vol. 17 No. 1, pp. 18-37, doi: 10.4314/udslj.v17i1.3.
- UNODC (2013), *Guidebook on Anti-corruption in Public Procurement and the Management of Public Finances*, United Nations Office on Drugs and Crime, Vienna.
- URT (2013), *The Public Procurement Regulations (As Amended in 2016)*, Public Procurement Regulatory Authority, Dar es Salaam, Tanzania.
- URT (2022), “*Demographic and Health Survey and Malaria Indicator Survey*”, Ministry of Health: Dodoma, Tanzania.
- Vian, T. (2020), “Anti-corruption, transparency and accountability in health: concepts, frameworks, and approaches”, *Global Health Action*, Vol. 13 No. 1, pp. 1-24, doi: 10.1080/16549716.2019.1694744.

-
- Vian, T., Kohler, J.C., Forte, G. and Dimancesco, D. (2017), "Promoting transparency, accountability, and access through a multi-stakeholder initiative: lessons from the medicines transparency alliance", *Journal of Pharmaceutical Policy and Practice*, Vol. 10 No. 18, pp. 1-11, doi: 10.1186/s40545-017-0106-x.
- Wahyuningsih, N., Wulansari, N.A., Ariyati, Pratama, N.W. and Pinandita, M.K. (2023), "E-procurement in preventing fraud in the procurement of government goods and services at Semarang state university", *Journal of Public Administration and Government*, Vol. 5 No. 2, pp. 227-238.
- Wilson, S. (2022), "Developing an analytical framework to identify early warnings of serious problems with the quality and safety of care", *International Journal of Health Governance*, Vol. 27 No. 2, pp. 208-216, doi: 10.1108/ijhg-10-2021-0109.
- Wolf, E.J., Harrington, K.M., Clark, S.L. and Miller, M.W. (2013), "Sample size requirements for structural equation models an evaluation of power, bias, and solution propriety", *Educational and Psychological Measurement*, Vol. 73 No. 6, pp. 913-934, doi: 10.1177/0013164413495237.
- World Bank (2014), *Procurement Guidelines for Goods, Works, and Non- Consulting Services under IBRD Loans and IDA Credits and Grants by World Bank Borrowers*, World Bank, Washington, DC.
- Yang, Y. (2018), "Is transparency a double-edged sword in citizen satisfaction with public service? Evidence from China's public healthcare", *Journal of Service Theory and Practice*, Vol. 28 No. 4, pp. 484-506, doi: 10.1108/jstp-06-2017-0102.
- Zalvand, R., Mohammadian, M. and Meskarpour Amiri, M. (2022), "Factors affecting hospital costs and revenue: integrating expert opinions and literature review", *International Journal of Health Governance*, Vol. 27 No. 1, pp. 21-40, doi: 10.1108/ijhg-10-2021-0104.

Corresponding author

Baraka Israel can be contacted at: baraka.israel@cbe.ac.tz

For instructions on how to order reprints of this article, please visit our website:

www.emeraldgroupublishing.com/licensing/reprints.htm

Or contact us for further details: permissions@emeraldinsight.com

The current issue and full text archive of this journal is available on Emerald Insight at:
<https://www.emerald.com/insight/2279-0187.htm>

MANM
21,1

38

Received 6 January 2024
Revised 22 February 2024
Accepted 19 March 2024

Game on for learning: a holistic exploration of Gamification's impact on student engagement and academic performance in educational environments

C. Neerupa

*Department of Professional Accounting and Finance,
Kristu Jayanti College, Autonomous, Bengaluru, India*

R. Naveen Kumar

School of Management, Kristu Jayanti College, Autonomous, Bengaluru, India

R. Pavithra

*Department of Artificial Intelligence and Machine Learning,
Kongunadu Arts and Science College, Autonomous, Coimbatore, India, and*

A. John William

School of Management, Kristu Jayanti College, Autonomous, Bengaluru, India

Abstract

Purpose – The research paper examines the complex relationship between gamification, student engagement and academic performance in educational environments. The study employed a structural equation model that highlights important connections among key constructs within the educational setting.

Design/methodology/approach – This research aims to explore the connection between gamification, student engagement and academic performance in educational settings. The study employs various statistical techniques such as factor analysis, Kaiser–Meyer–Olkin (KMO), Bartlett's test, component transformation matrix, correlation and regression analysis, descriptive statistics, ANOVA, coefficients and coefficient correlations, residual statistics and confirmatory factor analysis (CFA) to analyze the data.

Findings – It was found that active participation by the instructor and good time management skills have a positive impact on student engagement levels ($\beta = 0.380, p < 0.001$; $\beta = 0.433$ and $p < 0.001$). However, peer interaction does not significantly predict student engagement ($\beta = -0.068$ and $p = 0.352$). Additionally, there is a positive correlation between student engagement and performance ($\beta = 0.280$ and $p < 0.001$).

Research limitations/implications – The study highlights the importance of innovative design to fully utilize gamification. Future research should consider design, user characteristics and educational context. The findings can guide informed decisions about gamification in education, fostering motivation and learning objectives.

Practical implications – The study presents a reliable tool for assessing student engagement and performance in educational settings, demonstrating high Cronbach's alpha and robust reliability. It identifies student engagement and time management as significant predictors of Global Learning Outcome. The findings can inform decisions on implementing gamification in educational settings, promoting intrinsic motivation and aligning with learning objectives.



Management Matters
Vol. 21 No. 1, 2024
pp. 38–53
Emerald Publishing Limited
e-ISSN: 2752-8359
p-ISSN: 2279-0187
DOI 10.1108/MANM-01-2024-0001

© C. Neerupa, R. Naveen Kumar, R. Pavithra and A. John William. Published in *Management Matters*. Published by Emerald Publishing Limited. This article is published under the Creative Commons Attribution (CC BY 4.0) licence. Anyone may reproduce, distribute, translate and create derivative works of this article (for both commercial and non-commercial purposes), subject to full attribution to the original publication and authors. The full terms of this licence may be seen at <http://creativecommons.org/licenses/by/4.0/legalcode>

Social implications – The research highlights the transformative impact of gamification on educational practices, highlighting its potential to enhance student experiences, motivate, promote diversity and improve long-term academic performance, highlighting the trend of integrating technology into education.

Originality/value – In today's ever-changing education landscape, it is essential to incorporate innovative techniques to keep students engaged and enthusiastic about learning. Gamification is one such approach that has become increasingly popular. It is a concept that takes inspiration from the immersive world of games to enhance the overall learning experience.

Keywords Gamification, Student engagement, Student performance, Motivation, Educational technology, Learning outcomes

Paper type Research paper

1. Introduction

Education is currently transforming with the integration of innovative technologies and new pedagogical approaches. One such strategy is gamification, which involves incorporating game design elements into non-game contexts to increase student engagement and performance. By leveraging psychological principles such as competition, rewards, achievement and progression, gamification creates an environment that mirrors gaming experiences. This approach has a significant impact on education, as it fosters intrinsic motivation, transforms focus and retention and improves understanding of course material. Understanding the impact of gamification is crucial for optimizing teaching methods and ensuring educational relevance.

In a comprehensive exploration of gamification's influence on education, Arufe Giráldez *et al.* (2022) conducted a study revealing the substantial impact of a multimodal gamified learning environment on the final grades of 133 Spanish university students. The intervention group, exposed to this innovative learning approach, exhibited higher overall scores and actively engaged in voluntary learning tasks. Further contributing to the discourse, Tan and Hew (2016) discovered that gamification significantly improved student engagement and affective outcomes in a blended learning class, emphasizing the experimental group's increased participation and motivation. In a distinct approach, Duggal *et al.* (2021) harnessed artificial intelligence and machine learning to enhance self-motivation and engagement among 120 higher education students through a gamified framework, successfully addressing disengagement issues and demonstrating improved participation compared to the control group. Alsadoon's *et al.* (2022) exploration into the effects of a gamified e-learning environment on middle school students during the COVID-19 pandemic found enhanced motivation and satisfaction, though the impact on achievement was not statistically significant. Leita's *et al.* (2022) study delves into the influence of game elements on recycling motivation among secondary school students in Portugal and the UK, revealing a notable trend toward autonomous motivation. Together, these studies underscore the varied and impactful outcomes of gamification in diverse educational contexts, offering valuable insights into its potential to enhance engagement, motivation and academic performance.

In the evolving landscape of education, Alsubhi *et al.* (2021) proposes a comprehensive engagement framework for gamification in education software development. By amalgamating game elements, learning activities and various factors, their framework has proven efficacious in not only enhancing student engagement and performance but also addressing the challenges posed by the COVID-19 pandemic on online learning. The study emphasizes the pivotal role of gamification, specifically using Quizziz, in mitigating the impact on students' critical thinking skills, highlighting the crucial role of teachers in this process. Kang and Recard (2023) contribute further insights by investigating the implementation of a gamification approach to enhance students' learning engagement. Their study identifies key game elements for enhancing engagement in e-learning platforms.

It proposes a conceptual engagement framework, informed by literature analysis and a comprehensive questionnaire survey, serving as a valuable guide for developers and academics in crafting engaging educational systems. Additionally, Alsubhi's *et al.* (2020) research into learners' engagement in gamified learning environments, unveils distinct achievement-oriented and perfection-oriented engagement types, each influencing motivation and providing valuable insights into gamification design and adaptation. Lavoué *et al.* (2021) shed light on the effectiveness of game-based learning, demonstrating its efficacy in planning education and fostering motivation, emotional involvement and teamwork among students, thereby enhancing overall engagement. Hartt *et al.* (2020) explores the dynamics of e-learning platforms, gamification and adaptive gamification, revealing that while both improve engagement, adaptive gamification, tailored to learning styles, exhibits a notable 25% increase in motivation and a 26% reduction in dropout rates. Hassan *et al.* (2021) advocate for incorporating interactive activities like games and gamification in education to not only enhance learning but also promote sustainable life skills and increase engagement, challenging traditional teaching methods. Duggal *et al.* (2021) emphasizes the positive impact of a reward-based gamification system on the educational experience during the COVID-19 pandemic, particularly in two gamified undergraduate courses. Rincon-Flores and Santos Guevara (2021) study on gamification in higher education reveals that challenge and enjoyment significantly influence engagement and satisfaction, suggesting that gamification can enhance educational quality. Nguyen-Viet and Nguyen-Viet (2023) delve into enhancing satisfaction among Vietnamese students through gamification, emphasizing its mediating role in engagement and learning effectiveness. Collectively, these studies provide a comprehensive understanding of the multifaceted impact of gamification on education, offering valuable insights for educators, developers and policymakers alike.

2. Review of literature

Errol Scott Rivera (2021) has contributed a unique perspective on integrating gamification in education. Their proposed framework, called the Gamification for Student Engagement Framework, is designed to provide a systematic guide for practitioners to create gamified learning experiences customized for specific student outcomes. This can help enhance student satisfaction and well-being across different educational settings. The framework emphasizes the importance of aligning gamification strategies with individual student experiences, taking into account the nuanced nature of their preferences and learning environments.

Numerous studies have provided valuable insights into the multifaceted impact of gamification in education. Alsawaier's (2017) meta-analysis highlights the positive impact of gamification on motivation and engagement and identifies design elements and moderators influencing its effectiveness. Other studies, such as those by Huang *et al.* (2020) and García-López *et al.* (2023), examine the motivational aspects of gamified platforms, emphasizing their impact on behavioral dissatisfaction, cognition and metacognition in university students. The integration of gamification in specific subjects, such as chemistry (Chans and Portuguese Castro, 2021) and industrial psychology (Eltahir *et al.*, 2021), showcases its effectiveness in various academic domains. Research by Qiao *et al.* (2023) investigates the effects of mixed and non-digital gamification, emphasizing improvements in learning achievement, cognitive engagement and course satisfaction. Camacho-Sánchez *et al.* (2023) conducted a systematic review on game-based learning and gamification in physical education, providing insights into enhancing student engagement. Luo's analysis (2022) using HistCite software identifies crucial factors contributing to the varied effectiveness of educational gamification. The incorporation of flipped classrooms and gamification in postgraduate business education programs in China during the pandemic, as studied by Ng and Lo (2022), further highlights

the positive impact on learner achievement and engagement. Different audiences and types of material may have different reactions to the educational and learning benefits of gamification. According to research, students who take gamified classes do better academically because they are better able to focus on their coursework. For instance, college students who participated in a gamified cell biology class outperformed their peers who attended a lecture-based session by a factor of forty percent (Kim *et al.*, 2018).

One strategy for incorporating gamification into a system involves beginning with unsatisfied needs and using a simple, superficial reward-based layer as an introduction to the system. These advantages need to be quickly replaced with others that are more meaningful, such as a narrative, the option to choose which routes to study, engaging activities and opportunities to reflect (Nicholson, 2015). Using educational games as learning aids is a feasible technique because of the games' inherent ability to teach as well as facilitate the development of important skills such as problem-solving, collaboration and communication. According to Dicheva *et al.* (2015), games possess an incredible driving force; they utilize a range of appeals, sometimes without obtaining anything in return, merely for the joy of it and the potential to win. Games also provide the possibility of winning.

Hamari *et al.* (2014) gamification can be effective in enhancing engagement and motivation, but its impact on performance is more nuanced and context-dependent. Dicheva *et al.* (2015) have found that gamification has a positive impact on student engagement and motivation. However, the effectiveness of gamification depends on various factors, such as the design of gamified activities, the context of implementation and the individual characteristics of students. Landers *et al.* (2017) has discussed the role of rewards, motivation and engagement in gamified learning environments. As per the findings, gamification can enhance student motivation and engagement by leveraging psychological principles, such as intrinsic and extrinsic motivation, self-determination theory and flow theory.

Seaborn and Fels (2015), the benefits of the digital gaming medium stimulate its use in fields that are not related to entertainment. Gamification is a term that has been used in the field of education to describe both video games in general and digital game-based learning (DGBL) in particular (Kim *et al.*, 2018). Education has a significant potential for application since its goal is to raise the level of enthusiasm and involvement among students. The use of game mechanics to solve challenges in learning and education is referred to as gamification, and it relates to a variety of activities and processes (Rapp *et al.*, 2019). Gamification may be broken down into many categories. Over the last several years, gamification has been an increasingly popular tactic. However, further work has to be done in the field of academic research on gamification in education to cover certain significant gaps.

3. Research objective

The principal objective of this study is to comprehensively examine the factors associated with gamification and their consequences, particularly by investigating how these factors affect student engagement and, subsequently, how student engagement influences student performance.

4. Research questions

The effectiveness of integrating gamification in education remains a subject of debate, with varying outcomes reported in different studies. To address this, the growing body of literature on this topic has enabled us to conduct a meta-analysis to better understand the overall success of implementing gamification in educational settings. The primary research question guiding this analysis is, "What is the influence of gamification on student performance?" This central question has led to the following subsidiary questions: (1) Does

the adoption of a gamified learning system (or elements of gamification) impact student engagement? (2) Does increased student engagement through gamification translate into improved student performance?

5. Hypothesis

42

- H1.* Instructor involvement does not exert a notable influence on student engagement in gamification.
- H2.* Effective time management does not seem to significantly affect student engagement in gamification.
- H3.* Peer interaction appears to have minimal impact on student engagement.
- H4.* Student engagement does not appear to be a strong predictor of student performance.

6. Methodology

The research methodology involved analyzing data using various tools and techniques. Data cleaning was done to remove missing data, and 93.3% of cases were considered valid for analysis. The reliability analysis showed strong internal consistency among the measurement scale items. The scale had 30 items, with an average mean score of 3.368. The inter-item correlation was moderate, indicating a reasonable degree of association among items. Descriptive statistics were provided for the overall scale.

The data was well-suited for factor analysis due to the high correlation between variables. A statistically significant chi-square value supported the factorability of the correlation matrix. Factor identification was done, and Pearson correlation coefficients were calculated to determine the strength and direction of relationships between variables.

7. Data analysis

This research examines the relationship between gamification, student engagement and academic performance in educational contexts. It uses factor analysis, KMO, Bartlett's test, component transformation matrix, correlation and regression analysis, descriptive statistics, ANOVA, coefficients and coefficient correlations, residual statistics and confirmatory factor analysis (CFA). The findings highlight the potential of gamification in enhancing student motivation, participation and achievement, but emphasize the need for thoughtful design, alignment with learning objectives and individual differences.

8. Results

The test results in Table 1 shows the majority of participants identified as male, constituting 64.3% of the sample, while females accounted for 26.1%. The gender distribution indicates a notable gender imbalance in the study, with males being the more dominant group. Only 9.5% of the data had missing or unspecified gender information.

The test results in Table 2 shows the age distribution of participants demonstrates that the majority fall within the age range of 18–20, comprising 71.9% of the sample. Participants aged 15–18 represent 10.1%, while those between 21–25 make up 7.5%. Participants above the age of 25 constitute a smaller percentage at 1.0%. The data suggests a concentration of participants in the late adolescence to early adulthood range, with limited representation from older age groups.

The test results in Table 3 shows the majority of participants hold a degree, accounting for 78.9% of the sample. Higher Secondary education is the next most common category, making up 8.5%, followed by Diploma at 1.0% and Postgraduate at 2.0%. There are also 9.5% of cases where education-level information is missing or unspecified. The analysis suggests a diverse educational background among participants, with a significant portion having attained at least a degree.

The test results in Table 4 shows the Kaiser–Meyer–Olkin (KMO) Measure of Sampling Adequacy for the dataset is 0.872, indicating a high level of adequacy for factor analysis. Additionally, Bartlett’s Test of Sphericity reached statistical significance (Chi-Square = 2165.437, df = 210, Sig. = 0.000), suggesting that the correlation matrix is not an identity matrix, supporting the suitability of the data for factor analysis.

The test results in Table 5 shows the rotated factor matrix, obtained through Maximum Likelihood extraction and Varimax rotation with Kaiser Normalization, reveals distinct factor loadings for different variables. In Factor 1, significant loadings are observed for variables related to time management, indicating a cohesive factor associated with effective time management skills. Factor 2 captures variables related to student engagement, with strong

		Frequency	Gender Percent	Valid percent	Cumulative percent
Valid	Male	128	64.3	71.1	71.1
	Female	52	26.1	28.9	100.0
	Total	180	90.5	100.0	
Missing	System	19	9.5		
Total		199	100.0		

Table 1.
Demographics profile
of the respondents

Source(s): Authors’ own construct from validation 2024

		Frequency	Age Percent	Valid percent	Cumulative percent
Valid	15–18	19	9.5	9.5	9.5
	18–20	20	10.1	10.1	19.6
	21–25	143	71.9	71.9	91.5
	above 25	15	7.5	7.5	99.0
	Total	2	1.0	1.0	100.0
Total		199	100.0	100.0	

Table 2.
Age distribution
summary of the
respondents

Source(s): Authors’ own construct from validation 2024

		Frequency	Education level Percent	Valid percent	Cumulative percent
Valid	Degree	19	9.5	9.5	9.5
	Diploma	157	78.9	78.9	88.4
	Higher Secondary	2	1.0	1.0	89.4
	Postgraduate	17	8.5	8.5	98.0
	Total	4	2.0	2.0	100.0
	Total	199	100.0	100.0	

Table 3.
Educational level
distribution summary
of the respondents

Source(s): Authors’ own construct from validation 2024

MANM
21,1

44

loadings on Student_Egmt1 and Student_Egmt2. Factor 3 represents instructor involvement, as evidenced by substantial loadings on Inst_Invol2 and Inst_Invol3. Factor 4, with prominent loadings on Peer_Int1 and Peer_Int3, seems to encapsulate peer interaction. Lastly, Factor 5 is associated with variables related to student performance, as indicated by loadings on Student_Perf2 and Student_Perf3. The rotation method converged after 7 iterations, solidifying the stability of the factor solution. This rotated factor matrix provides a clearer interpretation of the underlying factors influencing the observed variables, facilitating a more nuanced understanding of the relationships within the dataset.

In this study, we used structural equation modeling (SEM) and CFA tools for data analysis and testing relationships between variables. We performed SEM and CFA using SPSS (software for statistical data analysis) and AMOS (software that can be used to perform SEM). In brief, SEM is a family of multivariate statistical analysis methods used to model a network of complex structural relationships between one or more measured variables and latent constructs. CFA

KMO and Bartlett's test

Kaiser–Meyer–Olkin Measure of Sampling Adequacy	0.872
Bartlett's Test of Sphericity	Approx. Chi-Square
	2165.437
	df
	210
	Sig
	0.000

Table 4.
KMO and Bartlett's
test summary

Source(s): Authors' own construct from validation 2024

Rotated factor matrix^a

	1	2	Factor 3	4	5
Time_Mgmt1	0.639				
Time_Mgmt2	0.765				
Time_Mgmt3	0.642				
Tme_Mgmt4	0.712				
Time_Mgmt5	0.770				
Student_Egmt1			0.813		
Student_Egmt2			0.725		
Student_Egmt3			0.673		
Student_Egmt4			0.657		
Inst_Invol1				0.660	
Inst_Invol2				0.710	
Inst_Invol3				0.774	
Inst_Invol4				0.568	
Peer_Int1		0.715			
Peer_Int2		0.645			
Peer_Int3		0.744			
Peer_Int4		0.558			
Peer_Int5		0.770			
Student_Perf1					0.585
Student_Perf2					0.618
Student_Perf3					0.642

Note(s): Extraction Method: Maximum Likelihood
Rotation Method: Varimax with Kaiser Normalization. ^A

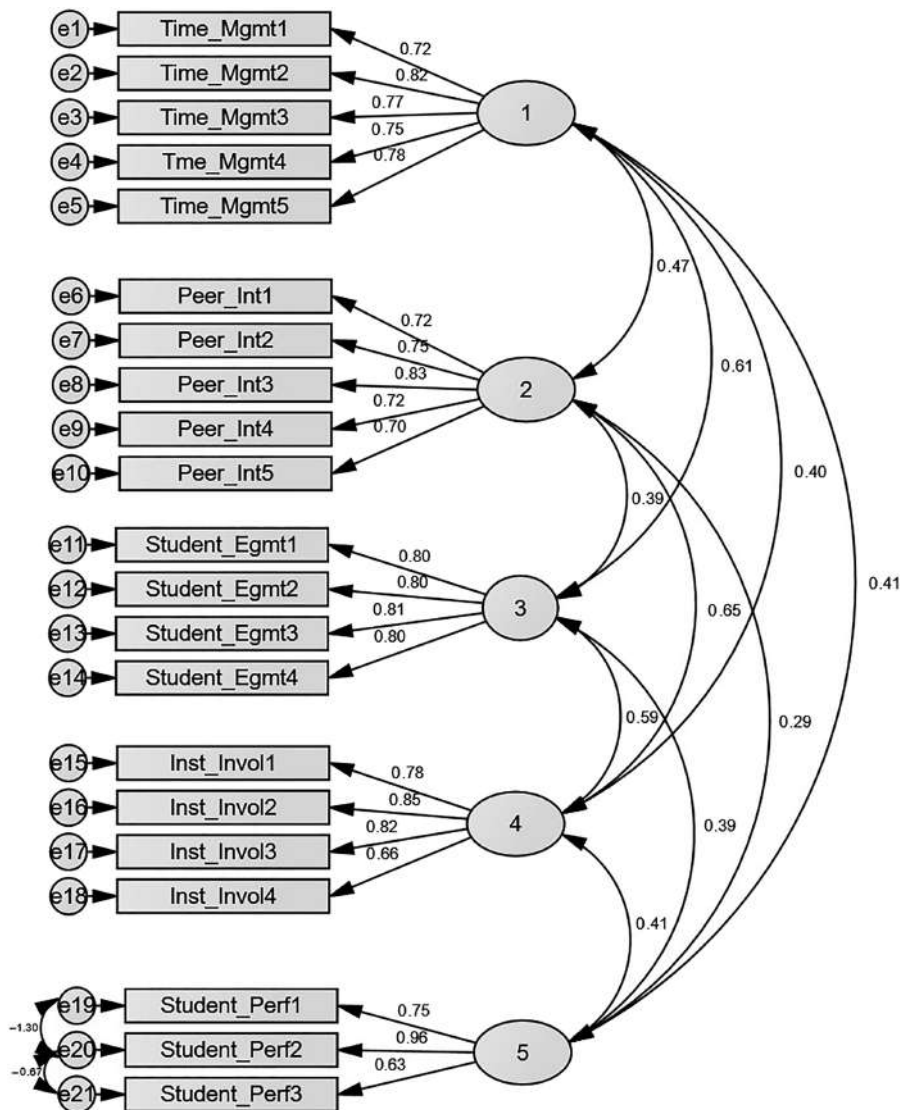
^aRotation converged in 7 iterations

Table 5.
Rotated factor matrix

Source(s): Authors' own construct from validation 2024

method is used to verify the factor structure of a set of observed variables. The SEM estimation results provide valuable insights into the relationships among the key constructs in the context of Student Performance. The path coefficients, standard errors, critical ratios and *p*-values offer a comprehensive understanding of the associations between Time Management, Peer Interaction, Instructor Involvement, Student Engagement and Student Performance.

Figure 1 CFA path model reveals a positive correlation between teacher involvement and student engagement (0.47), time management (0.41) and academic performance (0.27).



Source(s): Authors' own construct from Validation 2024

Figure 1.
Final CFA model

Students who are more engaged in class tend to have better teachers and time management leads to better academic performance. Student engagement is the most significant factor influencing performance.

The test results in Table 6 presents standardized factor loadings for items within five constructs: Time Management, Peer Interaction, Student Engagement, Instructor Involvement and Student Performance. The Time Management construct exhibits strong standardized factor loadings ranging from 0.723 to 0.816, contributing to a high Cronbach's Alpha of 0.77, indicating good internal consistency. The Peer Interaction construct demonstrates loadings between 0.699 and 0.829, resulting in a Cronbach's Alpha of 0.74. Student Engagement, with loadings from 0.798 to 0.808, shows a high Cronbach's Alpha of

Variables/ Constructs	Items	Standardized factor loadings	Cronbach's alpha	Composite reliability	Average variance extracted	Maximum shared variance
Time Management	Time_ Mgmt1	0.723	0.77	0.879	0.592	0.369
	Time_ Mgmt2	0.816				
	Time_ Mgmt3	0.774				
	Time_ Mgmt4	0.751				
	Time_ Mgmt5	0.780				
Peer Interaction	Peer_Int1	0.716	0.74	0.860	0.553	0.419
	Peer_Int2	0.746				
	Peer_Int3	0.829				
	Peer_Int4	0.722				
	Peer_Int5	0.699				
Student Engagement	Student_ Egmt1	0.804	0.80	0.879	0.645	0.369
	Student_ Egmt2	0.803				
	Student_ Egmt3	0.808				
	Student_ Egmt4	0.798				
	Student_ Egmt5	0.808				
Instructor Involvement	Inst_ Invol1	0.785	0.78	0.861	0.610	0.419
	Inst_ Invol2	0.852				
	Inst_ Invol3	0.818				
	Inst_ Invol4	0.656				
	Inst_ Invol5	0.818				
Student Performance	Student_ Perf1	0.747	0.78	0.831	0.628	0.168
	Student_ Perf2	0.963				
	Student_ Perf3	0.630				
	Student_ Perf4	0.630				

Table 6.
Reliability and
convergent validity

Note(s): Model fitness: $X^2 = 413.201$, $df = 177$, $X^2/df = 2.344$, RMSEA = 0.082, CFI = 0.884
Source(s): Authors' own construct from validation 2024

0.80. Instructor Involvement, characterized by loadings between 0.656 and 0.852, has a Cronbach's Alpha of 0.78. Lastly, Student Performance, featuring loadings from 0.630 to 0.963, displays a Cronbach's Alpha of 0.78. Composite reliability values are consistently high across all constructs, ranging from 0.831 to 0.879. The average variance extracted (AVE) is satisfactory for each construct, ranging from 0.553 to 0.645, indicating convergent validity. The Maximum Shared Variance values are within acceptable limits, further supporting construct validity. The model fitness indicators, including a chi-square of 413.201 with 177 degrees of freedom, a chi-square/df ratio of 2.344, an root mean square error approximation (RMSEA) of 0.082 and a comparative fit index (CFI) of 0.884, collectively suggest a reasonably good fit of the model to the data.

For establishing discriminant validity, we used the Fornell and Larcker (1981) criteria. The values in the diagonal bold are the square root of AVE and other values are inter-variable correlations. The requirement is that the diagonal bold values should be higher than other values in their respective rows and columns, which is met as can be seen in the table. Thus, we can say that our variables have good discriminant validity.

The test results in Table 7 reveals strong correlations between five factors influencing student performance: Time Management, Peer Interaction, Student Engagement, Instructor Involvement and Student Performance. Student engagement is the most significant factor influencing academic success, with active involvement in learning leading to better performance. Time management skills are highly correlated with student performance, with effective time management skills resulting in better grades. Instructor involvement positively impacts student engagement, with positive peer interactions contributing to motivation and interest in learning. However, the direct impact of peer interaction on performance is weaker. The data suggests that educators should focus on fostering student engagement, promoting good time management skills and creating a positive learning environment with active instructor involvement for improved student performance.

Figure 2 Structural Measure Model indicates that the path model reveals a positive correlation between teacher involvement and student engagement (0.47), time management (0.41) and academic performance (0.27). However, it does not show causality, suggesting that increasing teacher involvement does not necessarily lead to increased student engagement.

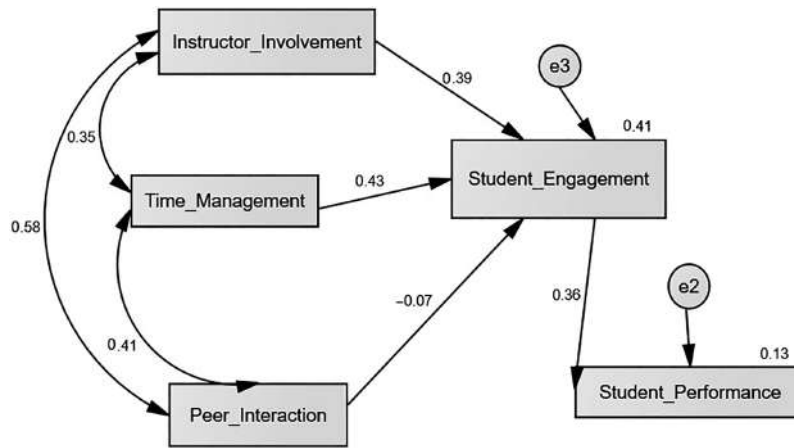
The test results in Table 8 reveals significant pathways between key constructs. Student Engagement is positively influenced by both Instructor Involvement ($\beta = 0.380, p < 0.001$) and Time Management ($\beta = 0.433, p < 0.001$), suggesting that students with more involved instructors and effective time management skills are likely to be more engaged. However, Peer Interaction does not significantly predict Student Engagement ($\beta = -0.068, p = 0.352$).

	Time management	Peer interaction	Student engagement	Instructor involvement	Student performance
Time Management	0.770				0.409***
Peer Interaction	0.472***	0.744			0.293**
Student Engagement	0.608***	0.385***	0.803		0.391***
Instructor Involvement	0.398***	0.647***	0.587***	0.781	0.406***
Student Performance					0.792

Note(s): *** $p < 0.001$

Source(s): Authors' own construct from validation 2024

Table 7.
Discriminant validity



Source(s): Authors' own construct from Validation 2024

Figure 2.
Structural measure
model results

	Estimate	S.E.	C.R.	<i>p</i>
Student_Engagement ← Instructor_Involvement	0.380	0.068	5.560	***
Student_Engagement ← Time_Management	0.433	0.064	6.773	***
Student_Engagement ← Peer_Interaction	-0.068	0.073	-0.930	0.352
Student_Performance ← Student_Engagement	0.280	0.054	5.191	***

Table 8.
Direct effect of research
model: standardized
regression weights

Note(s): **, * Significant at 1%, 5% level
S.E – An estimate of the standard error of the covariance
C.R – critical ratio obtained by covariance estimate by its standard error
Source(s): Authors' own construct from validation 2024

Moreover, Student Performance is positively associated with Student Engagement ($\beta = 0.280, p < 0.001$), indicating that more engaged students tend to have better academic performance. These findings underscore the importance of instructor involvement and time management in fostering student engagement, with subsequent positive implications for academic performance. The significance levels are denoted as ** (1%) and * (5%), providing confidence in the observed relationships. The standard error (S.E.) and critical ratio (C.R.) values further support the reliability and significance of the estimated covariance in the structural model.

The hypotheses test results in Table 9 shows the outcomes of the structural relationships investigated in the study. Hypothesis H1, asserting an influence of Instructor Involvement on Student Engagement in Gamification, is supported, indicating that students with more

H#	Study hypotheses	Result
H1	There is an influence of Instructor Involvement towards Student Engagement in Gamification	Supported
H2	There is an influence of Time Management on Student Engagement in Gamification	Supported
H3	There is an influence of Peer Interaction on Student Engagement in Gamification	Rejected
H4	There is an influence of Student Engagement in Gamification on Student Performance	Supported

Table 9.
Outline of structural
relationship results of
the study

Source(s): Authors' own construct from validation 2024

involved instructors tend to exhibit higher levels of engagement. H2, which posits an influence of Time Management on Student Engagement in Gamification, is also supported, suggesting that effective time management contributes positively to student engagement. However, H3, proposing an influence of Peer Interaction on Student Engagement in Gamification, is rejected, indicating that the study did not find a significant impact of peer interaction on student engagement in the context of gamification. Finally, H4, suggesting an influence of Student Engagement in Gamification on Student Performance, is supported, indicating that higher levels of student engagement are associated with better academic performance in the gamified learning environment. These results provide valuable insights into the factors influencing student engagement and performance in gamified educational settings.

9. Discussion and implications

The study's findings, as outlined in Table 7, provide a foundation for a comprehensive discussion on the relationships between key constructs in the context of gamified education.

Instructor Involvement on Student Engagement aligns with existing literature emphasizing the crucial role of instructors in facilitating engaging learning experiences. This result underscores the importance of instructor support, guidance and active involvement in gamified educational environments, contributing to enhanced student engagement.

Similarly, the confirmed influence of Time Management on Student Engagement highlights the significance of effective time management skills in fostering student engagement within gamification. Students who can efficiently manage their time are more likely to engage actively with the gamified elements, reinforcing the idea that time-related skills play a vital role in the success of gamified educational interventions.

Contrary to expectations, the study did not find a significant influence of Peer Interaction on Student Engagement in the gamified context. This unexpected result may prompt further exploration into the nature of peer interactions within gamification, considering factors such as group dynamics, individual preferences and the design of gamified activities that promote collaborative engagement.

The positive impact of Student Engagement in Gamification on Student Performance validates the notion that actively engaged students are more likely to achieve better academic outcomes. This result underscores the potential of gamification not only in enhancing engagement but also in positively influencing students' overall performance.

Overall, these findings contribute valuable insights to the literature on gamification in education. Educators and instructional designers can leverage these results to inform the development and implementation of gamified learning experiences, emphasizing the pivotal roles of instructor involvement, effective time management and individual student engagement for optimal educational outcomes. Future research could delve deeper into the dynamics of peer interaction in gamified settings and explore additional factors that may further enhance the effectiveness of gamification in education.

The confirmed relationships between key constructs underscore the potential of gamification as a pedagogical tool to enhance student engagement and, consequently, improve academic performance. These findings have practical implications for educators, instructional designers and policymakers seeking to optimize the effectiveness of gamified educational interventions. However, it is important to note the limitations of this study, such as the potential for response biases in self-reported data and the specific context in which the study was conducted. Future research could explore these relationships across diverse educational settings and demographic groups to enhance the generalizability of the findings. This study contributes to the growing body of literature on gamification in education and

provides actionable insights for educators aiming to leverage gamified approaches for enhanced student outcomes. The results invite further exploration and refinement of gamification strategies, emphasizing the need for continued research in this evolving field.

10. Theoretical implications

Gamification is a transformative approach to education, combining play and learning to engage modern learners. It is rooted in psychological principles such as self-determination theory, flow theory and narrative psychology. It enhances cognitive engagement by promoting deeper understanding and retention of information, stimulating critical thinking and problem-solving. Gamification also fosters intrinsic motivation, improving academic performance by increasing engagement and enhancing focus, retention and resilience. It also promotes social interaction, fostering collaboration and competition. Gamification's shift towards intrinsic motivation can instill a lifelong love for learning, transcending immediate academic goals. However, its impact on education is context-dependent and requires further research to adapt to evolving learning preferences. Understanding the theoretical foundations of gamification is crucial for educators, policymakers and researchers to optimize teaching methods, enhance student outcomes and ensure the relevance of education in an ever-evolving landscape.

11. Practical implications

The study provides a reliable measurement tool for assessing student engagement and performance in educational settings, with a high Cronbach's Alpha and robust reliability. The instrument's quality data collection and structural insights offer valuable insights for designing effective gamified educational interventions. The regression model reveals that Instructor Involvement and Time Management positively impact student engagement, while peer interaction doesn't. Both factors positively impact academic performance. The CFA confirms the instrument's validity and the parsimony-adjusted measures balance model fit and complexity. The study also emphasizes the need for innovative design to harness gamification's full potential. Future research should explore optimal conditions for gamification implementation, considering design, user characteristics and educational context. The findings can guide informed decisions about implementing gamification in educational settings, fostering intrinsic motivation and aligning with learning objectives.

12. Limitations and scope for future research

This study focuses on the impact of gamification on student engagement and academic performance in a specific context. The results are based on cross-sectional data, which may introduce preferences or inaccuracies in terms of geographical conditions. The model indicates that Instructor Involvement and Time Management positively influence student engagement, while peer interaction doesn't, both of which positively impact academic performance. Other factors like individual differences, teaching methods and external factors are not extensively explored. The effectiveness of gamification can be influenced by context-specific factors, which are not comprehensively considered in this study. Future research should include longitudinal investigations, diverse samples, objective measures, multifactorial analyses, comparative analyses, qualitative investigations, external validity, advanced analytics, optimal conditions and intervention studies. By addressing these limitations, scholars and practitioners can advance our understanding of gamification's impact on education and refine its implementation for the benefit of students and educational institutions.

13. Discussion and conclusion

This study provides valuable insights into gamified educational environments, highlighting factors that influence student engagement and performance. The findings support the hypotheses that Instructor Involvement and Time Management have a positive influence on Student Engagement, which in turn has a positive impact on Student Performance.

The results emphasize the important role of instructors in facilitating engaging learning experiences and the significance of effective time management skills for students participating in gamified activities.

Interestingly, the study found no significant influence of Peer Interaction on Student Engagement, which challenges assumptions about the role of peer collaboration in gamified learning environments. This unexpected result calls for further research to explore the dynamics of peer interactions within the context of gamification and to identify factors that may mediate or moderate these relationships.

References

- Alsadoon, E., Alkhawajah, A. and Suhaim, A.B. (2022), "Effects of a gamified learning environment on students' achievement, motivations, and satisfaction", *Heliyon*, Vol. 8 No. 8, e10249, doi: 10.1016/j.heliyon.2022.e10249.
- Alsawaier, R. (2017), "The effect of gamification on motivation and engagement", *International Journal of Information and Learning Technology*, Vol. 35 No. 1, pp. 56-79, doi: 10.1108/IJILT-02-2017-0009.
- Alsubhi, M.A., Sahari, N. and Wook, T.T. (2020), "A conceptual engagement framework for gamified e-learning platform activities", *International Journal of Emerging Technologies in Learning (IJET)*, Vol. 15 No. 22, pp. 4-23, doi: 10.3991/ijet.v15i22.15443.
- Alsubhi, M.A., Ashaari, N.S. and Wook, T.S.M.T. (2021), "Design and evaluation of an engagement framework for e-learning gamification", *International Journal of Advanced Computer Science and Applications*, Vol. 12 No. 9, pp. 411-417, doi: 10.14569/ijacsa.2021.0120947.
- Arufe Giráldez, V., Sanmiguel-Rodríguez, A., Ramos Álvarez, O. and Navarro-Patón, R. (2022), "Can gamification influence the academic performance of students?", *Sustainability*, Vol. 14 No. 9, p. 5115, doi: 10.3390/su14095115.
- Camacho-Sánchez, R., Manzano-León, A., Rodríguez-Ferrer, J.M., Serna, J. and Lavega-Burgués, P. (2023), "Game-based learning and gamification in physical education: a systematic review", *Education Sciences*, Vol. 13 No. 2, p. 183, doi: 10.3390/educsci13020183.
- Chans, G.M. and Portuguese Castro, M. (2021), "Gamification as a strategy to increase motivation and engagement in higher education chemistry students", *Computers*, Vol. 10 No. 10, p. 132, doi: 10.3390/computers10100132.
- Dicheva, D., Dichev, C., Agre, G. and Angelova, G. (2015), "Gamification in education: a systematic mapping study", *Educational Technology and Society*, Vol. 18 No. 3, pp. 75-88.
- Duggal, K., Gupta, L.R. and Singh, P. (2021), "Gamification and machine learning inspired approach for classroom engagement and learning", *Mathematical Problems in Engineering*, Vol. 2021, pp. 1-18, doi: 10.1155/2021/9922775.
- Eltahir, M.E., Alsalhi, N.R., Al-Qatawneh, S., AlQudah, H.A. and Jaradat, M. (2021), "The impact of game-based learning (GBL) on students' motivation, engagement, and academic performance in an Arabic language grammar course in higher education", *Education and Information Technologies*, Vol. 26 No. 3, pp. 3251-3278, doi: 10.1007/s10639-020-10396-w.
- Errol Scott Rivera and Claire Louise Palmer Garden (2021), "Gamification for student engagement: a framework", *Journal of Further and Higher Education*, Vol. 45 No. 7, pp. 999-1012, doi: 10.1080/0309877X.2021.1875201.

- Fornell, C. and Larcker, D.F. (1981), "Evaluating structural equation models with unobservable variables and measurement error", *Journal of Marketing Research*, Vol. 18 No. 1, pp. 39-50, doi: 10.2307/3151312.
- García-López, I.M., Acosta-Gonzaga, E. and Ruiz-Ledesma, E.F. (2023), "Investigating the impact of gamification on student motivation, engagement, and performance", *Education Sciences*, Vol. 13 No. 8, p. 813, doi: 10.3390/educsci13080813.
- Hamari, J., Koivisto, J. and Sarsa, H. (2014), "Does gamification work? A literature review of empirical studies on gamification", *2014 47th Hawaii International Conference on System Sciences*, IEEE, pp. 3025-3034.
- Hartt, M., Hosseini, H. and Mostafapour, M. (2020), "Game on: exploring the effectiveness of game-based learning", *Planning Practice and Research*, Vol. 35 No. 5, pp. 589-604, doi: 10.1080/02697459.2020.1778859.
- Hassan, M.A., Habiba, U., Majeed, F. and Shoaib, M. (2021), "Adaptive gamification in e-learning based on students' learning styles", *Interactive Learning Environments*, Vol. 29 No. 4, pp. 545-565, doi: 10.1080/10494820.2019.1588745.
- Huang, R., Ritzhaupt, A.D., Sommer, M., Zhu, J., Stephen, A., Valle, N., Hampton, J. and Li, J. (2020), "The impact of gamification in educational settings on student learning outcomes: a meta-analysis", *Educational Technology Research and Development*, Vol. 68 No. 4, pp. 1875-1901, doi: 10.1007/s11423-020-09807-z.
- Kang, S.P. and Recard, M. (2023), "Investigating the implementation of gamification approach to enhance students learning engagement", *Journey: Journal of English Language and Pedagogy*, Vol. 6 No. 2, pp. 295-307, doi: 10.33503/journey.v6i2.2846.
- Kim, S., Song, K., Lockee, B. and Burton, J. (2018), "What is gamification in learning and education?", in *Gamification in Learning and Education*, Springer, Cham, pp. 25-38.
- Landers, R.N., Bauer, K.N., Callan, R.C. and Armstrong, M.B. (2017), "Psychological theory and gamification: the role of rewards, motivation, and engagement", in *Gamification in Education and Business*, Springer, Cham, pp. 21-46.
- Lavoué, E., Ju, Q., Hallifax, S. and Serna, A. (2021), "Analyzing the relationships between learners' motivation and observable engaged behaviors in a gamified learning environment", *International Journal of Human-Computer Studies*, Vol. 154, 102670, doi: 10.1016/j.ijhcs.2021.102670.
- Leitão, R., Maguire, M., Turner, S., Arenas, F. and Guimarães, L. (2022), "Ocean literacy gamified: a systematic evaluation of the effect of game elements on students' learning experience", *Environmental Education Research*, Vol. 28 No. 2, pp. 276-294, doi: 10.1080/13504622.2021.1986469.
- Luo, Z. (2022), "Gamification for educational purposes: what are the factors contributing to varied effectiveness?", *Education and Information Technologies*, Vol. 27 No. 1, pp. 891-915.
- Ng, L.K. and Lo, C.K. (2022), "Online flipped and gamification classroom: risks and opportunities for the academic achievement of adult sustainable learning during COVID-19 pandemic", *Sustainability*, Vol. 14 No. 19, 12396.
- Nguyen-Viet, B. and Nguyen-Viet, B. (2023), "Enhancing satisfaction among Vietnamese students through gamification: the mediating role of engagement and learning effectiveness", *Cogent Education*, Vol. 10 No. 2, 2265276, doi: 10.1080/2331186x.2023.2265276.
- Nicholson, S. (2015), "A recipe for meaningful gamification", in *Gamification in Education and Business*, Springer, Cham, pp. 1-20.
- Qiao, S., Yeung, S.S.S., Zainuddin, Z., Ng, D.T.K. and Chu, S.K.W. (2023), "Examining the effects of mixed and non-digital gamification on students' learning performance, cognitive engagement, and course satisfaction", *British Journal of Educational Technology*, Vol. 54 No. 1, pp. 394-413, doi: 10.1111/bjet.13249.

-
- Rapp, A., Hopfgartner, F., Hamari, J., Linehan, C. and Cena, F. (2019), "Strengthening gamification studies: current trends and future opportunities of gamification research", *International Journal of Human-Computer Studies*, Vol. 127, pp. 1-6, doi: 10.1016/j.ijhcs.2018.11.007.
- Rincon-Flores, E.G. and Santos-Guevara, B.N. (2021), "Gamification during Covid-19: promoting active learning and motivation in higher education", *Australasian Journal of Educational Technology*, Vol. 37 No. 5, pp. 43-60, doi: 10.14742/ajet.7157.
- Seaborn, K. and Fels, D.I. (2015), "Gamification in theory and action: a survey", *International Journal of Human-Computer Studies*, Vol. 74, pp. 14-31, doi: 10.1016/j.ijhcs.2014.09.006.
- Tan, M. and Hew, K.F. (2016), "Incorporating meaningful gamification in a blended learning research methods class: examining student learning, engagement, and affective outcomes", *Australasian Journal of Educational Technology*, Vol. 32 No. 5, doi: 10.14742/ajet.2232.

Further reading

- Alsawaier, R.S. (2018), "The effect of gamification on motivation and engagement", *International Journal of Information and Learning Technology*, Vol. 35 No. 1, pp. 56-79, doi: 10.1108/IJILT-02-2017-0009.
- Dicheva, D. and Dichev, C. (2015), "Gamification in education: where are we in 2015?", in *E-Learn: World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education*, Association for the Advancement of Computing in Education (AACE), pp. 1445-1454.
- Sanchez, D.R., Langer, M., Kaur, R. (2020), "Gamification in the classroom: examining the impact of gamified quizzes on student learning", *Computers and Education*, Vol. 144, 103666, ISSN 0360-1315, doi: 10.1016/j.compedu.2019.103666, available at: <https://www.sciencedirect.com/science/article/pii/S0360131519302192>
- Siu, O.L., Bakker, A.B. and Jiang, X. (2014), "Psychological capital among university students: relationships with study engagement and intrinsic motivation", *Journal of Happiness Studies*, Vol. 15 No. 4, pp. 979-994, doi: 10.1007/s10902-013-9459-2.
- Taşkın, N. and Çakmak, E.K. (2023), "Effects of gamification on behavioral and cognitive engagement of students in the online learning environment", *International Journal of Human-Computer Interaction*, Vol. 39 No. 17, pp. 3334-3345, doi: 10.1080/10447318.2022.2096190.

Corresponding author

R. Naveen Kumar can be contacted at: naveen.austin@gmail.com

The current issue and full text archive of this journal is available on Emerald Insight at:
<https://www.emerald.com/insight/2279-0187.htm>

MANM
21,1

A quantitative analysis of cosmeceuticals: business service quality and client satisfaction

Mariah C. Bond

School of Advanced Studies, University of Phoenix, Phoenix, Arizona, USA

54

Received 14 January 2024
Revised 31 March 2024
Accepted 14 April 2024

Abstract

Purpose – The purpose of the quantitative correlational research study was to determine the relationship, if any, between the predictor variable, cosmeceutical business service quality, and the outcome variable, cosmeceutical client satisfaction, in the southeast region of the United States of America. Cosmeceuticals were cosmetics and medications administered by estheticians.

Design/methodology/approach – Literature on business service quality and client satisfaction theories was synthesized after extensive review. Quantitative research data were collected and statistically analyzed on the following subscales of consumer satisfaction: general satisfaction, technical quality, interpersonal manner, communication, financial aspects, time spent with professionals and accessibility/convenience. The hypotheses addressed the research question (RQ) of whether cosmeceutical business service quality affects client satisfaction. The Cosmeceutical Client Satisfaction Questionnaire 18 (CCSQ-18), a web-based research instrument, had strong reliability with a Cronbach's alpha of 0.84. The target population ($N = 50$) included randomly selected female cosmeceutical consumers in the southeast region of the United States of America. The researcher did not digress from the detailed research protocol, instrumentation, data collection or data analyses. Through the Likelihood Ratio (LR) chi-squared statistic $(18) = 65.35$ and its associated probability, $\text{Prob} > \text{chi-squared} = 0.000$, the researcher determined the predictor variable cohesively has a statistically significant effect on the outcome variable.

Findings – Research results concluded that a significant relationship exists between cosmeceutical business service quality and cosmeceutical client satisfaction in the southeast region of the United States of America.

Originality/value – The findings detailed in the results complimented the argument that, generally, business service quality is important to consider, because good business is based on client satisfaction.

Keywords Cosmeceuticals, Customer satisfaction, Business service quality, Quantitative research, Popular culture, Beauty industry

Paper type Research paper

1. Introduction

Growth in cosmeceutical sales and demand within the past ten years is associated with the change in the popular beauty culture (Laham, 2020; Lee, 2016). Clients believe the cosmeceutical services consumed would help increase self-image in comparison to popular beauty standards (Laham, 2020). A continued success of esthetic businesses is contingent to the business service quality of administering and facilitating the clients' needs (Kumar and Reinartz, 2018). There is little guarantee any degree of the cosmeceutical business service quality results in beauty consumer satisfaction (Laham, 2020). Globalization, brand awareness, an increase in popular culture media exposure and the classic adage for American women to look good and feel good has help fuel the rapidly growing cosmetic market (Laham, 2020).

JEL Classification — M00; M35

© Mariah C. Bond. Published in *Management Matters*. Published by Emerald Publishing Limited. This article is published under the Creative Commons Attribution (CC BY 4.0) licence. Anyone may reproduce, distribute, translate and create derivative works of this article (for both commercial and non-commercial purposes), subject to full attribution to the original publication and authors. The full terms of this licence may be seen at <http://creativecommons.org/licenses/by/4.0/legalcode>



The global cosmeceuticals market size is projected to grow from \$83.60 billion in 2023 to \$155.80 billion by 2030 (McMullen and Dell'Acqua, 2023). The American Academy of Facial Plastic and Reconstructive Surgery (AAFPRS), the largest association of facial cosmetic surgeons in the world, found 80% of all treatments performed by cosmetic professionals in 2022 were non-surgical procedures, predicting the cosmeceutical sector growing at a rate almost double in comparison to the rest of the beauty industry (McMullen and Dell'Acqua, 2023; Shehan *et al.*, 2023). Cosmeceuticals are cosmetic formulations containing bioactive ingredients known for their medical benefits. Cosmeceuticals, a combination of cosmetic products and pharmaceuticals like Botox injections, anti-aging lotions and collagen creams are generally more invasive than traditional cosmetics and must be professionally administered through the service of a cosmeceutical business (Lee, 2016). Cosmeceutical businesses are commonly known in the United States as an esthetic center or medical spa (medi-spa; Laham, 2020).

There are known health and medical benefits, as well as an increase in satisfactory appearance and self-image perceptions, from the consumption of cosmeceuticals (Laham, 2020). Client satisfaction ensures business profits and relates to client perceptions of the business service quality (Olsen *et al.*, 2014). A basic marketing practice for any business to increase profits is to increase business sales. An increase in sales can be achieved through favorable client satisfaction, therefore, the primary desire of the cosmeceutical business is to maximize business profits through client satisfaction (Lee, 2016). Business and research administrators alike have great concern in the continuous assessment of client satisfaction (Lee, 2016). There is a dearth of literature on consumer satisfaction; however, little research exists on the client satisfaction of cosmeceutical businesses (McMullen and Dell'Acqua, 2023). The researcher examined if a relationship exists between cosmeceutical business service quality and client satisfaction, because identifying the relationship between business service quality, regarding client satisfaction, is imperative for cosmeceutical businesses to remain competitive and achieve business success.

1.1 Background of the literature

Client satisfaction is not a novel business concept, although the notion has often been overlooked (Baumann, 2014). During the 1950s development of the marketing era, clients became the focus of businesses (Olsen *et al.*, 2014). The concept of client satisfaction was introduced as a marketing concept of business by Cardozo in 1965 (Ok *et al.*, 2018). In the United States, the cosmeceutical business market has increased in consumer consumption and has undergone enormous market growth in value since the early 1990s (Baumann, 2014; Bellad *et al.*, 2017). Continuing well into the 2000s, cosmeceutical businesses mainly attracted clients with the desire to purchase products such as anti-aging creams, hair removals and facial cleansers (Kumar and Reinartz, 2018; Lee, 2016; Pandey and Sonthalia, 2019).

Since 2010, the growth in the United States population has increased the number of women over the age of 40 (Cox *et al.*, 2016). Cosmetic enhancements to obtain a more youthful appearance have become increasingly common in current popular culture and have overcome the barriers of being taboo (Monteverde, 2016; Pandey and Sonthalia, 2019). Public figures, such as Kimberly Kardashian and her notoriously famous family, who as a family have earned a combined net worth of over two billion dollars from branded sales of cosmetic and beauty products alone, have set the beauty standards of popular culture. With audiences reaching over 2 million viewers for over 230 episodes, the glamorous family openly showcases beauty on the highly viewed reality television series *Keeping Up with the Kardashians* (Monteverde, 2016; Wissinger, 2016). Each member of the Kardashian family is candidly open about personal cosmetic enhancements and the consumption of cosmeceutical products and services.

Beauty consumers have found satisfaction in the trend of looking like a Kardashian, hence the popular moniker, keeping up (Monteverde, 2016; Pandey and Sonthalia, 2019). Cosmeceutical businesses employ a widely accepted popular culture beauty standard. Through comparisons with other women, an esthetic business may use a woman's anxiety over her appearance to market clients, boosting business sales and enhancing business profits (Bellad *et al.*, 2017; Griva *et al.*, 2018; Wirtz and Ehret, 2017). Cosmeceutical businesses may attract consumers who expect the cosmeceutical service would help better align one's self-image with popular beauty standards (Milam and Rieder, 2016). The quality of service provided by a business and the level of satisfaction with business service quality can become the leading factor in a business' success.

A focus on cosmeceutical client satisfaction requires a review of business service quality (Bansal and Taylor, 2015). Business service quality is important to consider because to facilitate good business, clients must be satisfied with the business service quality received (Lang *et al.*, 2023). The costly nature of cosmeceutical business service quality places high emphasis on client satisfaction, leading to successful business. Marketers contend client satisfaction is the most valuable tool a business can employ to drive an increase in sales and profits (Lang *et al.*, 2023; Peppers and Rogers, 2016). In business, the client is the most important resource related to business performance.

For a cosmeceutical business, every business service is centered on the client (Lun *et al.*, 2016). A cosmeceutical client feels satisfied when the esthetic business' service quality meets predefined expectations (Sivakumar *et al.*, 2018). In business, the client is dissatisfied when the service quality is lower than expected, whereas the client is satisfied when the service quality is higher than expected (Sivakumar *et al.*, 2018). Client satisfaction is a strong marketing tool and value-added benefit for a business, often seen by clients as just as important as the business products and services sold (Gupta *et al.*, 2022; Lun *et al.*, 2016). Exceptional service quality is a key component of the cosmeceutical business and may even be ultimately responsible for business survival and success (Kasiri *et al.*, 2017).

The value of clients in the business realm emerged in the 1980s. It is important to continuously research the clients' satisfaction before, during and after consumption, because variable business service qualities have remained prevalent (Kitapci *et al.*, 2014). As discovered in the literature, businesses consistent with client satisfaction display greater business profits and accomplishments (Arslanagic-Kalajdzic and Zabkar, 2017; Griva *et al.*, 2018; Gupta *et al.*, 2022). Businesses satisfy clients to maintain client relationships, increase sales and ensure productivity. Client satisfaction as a concept has been extensively researched, as the success of any business is greatly dependent on the satisfaction level of the business' clients (Baumann, 2014; Ok *et al.*, 2018).

Client satisfaction has been researched in various ways, from a standard of measure to a correlation with other business processes (Olsen *et al.*, 2014). Business research has led to probable methods of determining client satisfaction, with business service quality as the lead determinant (Oliver, 1980; Parasuraman *et al.*, 1985). Client satisfaction is largely based on the level of service quality of the business (Baumann, 2014; Galib and Paymaei, 2022; Kasiri *et al.*, 2017). As evidence businesses are still discovering the facets of client satisfaction, research is steadily being conducted in the field. To create satisfaction in clients, cosmeceutical businesses need to conduct research to answer questions on how clients perceive business service quality, before, during and after consumption (Bellad *et al.*, 2017; Gupta *et al.*, 2022; Lee, 2016).

1.2 Purpose

A prosperous 108 million cosmeceutical client base throughout the United States exists (Feetham *et al.*, 2018). A financial and performance of over \$28 billion is at risk if

cosmeceutical business service quality does not result in cosmeceutical client satisfaction (Feetham *et al.*, 2018; Meng and Pan, 2012). Little research focuses on the relationship between cosmeceutical business service quality and cosmeceutical client satisfaction (Lee, 2016). The problem is there is limited empirical evidence on what relationship, if any, exists between cosmeceutical business service quality and cosmeceutical client satisfaction in the Southeast Region of the United States. Specifically, there is a gap in the literature on the relationship of cosmeceutical business service quality and cosmeceutical client satisfaction (Olsen *et al.*, 2014).

The lack of empirical knowledge is an indication there is a considerable need for additional research on the topic to establish the relationship between cosmeceutical business service quality and cosmeceutical client satisfaction (Black, 2005; Lee, 2016). Client expectations determine the level of satisfaction. For favorable satisfaction to be achieved, the cosmeceutical client expectations with business service quality must remain consistent with the service quality delivered by the cosmeceutical business (Baumann, 2014). Client satisfaction with business service quality is the most important part of a business' challenge in building lasting consumer relationships (Baumann, 2014; Peppers and Rogers, 2016). To remain lucrative in the beauty market, cosmeceutical business service quality must facilitate the integration of cosmeceutical client satisfaction and expectations (Laham, 2020).

The purpose of the quantitative research study was to determine what relationship, if any, exists between the predictor variable, cosmeceutical business service quality, and the outcome variable, cosmeceutical client satisfaction, in the Southeast Region of the United States. Research participants included female cosmeceutical consumers over the age of 18 in the Southeast Region of the United States. Cosmeceutical clients' responses to the Cosmeceutical Client Satisfaction Questionnaire 18 (CCSQ-18) concerning the satisfaction with cosmeceutical business service quality were used to determine results of the research. The hypotheses and research questions (RQs) were the focus of the entire cosmeceutical research study. As a RQ construct, the research study sought to determine what relationship, if any, exists between cosmeceutical business service quality and cosmeceutical client satisfaction. For the research study, correlative hypotheses were tested to determine what relationship, if any, exists between cosmeceutical business service quality and cosmeceutical client satisfaction in the Southeast Region of the United States. The hypothesis and RQ became the focus of the cosmeceutical research study.

2. Methodology and design

The research study used the quantitative methodology with a correlational research design. Quantitative research encompasses significant issues where research aims to establish an understanding of the assumptions identified in a given research study, a phase of hypothesis formulation and discipline during the development of the research design (Black, 2005; Burns *et al.*, 2014; Vogt, 2007). To determine what relationship, if any, exists between cosmeceutical business service quality and cosmeceutical client satisfaction was the objective of the quantitative correlational research study. A quantitative analysis was appropriate because the research is led by theory that describes models, study instruments and approaches to the topics of research, including descriptive data for demographics, sample size and tests for data normality (Black, 2005; Vogt, 2007). In quantitative method designs, the hypothesis analysis frames the study and the development of the RQs, which gives the researcher more control over the study (Black, 2005; Burns *et al.*, 2014).

Correlational research designs aim to identify a relationship between sets of variables (Black, 2005; Vogt, 2007). Using technological resources, the relationship is computable (Black, 2005; Konerding, 2016; Vogt, 2007). The quantitative correlational research included a research instrument that enabled the study to benefit from the method design with an

efficient use of statistics for data analysis (Black, 2005; Vogt, 2007). If a significant relationship existed, the researcher could then determine the strength and direction of the relationship (Sekaran and Bougie, 2016). Quantitative research with a correlational design was the most suitable method to determine what relationship, if any, exists between the variables, because it gives the researcher the opportunity to make deductions from the data (Black, 2005; Vogt, 2007; Vogt *et al.*, 2014).

The use of an appropriate research method was based on the objective and approach of the research study and the evaluation of the strengths and weaknesses of each method (Black, 2005; Burns *et al.*, 2014; Vogt, 2007). Although a correlational research design was the optimal choice for determining the relationship of the variables of the research study, other research designs such as descriptive research, quasi-experimental research and experimental research were also considered (Black, 2005; Vogt, 2007). Descriptive research design's data collection is observational in nature and not an ideal choice because the researcher's bias may negate the data's validity (Black, 2005; Vogt *et al.*, 2014). A quasi-experimental research design would not be beneficial because quasi-experimental research design is used to determine the cause-effect relationship between research variables (Black, 2005; Vogt, 2007; Vogt *et al.*, 2014). Experimental research would not be valuable because the design seeks to determine the cause and effect or manipulate variables (Black, 2005; Vogt, 2007; Vogt *et al.*, 2014).

The survey instrument was the Patient Satisfaction Questionnaire 18 (PSQ-18) in a distinctive Likert format, choices denoted the degree of agreement each participant had on the inquiry to assess client opinion of each item (Meng and Pan, 2012). The researcher obtained permissions to use the PSQ-18, scoring tables and other instrumental figures, both electronically and in print, as evidenced in the License for PSQ-18 Usage. Text used in the PSQ-18 was altered to specify the specific business service setting of research interest without losing any psychometric tested properties or strength (Marshall and Hays, 1994; Rand Corporation, 2019). The research questionnaire, the Cosmeceutical CCSQ-18, is an adaptation of the PSQ-18 with the text altered only for specification of the research. Along with the survey questions, the CCSQ-18 presented demographic questions (categorical variables) for age, income and racial identity.

Data collection for the study was administered online through SurveyMonkey™ as the survey instrument to examine the cosmeceutical client satisfaction for cosmeceutical business services received. The researcher used SurveyMonkey™, a self-service secured online interface for users to input, create, deploy and analyze surveys, to input the CCSQ-18 survey instrument with licensed permission for the quantitative research study. Data analysis was completed using version 26 of the statistical testing software by IBM known as the Statistical Package for the Social Sciences (SPSS; Black, 2005; Burns *et al.*, 2014). A correlational Point biserial model two-tail test was used to help the researcher reject or approve the hypothesis in 95% reliability level (Marshall and Hays, 1994; Rand Corporation, 2019; Vogt, 2007). A 5% error and effect size of 0.50 was used in the research study (Black, 2005; Marshall and Hays, 1994; Rand Corporation, 2019; Vogt, 2007; Vogt *et al.*, 2014).

The quantitative correlational research study focused on business service quality and consumer satisfaction. The theoretical basis for the research study is presented in the framework. The hypotheses addressed the RQ of whether cosmeceutical company service quality affects client satisfaction. Quantitative research data collected was statistically analyzed against the following subscales of consumer satisfaction: general satisfaction, technical quality, interpersonal manner, communication, financial aspects, time spent with professionals and accessibility/convenience. The CCSQ-18, a web-based research instrument, had strong reliability with a Cronbach's alpha of 0.84. The target population ($N = 50$) included randomly selected female cosmeceutical consumers in the Southeast Region of the United States.

2.1 Methodology literature

A fundamental step of research a researcher faces is deciding between quantitative or qualitative research methods. The choice is based on the decision of which data collection method would answer the RQ (Black, 2005; Dzwigol, 2020; Vogt, 2007). In the Likert survey design of a quantitative effort, options are offered for each question or statement (Joshi *et al.*, 2015). The presented options represent the degree of agreement a research participant has on each item of inquiry. The Likert design format allows participants to openly respond (Joshi *et al.*, 2015). With the efficient use of statistics for data analysis, the research instrument enables the study to benefit from the quantitative method design.

In the quantitative method, the researcher is given more control over the study, and the opportunity to make more deductions from the data collected (Black, 2005; Burns *et al.*, 2014; Gupta *et al.*, 2022; Sekaran and Bougie, 2016). The quantitative method is best for the exploration of perceptions to provide further insight into cosmeceutical client satisfaction (Black, 2005; Burns *et al.*, 2014; Vogt, 2007). The assessment of cosmeceutical business services and client satisfaction provides an opportunity for quantitative method research to help determine whether a relationship exists between cosmeceutical business service quality and client satisfaction (Black, 2005; Vogt, 2007). Quantitative research involves the use of computational, statistical and mathematical tools to derive results (Dzwigol, 2020). Using a questionnaire as the research instrument, the study can benefit from the quantitative method with a correlational design (Black, 2005; Marshall and Hays, 1994; Vogt, 2007).

Quantitative data is associated with functioning in the deductive research approach against a hypothesis to be tested (Black, 2005; Burns *et al.*, 2014; Vogt, 2007). Quantitative methods focus on a statistical assessment of numerical and scientific data to establish relationships that may exist between variables (Black, 2005; Dzwigol, 2020; Oliver, 2014). Sarstedt *et al.* (2022) posited that although quantitative data is focused on statistical components, business research benefits significantly from the data and statistics discovered. Sarstedt *et al.* (2022), described quantitative as being used principally to describe all parts of the data collection process. The research instrument in a true Likert format, the PSQ-18, was tested and proven to be strong in reliability and validity (Marshall and Hays, 1994; Sarstedt *et al.*, 2022; Valdes *et al.*, 2021).

Valdes *et al.* (2021) conducted a review of periodical articles to determine whether careful consideration of measurement goals can be encompassed using the PSQ-18. A systematic review of 28 patient satisfaction scales by researchers Miglietta *et al.* (2018) determined the selection of the most appropriate scale is dependent upon the purpose of the research, the setting of the research, the scope of the research and the allotted time for the research. In quantitative research conducted by Ng and Luk (2019) satisfaction surveys were administered to patients to determine satisfaction with quality and to pinpoint possible opportunities for quality improvement. The researchers determined the instrument to have great reliability and validity to precisely function in the collection of the patient's feedback on service quality (Ng and Luk, 2019). The PSQ-18 has been selected to assess client satisfaction in various settings, but no study has assessed cosmeceutical client satisfaction.

Merk and Michel's (2019) study, "How to measure satisfaction with the service quality of luxury beauty salons," used a quantitative non-experimental descriptive-correlational design to measure service quality and customer satisfaction. The study used primary data from respondents at six beauty salons, with each salon having a quota of 50 customers to rate. The study employed a convenient sampling technique and mean (μ_x) to measure the level of service quality and customer satisfaction. The purpose of the study was to identify the determinants of client satisfaction and the characteristics of service quality favored by luxury salon clients (Ajitha and Sivakumar, 2017). When factor analysis was executed on sixteen variables, the researcher determined four preferred service quality characteristics

based on customer support, service, relations and communication (Herhausen *et al.*, 2019). Responsiveness was found to be most influential concerning client satisfaction in comparison with other characteristics (Mori and Lee, 2019). A significant relationship between luxury salon service quality and client satisfaction was determined. The luxury salon services were assessed, which differs from the business service quality in the administration of cosmeceutical products.

Even though the general topic was an area of research like Merk and Michel's (2019) study, different aspects and variables within the domain of cosmeceutical business service quality were assessed. A focus on different geographic regions, customer demographics and specific components of business service quality led to additional constructs. A variation in the correlational research design and statistical analyses used helped to contribute to the existing literature. The current research incorporated variables to offer an avenue for exploring the intricate dynamics shaping customer perceptions and experiences within the cosmeceutical industry. Differences in industry trends between luxury beauty salons and the cosmeceutical industry, regulatory environments of each, basic consumer preferences and the competitive landscape emphasized the insights of the findings and indications of the current research.

Correlational research involves the determination of the degree of association between quantitative research variables. In correlational research, variables are not manipulated or controlled like variables are in an experimental design (Bell *et al.*, 2018). The most appropriate methodology to describe and measure the degree of association between cosmeceutical business service quality (the predictor variable) and cosmeceutical client satisfaction (the outcome variable) was a quantitative, correlational design.

Correlational designs search for relationships between variables (Vogt *et al.*, 2014). If a relationship exists, the researcher can gather data about the strength and direction of the relationship (Black, 2005; Burns *et al.*, 2014; Vogt, 2007). With evidence of a significant correlation between variables, some statistical inferences can be made to provide answers to the RQ and test the hypotheses (Bell *et al.*, 2018; Vogt *et al.*, 2014). Results also produced descriptive data for demographics and sample size, tests for data normality and independent *t*-tests (Jeon, 2015; Levine *et al.*, 2017). The statistical tests were used to determine what relationship, if any, exists between cosmeceutical business service quality and client satisfaction.

Studies based on a correlational design uses variables the researcher is unable to control. Even though the variables are not manipulated as in an experimental design, a correlational research study is a chance to recognize the relationship among the research variables (Jeon, 2015; Levine *et al.*, 2017). In correlational research, the research concepts are defined in terms of the variables. The correlation statistic is used to describe or measure the relationship between two or more variables or sets of scores (Black, 2005; Jeon, 2015; Levine *et al.*, 2017; Vogt, 2007). The research studied the relationship between cosmeceutical business service quality (i.e. the predictor variable) and cosmeceutical client satisfaction (i.e. the outcome variable) while incorporating an understanding of theory.

Quantitative research using a correlation design involves statistical measurement instead of an experimental manipulation of variables (Black, 2005; Jeon, 2015; Vogt, 2007). A correlational design allows the researcher to identify relationships or predictive relationships which may exist between the variables (Jeon, 2015; Levine *et al.*, 2017). The goal of the presented correlational research was to determine the relationship, if any, existing between cosmeceutical business service quality and cosmeceutical client satisfaction (Jeon, 2015; Levine *et al.*, 2017). In the research study, a primary objective included examining and evaluating the variables in the research to determine what relationship, if any, exists between cosmeceutical business service quality and cosmeceutical client satisfaction in the Southeast Region of the United States.

2.2 Theoretical framework

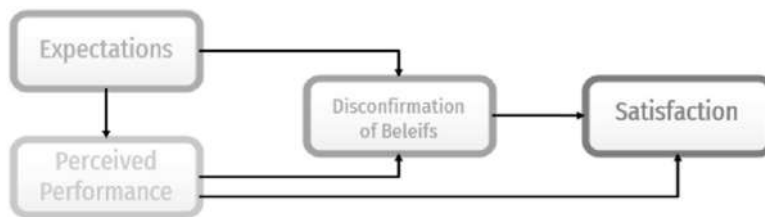
The theoretical basis for the research study was the expectancy disconfirmation theory (EDT) of satisfaction (Oliver, 1980; Oliver, 2014; Williams, 2015). The EDT, developed by Oliver (1980), served as the underpinning theory in examining the constructs of customer or client satisfaction. One of the most accepted theories of client satisfaction is the EDT (Oliver, 1980; Williams, 2015). EDT considers client satisfaction as an outcome of the gap between the client’s expected and perceived business service quality performance (Arslanagic Kalajdzic and Zabkar, 2017; Oliver, 1980). Applying the theory to the present research study aided in understanding the relationship, if any, between cosmeceutical business service quality and cosmeceutical client satisfaction for clients in the Southeast Region of the United States because the constructs of business service quality were assessed for client satisfaction (Bellad *et al.*, 2017; Lee, 2016).

High-quality service can lead to high levels of client satisfaction, which in turn facilitates an increase in business sales and performance (Kumar and Reinartz, 2018). The EDT of satisfaction is based on the needs and wants of business clients (Oliver, 2014; Williams, 2015). According to the interpretations of business researchers, client satisfaction is a sense occurring after the client evaluates what was expected to what was received from a product or service. Client satisfaction occurs when the client assesses whether the business service has met perceived needs and expectations (Olsen *et al.*, 2014; Parasuraman *et al.*, 1985). Business clients perceive service quality as favorable when expectations are met or exceeded (Olsen *et al.*, 2014; Parasuraman *et al.*, 1991). As displayed in Figure 1, Oliver (2014) believed a consumer will only choose a product or service expected to provide the most satisfaction with the consumer experience.

To better understand the relationship between cosmeceutical business service quality and cosmeceutical client satisfaction, the relationship between the constructs in the research study was explained by using the Oliver (1980) satisfaction and service quality model. Oliver (1980) defined the difference between pre-consumption and post-consumption expectations and pre-consumption and post-consumption observed performance as disconfirmation. A positive disconfirmation is the result of the client’s observed business service performance exceeding pre-consumption expectations (Oliver, 1980; Oliver, 2014; Parasuraman *et al.*, 1991). In contrast, a negative disconfirmation is the result of the observed business service performance failing to meet 16 pre-consumption expectations. Theoretically, in a cohesive manner, expectation and disconfirmation conjointly produce a measure of client satisfaction.

2.3 Research questions/hypotheses

As the fundamental principle of a research study, the RQ framed the study, determined the methodology and defined all phases of analysis and reporting (Black, 2005; Vogt, 2007). As a RQ construct, the study sought to determine the relationship, if any, between cosmeceutical



Note(s): Illustration depicting customer satisfaction as a comparison of expectations to experience
Source(s): Oliver (2014)

Figure 1.
Simplified expectation disconfirmation model

business service quality and cosmeceutical client satisfaction. A cross-sectional questionnaire was administered to women in the Southeast Region of the United States to address the following RQ.

RQ. What relationship, if any, exists between cosmeceutical business service quality and cosmeceutical client satisfaction in the Southeast Region of the United States?

For the research study, correlative hypotheses were tested to determine the relationship, if any, between cosmeceutical business service quality and cosmeceutical client satisfaction in the Southeast Region of the United States (Black, 2005; Burns *et al.*, 2014; Vogt, 2007).

The research study tested the following null hypothesis.

H0. There is no significant relationship between cosmeceutical business service quality and cosmeceutical client satisfaction in the Southeast Region of the United States.

The alternative hypothesis is:

H1. There is a significant relationship between cosmeceutical business service quality and cosmeceutical client satisfaction in the Southeast Region of the United States.

For the research study, the variables were defined as.

Variable 1. The predictor variable, cosmeceutical business service quality, was categorized as prepaid beauty services and represented the integrated working of the ten service quality determinants.

Variable 2. The outcome variable, cosmeceutical client satisfaction, was measured by the PSQ-18 and represented the cosmeceutical client's satisfaction with cosmeceutical business services received (Rand Corporation, 2019).

2.4 Data analysis

Data analysis applied the Statistical Package for the Social Sciences (SPSS) software to statistically assess what relationship, if any, exists between cosmeceutical business services quality and cosmeceutical client satisfaction. First, a correlation Point biserial model two-tail test was used at 95% reliability level and 5% error to specify the impact or non-impact of each questionnaire sub-category (Marshall and Hays, 1994; Parasuraman *et al.*, 1985; Vogt *et al.*, 2014). The two-tail test was used to help the researcher reject or approve the hypothesis in 95% reliability level, 5% error and effect size of 0.50 (Marshall and Hays, 1994; Rand Corporation, 2019; Vogt, 2007). A priori analysis was used to compute the required sample size. While the noncentrality parameter output was 3.741657, the critical *t* was 2.021075, the *df* was 40, the total sample size was 42, and the actual power was 0.954528.

The SPSS helped to determine what relationship, if any, exists between the research study's variables. In the case of the research study, the predictor variable was the cosmeceutical business service quality, and the outcome variable was cosmeceutical client satisfaction. The CCSQ-18 inquiry items were asked in a way an indication of agreement reflected satisfaction with services, while other inquiry items were asked in a way disagreement reflected dissatisfaction with services (Marshall and Hays, 1994; Rand Corporation, 2019; Vogt *et al.*, 2014). Rand Corporation (2019) explained how the PSQ-18 produces separate scores for each of seven different subscales: General Satisfaction (Items 3 and 17); Technical Quality (Items 2, 4, 6 and 14); Interpersonal Manner (Items 10 and 11); Communication (Items 1 and 13); Financial Aspects (Items 5 and 7); Time Spent with Professionals (Items 12 and 15); Accessibility and Convenience (Items 8, 9, 16 and 18) as shown in Table 1.

The conventional way to analyze a Likert scale instrument, such as the CCSQ-18, is to find the sum of each selection and determine a score for each value (Joshi *et al.*, 2015; Vogt *et al.*,

Item numbers	Original response value		Scored
1, 2, 3, 5, 6, 8, 11, 15, 18	1	→	5
	2	→	4
	3	→	3
	4	→	2
	5	→	1
4, 7, 9, 10, 12, 13, 14, 16, 17	1	→	1
	2	→	2
	3	→	3
	4	→	4
	5	→	5

Source(s): Author's own research

Table 1.
CCSQ-18 response value and item scoring

2014). Responses from each of the 18 items of the CCSQ-18 are coded 1–5 from strongly agree to strongly disagree. In the CCSQ-18, negatively worded questions are reverse scored (1 = 5, etc.) so in all cases a low score indicated satisfaction (Marshall and Hays, 1994; Rand Corporation, 2019). Determined scores represent specific traits which are used in the data analysis of the research, and the scores were useful for determining a research participant's opinion of the perceived satisfaction (Marshall and Hays, 1994; Rand Corporation, 2019; Vogt *et al.*, 2014). After item scoring, items within the same subscale were averaged together to create the seven subscale scores as shown in Tables 1 and 2, and the scores could then be analyzed and depicted on a chart of the distribution of opinions across the population (Marshall and Hays, 1994).

The descriptive statistics defined a depiction of the results to determine if a relationship exists, while inferential statistics determined the strength and direction of the relationships (Jeon, 2015; Black, 2005; Vogt, 2007; Vogt *et al.*, 2014). A correlation in the same direction is referred to as a positive correlation, meaning if one variable increases the other also increases (Jeon, 2015; Vogt, 2007). More so, when one variable decreases the other also decreases (Jeon, 2015; Vogt, 2007). In a negative correlation, the variables move in the inverse, or the opposite, direction as one variable increases, the other variable decreases (Jeon, 2015; Vogt, 2007). In an effort of more in-depth data exploration, the researcher cross-tabulated the means of contributing service quality factors (Marshall and Hays, 1994).

3. Findings

The sample consisted of 50 subjects. Of all contacts made with the CCSQ-18 survey link ($N = 59$), 59 web-based questionnaires were completed. However, 50 responses qualified for research use. The response rate for those accessing the instrument through the research

Scale	Average these items
General satisfaction	3, 17
Technical quality	2, 4, 6, 14
Interpersonal manner	10, 11
Communication	1, 13
Financial aspects	5, 7
Time spent with professional	12, 15
Accessibility and convenience	8, 9, 16, 18

Source(s): Author's own research

Table 2.
Creating the CCSQ-18 scores

recruitment link and completing the questionnaire thereafter was 83%. Respondents were required to answer qualifier questions about cosmeceutical consumption, region of residence and gender before being able to access the 18 questions of the CCSQ-18. If a respondent initially refused to provide informed consent or to participate in the research, the respondent was disqualified from participating in the research. The mean (\bar{x}) age (SD) of the sample was 49 (± 1.199) years. The difference in mean age across the states within the Southeast Region of the United States respondents was not statistically significant. Female respondents comprised 100% of the sample, with 50 respondents. 100% of respondents indicated consumption of cosmeceuticals within the past 5 years and 100% resided in the Southeast Region of the United States as shown in Table 3.

The respondent sample was from the Southeast Region of the United States; the distribution by state did not differ significantly across the region. The respondent sample was predominantly White 26 (52%). Interestingly, a significantly greater proportion of minorities chose African American 13 (26%) as ethnicity than any other ethnic groups, with Multi-racial 5 (10%), Hispanic 4 (8%), Asian 1 (2%) and Indian 1 (2%) following behind. The respondents differed in the distribution of total household income level. Respondents indicated income levels responses as 12% reporting an income of \$40,000 and under, 30%

Characteristic	N	%
<i>State of residence</i>		
South Atlantic	19	38
East South Central	15	30
West South Central	16	32
<i>Age</i>		
21 – under	0	0
22–25	0	0
26–30	12	6
31–39	12	24
40–49	18	36
50–59	11	22
60–69	2	4
70 – older	0	0
I prefer not to respond	1	2
<i>Level of income</i>		
\$40,000 – under	6	12
\$41,000–50,000	15	30
\$51,000–60,000	11	22
\$61,000–70,000	8	16
\$70,000 – above	7	14
I prefer not to respond	3	6
<i>Race/ethnicity</i>		
African American/Black	13	26
American Indian/Alaskan	1	2
Asian/Pacific Islander	1	2
Hispanic/Latino	4	8
White	26	52
Multi-racial	5	10
I prefer not to respond	0	0
Total participants	50	100

Table 3.
Demographic
characteristics of
research participants

Source(s): Author’s own research

reporting an income of \$41,000–50,000, 22% reporting an income of \$51,000–60,000, 16% reporting an income of \$61,000–70,000 and 14% reporting an income of \$71,000 and above.

An initial analysis to test the assumption that the research data is normally distributed was performed on the research data. From the data represented in the table, the researcher found the data is normally distributed. A normal distribution was determined because the absolute numbers for positive kurtosis and skewness were low. In addition, the absolute numbers for the negative skewness and kurtosis were not very high. The mean, standard deviation, skewness and kurtosis of the variables are displayed in Table 4.

As a first approach to determine the existence of a relationship between cosmeceutical business service quality and cosmeceutical client satisfaction, the estimated results of Pearson's chi-squared test were used. According to the coefficient and the level of statistical significance, the results are mostly consistent for each item. Through the results, the alternative hypothesis can be accepted for each item except for I have to pay more for my cosmeceutical services than I can afford, I have some doubts about the ability of the cosmeceutical professionals who service me and I find it hard to get an appointment for cosmeceutical services, whose level of significance is greater than 0.05. However, the test only provides valuable information in which it is determined if there is a relationship, and it is not possible to know whether this is positive or negative and the expected effect by including Pearson's chi-squared test analysis. The results presented in Table 5 compare Items 2 through 18 against Item 1 to determine the relationship.

To determine whether there is a significant relationship between cosmeceutical business service quality and cosmeceutical client satisfaction in the Southeast Region of the United States, an estimate of an ordered probit model was used to determine the influence of the categorical variables corresponding to the responses to items of the CCSQ-18. The model is expressed in the functional form:

$$y_i^* = x_i'\beta + \mu_i$$

The predictor variable y^* is the measure of the observed quality of service for each individual i . The variable x represents the matrix of the predictor variables and β as the vector of the estimated coefficients of the model. Finally, μ is presented as the error term for each individual i . According to the pseudo- R^2 of the model, it is considered that there is a good fit of the model with a 0.626 for 50 observations. Through the Likelihood Ratio (LR) chi-squared statistic (18) = 65.35 and its associated probability, Prob > chi-squared = 0.000, the researcher determined the predictor variable cohesively has a statistically significant effect on the outcome variable, which indicates the correct specification and validity of the model. In further evaluation, it was observed that Item 2 and Item 3 are not statistically significant with a p -value greater than 0.05. However, Item 4 is significant (p -value < 0.05), and the estimated coefficient indicates the existence of a negative relationship with cosmeceutical business service quality. Table 6 presents the results, which reflect different effects depending on the CCSQ-18 items. Observations reveal that Item 5 also presents a statistically significant p -value, but the variable has a positive relationship with cosmeceutical business service quality. Item 4, Item 7 and Item 14 are also negatively related to the other variables, whereas Item 17 has a positive association.

Finally, the income level of the participants was included and was determined to be statistically significant, given a p -value of less than 0.05. According to its estimated coefficient, a positive relationship with the variable is observed; that is, at a higher level of income, there is a greater probability that there is a better degree of cosmeceutical client satisfaction. Although some variables had a p -value greater than 0.05 and were not significant, it is possible to determine that the sign of each coefficient can provide an intuition of the expected effect. Nonetheless, the evidence shows that there is a positive and negative

Table 4.
Descriptive statistics of
CCSQ-18

	N	Minimum	Maximum	Mean (\bar{x})	Std. Deviation (σ_s)	Variance (s^2)	Skewness (β_1)		Kurtosis (K)	
							Statistics	Std. Error	Statistics	Std. Error
Item 1	50	1	5	4.20	0.857	0.735	-1.620	0.337	3.802	0.662
Item 2	50	2	5	3.98	0.958	0.918	-0.829	0.337	-0.068	0.662
Item 3	50	2	5	3.92	0.944	0.891	-0.745	0.337	-0.148	0.662
Item 4	50	1	5	3.64	1.083	1.174	-0.828	0.337	-0.061	0.662
Item 5	50	1	5	3.68	1.019	1.038	-0.995	0.337	0.590	0.662
Item 6	50	2	5	4.22	0.708	0.502	-1.062	0.337	2.250	0.662
Item 7	50	1	5	3.70	0.995	0.990	-0.907	0.337	0.763	0.662
Item 8	50	1	5	1.94	1.058	1.119	1.417	0.337	1.686	0.662
Item 9	50	1	5	3.76	1.021	1.043	-0.688	0.337	-0.076	0.662
Item 10	50	2	5	3.98	0.869	0.755	-0.739	0.337	0.172	0.662
Item 11	50	4	5	4.50	0.505	0.255	0.000	0.337	-2.085	0.662
Item 12	50	2	5	3.78	0.932	0.869	-0.797	0.337	-0.083	0.662
Item 13	50	2	5	4.08	0.752	0.565	-1.035	0.337	1.835	0.662
Item 14	50	1	5	3.96	1.009	1.019	-1.158	0.337	0.909	0.662
Item 15	50	2	5	3.92	0.944	0.891	-0.442	0.337	-0.733	0.662
Item 16	50	2	5	3.96	0.925	0.856	-0.724	0.337	-0.127	0.662
Item 17	50	1	5	3.86	0.948	0.898	-1.058	0.337	1.039	0.662
Item 18	50	1	5	4.02	0.937	0.877	-1.283	0.337	1.810	0.662

Source(s): Author's own research

Item	N	Pearson's chi-squared	Sig
Item 2: I think cosmeceutical businesses have everything needed to provide complete services	50	43.950	0.000
Item 3: The cosmeceutical services I have been receiving is just about perfect	50	33.738	0.001
Item 4: Sometimes cosmeceutical professionals make me wonder if their diagnosis is correct	50	28.351	0.029
Item 5: I feel confident that I can get the cosmeceutical service I need without being set back financially	50	75.405	0.000
Item 6: When I go for cosmeceutical services, they are thorough when treating and examining me	50	65.836	0.000
Item 7: I must pay more for me cosmeceutical services than I can afford	50	23.462	0.102
Item 8: I have easy access to the cosmeceutical services that I need	50	60.812	0.000
Item 9: Where I get cosmeceutical services, clients have to wait too long for treatment	50	79.519	0.000
Item 10: Cosmeceutical business professionals act too businesslike and impersonal towards me	50	27.182	0.007
Item 11: Cosmeceutical professionals treat me in a very friendly and courteous manner	50	12.907	0.012
Item 12: Those who provide my cosmeceutical services sometimes hurry too much when they treat me	50	30.120	0.003
Item 13: Cosmeceutical professionals ignore what I tell them	50	21.297	0.046
Item 14: I have some doubts about the ability of the cosmeceutical professionals who service me	50	27.955	0.320
Item 15: Cosmeceutical professionals usually spend plenty of time with me	50	31.518	0.002
Item 16: I find it hard to get an appointment for cosmeceutical services	50	10.792	0.547
Item 17: I am dissatisfied with some things about the cosmeceutical services I receive	50	52.169	0.000
Item 18: I am able to get cosmeceutical services whenever I need them	50	42.957	0.000

Source(s): Author's own research

Table 5.
Pearson's chi-squared test values

relationship between the items in the model, and the information presented by the model is conclusive in determining the influence of each individual variable on satisfaction and quality of service.

In addition, the generalizability, trustworthiness, validity and reliability of the research is also based on the research results revealing most participants ($N = 23, 46\%$) from the questionnaire agreed the cosmeceutical services are available as desired as well as agreed to the providers delivering the services needed. Many participants ($N = 28, 56\%$) also agreed with cosmeceutical professionals explaining services well, while ($N = 26, 52\%$) disagreed with cosmeceutical professionals making them wonder about diagnosis. A high percentage of participants ($N = 29, 58\%$) agreed when going for services cosmeceutical professionals are thorough; additionally, most participants ($N = 25, 50\%$) agreed that the professionals deliver treatments in a friendly manner and ($N = 25, 50\%$) disagreed with services being unaffordable. Notably, participants ($N = 24, 48\%$) agreed the cosmeceutical business service quality received was just about perfect and ($N = 28, 56\%$) indicated disagreement with being dissatisfied. Frequencies and percentages of the 18-question questionnaire confirmed the significance of cosmeceutical client satisfaction to cosmeceutical businesses and the beauty industry.

The research study was executed as a response to the need for a deeper understanding of the relationship that may exist between cosmeceutical business service quality and

Table 6.
Ordered probit model
test values

Variable	Coef	Std. Err	p-value
Item 1	0.969	0.562	0.085
Item 2	0.576	0.655	0.379
Item 3	-1.398	0.707	0.048
Item 4	1.420	0.611	0.020
Item 5	-0.476	1.164	0.682
Item 6	-1.560	0.655	0.017
Item 7	-0.797	0.439	0.070
Item 8	0.962	0.635	0.129
Item 9	-0.108	0.538	0.841
Item 10	-0.130	0.817	0.873
Item 11	-0.221	0.566	0.697
Item 12	0.302	0.638	0.636
Item 13	-1.202	0.581	0.039

Source(s): Author's own research

cosmeceutical client satisfaction. Relationships among cosmeceutical clients' perceived cosmeceutical business service quality satisfaction through a self-reported research questionnaire, the Cosmeceutical CCSQ-18. This research study is unique because the measure applied to assess the relationship existing between cosmeceutical client satisfaction and cosmeceutical business service quality consists of a research instrument that has been deemed valid and reliable across a multitude of previous research settings. Before the present research study, minimal empirical evidence linking cosmeceutical business service quality with cosmeceutical client satisfaction was discovered. Consistent with the hypothesis set forth in the study, the results from this study indicate that a significant relationship exists between the predictor variable, cosmeceutical business service quality, and the outcome variable, cosmeceutical client satisfaction, in the Southeast Region of the United States.

The research findings remain consistent with previous research, which revealed that consumer satisfaction is based upon and directly related to the service quality determinants and the disconfirmation theory of customer satisfaction (Herhausen *et al.*, 2019; Marshall and Hays, 1994; Oliver, 2014; Parasuraman *et al.*, 1985, 1991). Research results from evaluating the RQ presented in the current study indicate that cosmeceutical business service quality is significantly related to cosmeceutical client satisfaction. Specifically, research results from studies conducted by Ramya *et al.* (2019) revealed that the more favorable business service quality was perceived, the more clients were satisfied, which was affirmed through the findings of the current cosmeceutical research. The findings directly support the arguments of Hill and Alexander (2017) who believed client satisfaction is one of the most critical issues faced by businesses of all types. Although the relationships between business service quality and consumer satisfaction have been researched in past research, the introduction of cosmeceutical client satisfaction facets is innovative to the industry literature.

The research results did not reveal any data to support the arguments of Kumari and Khurana (2013), who believed the cosmeceutical sector has a raised competitive advantage over the cosmetics industry. However, the results supported previous literature stating the cosmeceutical business' focus has been on remaining unique through providing favorable service quality and not just selling cosmetic products (Lee, 2016; Bellad *et al.*, 2017). Being innovative with operations and strategies has made the cosmeceutical market what it is today, and the research results have helped determine favorable business service quality and have helped push the market forward. In addition, the results did not reveal any data to support women use cosmetics to change the appearance of age or to appear sexier (Walker *et al.*, 2021).

More importantly, the research results revealed data in opposition to the Walker *et al.* (2021) argument women do not consider the use of cosmetics as favorable.

The research findings clearly support the arguments of Kumar and Reinartz (2018), who posited business leaders should constantly seek opportunities to apply technical knowledge, skills, abilities and proficiency to improve business service quality to create consumer satisfaction. Research assessing client satisfaction in the cosmeceutical market is significant, because with the proper strategic response, the twofold goal of cosmeceutical businesses satisfying clients and generating business success may be accomplished (Bellad *et al.*, 2017).

4. Conclusions

Beauty consumers have interest in the trend to look like a Kardashian-hence the popular moniker, keeping up (Monteverde, 2016). Through a research design which business administrators and industry leaders have had a long interest in understanding, the study explores the problem of client satisfaction. The purpose of the quantitative correlational research study was to determine what relationship, if any, exists between the predictor variable, cosmeceutical business service quality, and the outcome variable, cosmeceutical client satisfaction, in the Southeast Region of the United States. Cosmeceutical business service quality, the predictor variable, was categorized as prepaid beauty services.

Cosmeceutical client satisfaction, the outcome variable, which occurs after the client evaluated what was expected to what was received from a product or service was measured by the CCSQ-18 (Konerding, 2016; Marshall and Hays, 1994; Olsen *et al.*, 2014; Rand Corporation, 2019). The significance of the study was based on the increasing global cosmeceuticals market valued at \$83.60 billion in 2023 (Cosmeceuticals Market, 2023; McMullen and Dell'Acqua, 2023). The global cosmeceuticals market is projected to reach around USD 155.80 billion by 2030, with a compound annual growth rate (CAGR) of about 8.09% from 2023 to 2030 (Cosmeceuticals Market, 2023). The nature of the study used the quantitative method with a correlational design, with a theoretical basis as the EDT of satisfaction (Bellad *et al.*, 2017; Oliver, 1980).

Research participants included female cosmeceutical consumers over the age of 18 in the Southeast Region of the United States. The RQ probed what relationship, if any, exists between cosmeceutical business service quality and cosmeceutical client satisfaction in the Southeast Region of the United States. With the results detailed, a correlational Point biserial model two-tail test helped the researcher reject or approve the hypothesis in 95% reliability level, 5% error and effect size of 0.50 (Marshall and Hays, 1994; Rand Corporation, 2019).

The recommendation is made for cosmeceutical businesses to improve brand loyalty through personalized customer experiences, while for consumers, identifying high-quality products and services is key. Focus was put on presenting practical insights that businesses can readily implement, such as optimizing online engagement strategies or enhancing employee training programs. The engagement of stakeholders throughout the research process was valuable and further research may include conducting interviews with industry professionals and hosting workshops to gather input and disseminate findings. This collaborative approach will ensure the research resonates with stakeholders and has a meaningful impact on the cosmeceutical industry as a whole.

The research findings are aligned with the disconfirmation theory of satisfaction concepts. The disconfirmation theory of satisfaction emphasizes consumer perceived quality with each of the business service quality determinants (Oliver, 1980). The main takeaway from the results of the research study is a significant relationship between cosmeceutical business service quality and cosmeceutical client satisfaction exists, hence key decisions may be based on the concept within the parameters of identified limitations.

The continual success of the cosmeceutical market, both globally and domestically in the United States, brings up extensive consumer attention on cosmeceuticals and the functional promises that have been emphasized in popular culture media. The combined nature of cosmeceuticals (cosmetics and pharmaceuticals) presents the beauty industry as an exploratory experience to target consumers in both topical and ingestible forms. To understand female consumers' satisfaction with cosmeceuticals and the business service quality, the research investigates what relationship, if any, exists between cosmeceutical business service quality and cosmeceutical client satisfaction. More importantly, female cosmeceutical consumers' perception of cosmeceutical business service quality is assessed in the cosmeceutical research. As detailed in the manuscript, research results can be used by industry leaders and providers to make informed business decisions.

The purpose of the quantitative correlational research study was to determine what relationship, if any, exists between the predictor variable, cosmeceutical business service quality, and the outcome variable, cosmeceutical client satisfaction, in the Southeast Region of the United States. For the research study, cosmeceuticals were defined as non-invasive cosmetic services and procedures often performed by esthetic professionals to modify physical appearance. Cosmeceutical business service quality, the predictor variable, was categorized as prepaid beauty services. Cosmeceutical client satisfaction, the outcome research variable, was measured by the PSQ-18, which is a tool to examine the client satisfaction for cosmeceutical business services received (Rand Corporation, 2019). As primary objective, examining and evaluating the research's variables to determine what relationship, if any, exists between cosmeceutical business service quality and cosmeceutical client satisfaction in the Southeast Region of the USA is essential.

The hypotheses addressed the RQ, which questioned what relationship, if any, exists between cosmeceutical business service quality and cosmeceutical client satisfaction. General satisfaction, technical quality, interpersonal manner, communication, financial aspects, time spent with professionals and accessibility and convenience were scored to help determine if a relationship exists between cosmeceutical business service quality and cosmeceutical client satisfaction. The CCSQ-18, the questionnaire used in the current research, was web-based. The target population consisted of $N = 50$ randomly selected female cosmeceutical consumers residing in the Southeast Region of the United States. Adding to the limitations of the study was the geographic selection of the Southeast Region of the United States, instead of the entire country, excluding the male gender and accessing only cosmeceutical consumers instead of medical esthetic or marketing professionals as well.

The research had 50 total participants who responded to all questions and items of the CCSQ-18 which fueled the RQ used in the study. Rand Corporation (2019) detailed how the CCSQ-18 produces separate scores for each of seven different subscales: General Satisfaction (Items 3 and 17); Technical Quality (Items 2, 4, 6 and 14); Interpersonal Manner (Items 10 and 11); Communication (Items 1 and 13); Financial Aspects (Items 5 and 7); Time Spent with Professionals (Items 12 and 15); Accessibility and Convenience (Items 8, 9, 16 and 18) as shown in Table 2. Responses to the survey questions were contingent upon a 5-point Likert scale (5 = strongly disagree, 4 = disagree, 3 = neither agree nor disagree, 2 = agree and 1 = strongly agree). The average estimations were computed for each of the 18 items in the data analysis of the survey responses, with the means presented in Table 4. Through the LR χ^2 statistic (18) = 65.35 and its associated probability $\text{Prob} > \chi^2 = 0.000$, it was determined that the research study variables have a statistically significant effect on one another which indicates the correct specification and validity of the research model.

The research study was executed as a response to the need for a deeper understanding of what relationship that may exist between cosmeceutical business service quality and cosmeceutical client satisfaction. The relationships among cosmeceutical clients' perceived cosmeceutical business service quality satisfaction through a self-reported research

questionnaire, the Cosmeceutical CCSQ-18. The research study is unique because the measure applied to assess the relationship existing between cosmeceutical client satisfaction and cosmeceutical business service quality consists of a research instrument that has been deemed valid and reliable across a multitude of previous research settings as determined in the background literature. Prior to the present research study, minimal empirical evidence linked cosmeceutical business service quality with cosmeceutical client satisfaction. Consistent with the hypothesis set forth in the study, results from this study indicate that a significant relationship exists between the predictor variable, cosmeceutical business service quality, and the outcome variable, cosmeceutical client satisfaction, in the Southeast Region of the United States.

The research findings remain consistent with previous research which revealed that consumer satisfaction is based upon and directly related to the service quality determinants and the disconfirmation theory of customer satisfaction (Herhausen *et al.*, 2019; Marshall and Hays, 1994; Oliver, 1997; Parasuraman *et al.*, 1985, 1991). Research results from evaluating the RQ presented in the current study indicate that cosmeceutical business service quality is significantly related to cosmeceutical client satisfaction. Specifically, research results from a study conducted by Daniels (2018) revealed that the more favorable business service quality was perceived, the more clients were satisfied, which was affirmed through the findings of the current cosmeceutical research. The findings directly support the arguments of Hill and Alexander (2017) which believed client satisfaction is one of the most critical issues businesses of all types face. Although the relationships between business service quality and consumer satisfaction have been researched in past research, the introduction of cosmeceutical client satisfaction facets is innovative to the industry literature.

The research results did not reveal any data to support the arguments of Kumari and Khurana (2013) which believed the cosmeceutical sector has raised competitive advantage over the cosmetics industry. However, the results supported previous literature stating the cosmeceutical business' focus has been on remaining unique through providing favorable service quality and not just selling cosmetic products (Lee, 2016; Nanjwade *et al.*, 2017). Being innovative with operations and strategies has made the cosmeceutical market what it is today, and the research results helped determine favorable business service quality has helped push the market forward. Also, the results did not reveal any data to support the women use cosmetics to change the appearance of age or to appear sexier (Laham, 2020). More importantly, the research results revealed data in opposition of the Davis (2013) argument women do not consider the use of cosmetics as favorable.

The research findings clearly support the arguments of which Kumar and Reinartz (2018) posited business leaders should constantly seek opportunities to apply technical knowledge, skills, abilities and proficiencies to better business service quality to create consumer satisfaction. As previously discussed, research assessing client satisfaction in the cosmeceutical market is significant, because with the proper strategic response the twofold goal of cosmeceutical businesses satisfying clients and generating business success may be ultimately accomplished (Bryman and Bell, 2015). Again, supporting the literature, the research findings are aligned with disconfirmation theory of satisfaction concepts. The disconfirmation theory of satisfaction emphasizes consumer perceived quality with each of the business service quality determinants (Oliver, 1980). The main take away from the results of the research study is a significant relationship between cosmeceutical business service quality and cosmeceutical client satisfaction exists, hence key decisions may be based on the concept within the parameters of identified limitations.

5. Research limitations

Limitations of the current research study relating to the generalizability, trustworthiness, validity and reliability of the hypotheses exist. Limitations describe the uncontrollable

factors of the research narrowing the scope of the study (Black, 2005; Vogt, 2007). Every research design, despite the strength of the method, has some limitations (Simon and Goes, 2013). Furthermore, limitations reveal why it is impractical to employ the words “prove” and “disprove” when referencing research results (Simon and Goes, 2013). Identifying the limitations of the research helps strengthen the significance of the study.

The main limitation of the study is that the direction of the effect on the variables, as a whole, cannot be determined. Differentiating positive or negative influences on cosmeceutical business service quality is not possible; however, an observation of the individual effect of each of the questions is probable. The research is based on EDT of satisfaction, but the construct can be improved with the use of additional variables and mediation thereof. Simon and Goes (2013) noted individual research designs might only be significant to a group, or the relationship among the variables in a correlational analysis might only be tested in specific research settings. The relationship discovered among the variables may not be sufficiently informative enough for the researcher to rule out all alternative explanations for correlational findings and offer evidence for causation. Another limitation is the researcher was not allowed to go beyond the data collected in the study; therefore, no additional inferences in the research transpired (Simon and Goes, 2013).

General satisfaction, technical quality, interpersonal manner, communication, financial aspects, time spent with professionals and accessibility and convenience were scored to help determine whether a relationship exists between cosmeceutical business service quality and cosmeceutical client satisfaction. The CCSQ-18, the questionnaire used in the current research, was web-based. The target population consisted of $N = 50$ randomly selected female cosmeceutical consumers residing in the Southeast Region of the United States. Adding to the limitations of the study was the geographic selection of the Southeast Region of the United States. Instead of the entire country, excluding the male gender and accessing only cosmeceutical consumers instead of medical esthetic or marketing professionals.

The research instrument of the study had high internal validity as the instrument had undergone extensive psychometric testing, as the PSQ-18 is in its third iteration (Rand Corporation, 2019). With the high external validity of the research, the researcher was confident that the preference is relevant to all cosmeceutical consumers' decisions. In evaluating the research design, the construct validity was extremely high because the research processes were aligned with the RQ. The appropriate sample size of 42 participants for the research was determined using G*Power Analysis. Cronbach's alpha for the CCSQ-18 questionnaire instrument was 0.84, which indicated strong reliability (Dzwigol, 2020; Marshall and Hays, 1994). The researcher did not digress from the detailed research protocol, instrumentation, data collection and data analyses at any time.

The generalizability, trustworthiness, validity and reliability of the research is based on the research results revealing most participants ($N = 23, 46\%$) from the questionnaire agreed the cosmeceutical services are available as desired as well as agreed to the providers delivering the services desired. Many participants ($N = 28, 56\%$) also agreed with cosmeceutical professionals explaining services well, while ($N = 26, 52\%$) disagreed with cosmeceutical professionals making them wonder about diagnosis. A high percentage of participants ($N = 29, 58\%$) agreed that when going for services, cosmeceutical professionals are thorough; additionally, majority of participants ($N = 25, 50\%$) agreed that the professionals deliver treatments in a friendly manner and ($N = 25, 50\%$) disagreed with not being able to afford the services. Notably, participants ($N = 24, 48\%$) agreed the cosmeceutical business service quality received was just about perfect and ($N = 28, 56\%$) indicated disagreement with being dissatisfied. The results showed and confirmed the significance of cosmeceutical client satisfaction to cosmeceutical businesses and the beauty industry.

Acknowledgment

I would like to thank the participants in the research for the valuable information. The author would like to thank the doctoral team for their constructive comments throughout the review process. The suggestions significantly improved the quality of the research and this work.

Ethical approval: Informed consent explicitly defines the research ethical workings as made mandatory by the Institutional Review Board (IRB) for researching human behavior (White, 2020). The Informed Consent Release Form recognized the researcher as a student in advanced university studies. Based on previously defined research protocols by the IRB, an ethical protocol in the research study defined the ethical standards the researcher adopted to ensure participant rights (White, 2020). The Informed Consent Release Form also provided an anonymous research experience and promoted the protection of the welfare of each participant and the associated community (White, 2020). The research participants were presented with an informed consent form within the web-based survey indicating approval by the IRB. Participation in the research was completely voluntary, and participants could withdraw from participation during any point of the research process without any consequences or penalties.

Author contribution: This paper is based on an unpublished dissertation defended at the University of Phoenix, October 2019 by Dr Mariah C. Bond.

Funding bodies: The research was conducted independently without any external funding bodies or entities involved in the work.

Data availability: The data that supports the findings of this study are available in the supplementary material of this article.

Conflicts of interest: There are no known conflicts of interest or relationship, financial or otherwise, that might be perceived as influencing the author's objectivity.

References

- Ajitha, S. and Sivakumar, V.J. (2017), "Understanding the effect of personal and social value on attitude and usage behavior of luxury cosmetic brands", *Journal of Retailing and Consumer Services*, Vol. 39, pp. 103-113, doi: 10.1016/j.jretconser.2017.07.009.
- Arslanagic-Kalajdzic, M. and Zabkar, V. (2017), "Is perceived value more than value for money in professional business services?", *Industrial Marketing Management*, Vol. 65, pp. 47-58, doi: 10.1016/j.indmarman.2017.05.005.
- Bansal, H.S. and Taylor, S. (2015), "Investigating the relationship between service quality, satisfaction and switching intentions", *Proceedings of the 1997 Academy of Marketing Science (AMS) Annual Conference*, Springer International Publishing, Cham, pp. 304-313, doi: 10.1007/978-3-319-13141-2_107.
- Baumann, L. (2014), *Cosmeceuticals and Cosmetic Ingredients*, McGraw-Hill Education, New York, NY.
- Bell, E., Bryman, A. and Harley, B. (2018), *Business Research Methods*, Oxford University Press, Oxford.
- Bellad, K.A., Nanjwade, B.K., Kamble, M.S., Srichana, T. and Idris, N.F. (2017), "Development of cosmeceuticals", *World Journal of Pharmacy and Pharmaceutical Sciences*, Vol. 6 No. 4, pp. 643-682, doi: 10.20959/wjpps20174-8927.
- Black, T.R. (2005), *Doing Quantitative Research in the Social Sciences: An Integrated Approach to Research Design, Measurement and Statistics*, SAGE Publications, Thousand Oaks, CA.
- Bryman, A. and Bell, E. (2015), *Business Research Methods*, Oxford University Press, New York, NY.
- Burns, A.C., Bush, R.F. and Sinha, N. (2014), *Marketing Research*, Vol. 7, Pearson, Harlow.
- Cosmeceuticals Market (2023), *Cosmeceuticals Market*, Precedence Statistics.

- Cox, E.P., O'Dwyer, N., Cook, R., Vetter, M., Cheng, H.L., Rooney, K. and O'Connor, H. (2016), "Relationship between physical activity and cognitive function in apparently healthy young to middle-aged adults: a systematic review", *Journal of Science and Medicine in Sport*, Vol. 19 No. 8, pp. 616-628, doi: 10.1016/j.jsams.2015.09.003.
- Daniels, L.M. (2018), "The quest for a paradigm shift in leadership for the next decade and beyond", in *The Future of Leadership*, Palgrave Macmillan, London, pp. 15-37, doi: 10.1007/978-3-319-73870-3_2.
- Davis, K. (2013), *Reshaping the Female Body: the Dilemma of Cosmetic Surgery*, Routledge, New York, NY.
- Dzwigol, H. (2020), "Innovation in marketing research: quantitative and qualitative analysis", *Marketing and Management of Innovations*, No. 1, pp. 128-135, doi: 10.21272/mmi.2020.1-10.
- Feetham, H.J., Jeong, H.S., McKesey, J., Wickless, H. and Jacobs, H. (2018), "Skin care and cosmeceuticals: attitudes and trends among trainees and educators", *Journal of Cosmetic Dermatology*, Vol. 17 No. 2, pp. 220-226, doi: 10.1111/jocd.12460.
- Galib, M. and Paymaei, H. (2022), "Sponsored advertisement: does it contribute to brand equity?", *International Journal of Sales Retailing and Marketing*, Vol. 11 No. 1, pp. 55-79.
- Griva, A., Bardaki, C., Pramatar, K. and Papakiriakopoulos, D. (2018), "Retail business analytics: customer visit segmentation using market basket data", *Expert Systems with Applications*, Vol. 100, pp. 1-16, doi: 10.1016/j.eswa.2018.01.029.
- Gupta, M.J., Chaturvedi, S., Prasad, R. and Ananthi, N. (2022), *Principles and Practice of Management*, AG Publishing House (AGPH Books), London.
- Herhausen, D., Kleinlercher, K., Verhoef, P.C., Emrich, O. and Rudolph, T. (2019), "Loyalty Formation for different customer journey segments", *Journal of Retailing*, Vol. 95 No. 3, pp. 9-29, doi: 10.1016/j.jretai.2019.05.001.
- Hill, N. and Alexander, J. (2017), *The Handbook of Customer Satisfaction and Loyalty Measurement*, Routledge, New York, NY.
- Jeon, J. (2015), "The strengths and limitations of statistical modeling of complex social phenomenon: focusing on SEM, path analysis, or multiple regression models", *International Scholarly and Scientific Research and Innovation*, Vol. 9 No. 5, pp. 1634-1642, doi: 10.5281/zenodo.1105869.
- Joshi, A., Kale, S., Chandel, S. and Pal, D. (2015), "Likert scale: explored and explained", *British Journal of Applied Science and Technology*, Vol. 7 No. 4, pp. 396-403, doi: 10.9734/BJAST/2015/14975.
- Kasiri, L.A., Cheng, K.T.G., Sambasivan, M. and Sidin, S.M. (2017), "Integration of standardization and customization: impact on service quality, customer satisfaction, and loyalty", *Journal of Retailing and Consumer Services*, Vol. 35, pp. 91-97, doi: 10.1016/j.jretconser.2016.11.007.
- Kitapci, O., Akdogan, C. and Dortyol, I.T. (2014), "The impact of service quality dimensions on patient satisfaction, repurchase intentions and word-of-mouth communication in the public healthcare industry", *Procedia-Social and Behavioral Sciences*, Vol. 148, pp. 161-169, doi: 10.1016/j.sbspro.2014.07.030.
- Konerding, U. (2016), "Which kind of psychometrics is adequate for patient satisfaction questionnaires?", *Patient Preference and Adherence*, Vol. 10 No. 1, pp. 2083-2090, doi: 10.2147/PPA.S112398.
- Kumar, V. and Reinartz, W. (2018), *Customer Relationship Management: Concept, Strategy, and Tools*, Springer, New York, NY.
- Kumari, S. and Khurana, S.P. (2013), "Cosmeceuticals: current trends and market preparations", *IOSR Journal of Pharmacy and Biological Sciences*, Vol. 8 No. 3, pp. 45-48, doi: 10.9790/3008-0834548.
- Laham, M. (2020), *Made up: How the Beauty Industry Manipulates Consumers, Preys on Women's Insecurities, and Promotes Unattainable Beauty Standards*, Rowman & Littlefield, London.
- Lang, L.D., Behl, A., Guzmán, F., Pereira, V. and Del Giudice, M. (2023), "The role of advertising, distribution intensity and store image in achieving global brand loyalty in an emerging

- market”, *International Marketing Review*, Vol. 40 No. 1, pp. 127-154, doi: 10.1108/IMR-06-2021-0200.
- Lee, C.M. (2016), “Fifty years of research and development of cosmeceuticals: a contemporary review”, *Journal of Cosmetic Dermatology*, Vol. 15 No. 4, pp. 527-539, doi: 10.1111/jocd.12261.
- Levine, D., Stephan, D. and Szabat, K. (2017), *Statistics for Managers*, Pearson Education, Boston, MA.
- Lun, Y.V., Shang, K.C., Lai, K.H. and Cheng, T.C.E. (2016), “Examining the influence of organizational capability in innovative business operations and the mediation of profitability on customer satisfaction: an application in intermodal transport operators in Taiwan”, *International Journal of Production Economics*, Vol. 171, pp. 179-188, doi: 10.1016/j.ijpe.2015.02.019.
- Marshall, G.N. and Hays, R.D. (1994), *The Patient Satisfaction Questionnaire Short-form (PSQ-18)*, RAND Corporation, Santa Monica, CA.
- McMullen, R.L. and Dell’Acqua, G. (2023), “History of natural ingredients in cosmetics”, *Cosmetics*, Vol. 10 No. 3, p. 71, doi: 10.3390/cosmetics10030071.
- Meng, J. and Pan, P. (2012), “Investigating the effects of cosmeceutical product advertising in beauty-care decision making”, *International Journal of Pharmaceutical and Healthcare Marketing*, Vol. 6 No. 3, pp. 250-266, doi: 10.1108/17506121211259412.
- Merk, M. and Michel, G. (2019), “The dark side of salesperson brand identification in the luxury sector: when brand orientation generates management issues and negative customer perception”, *Journal of Business Research*, Vol. 102 No. 11, pp. 339-352, doi: 10.1016/j.jbusres.2019.01.037.
- Miglietta, E., Belessiotis-Richards, C., Ruggeri, M. and Priebe, S. (2018), “Scales for assessing patient satisfaction with mental health care: a systematic review”, *Journal of Psychiatric Research*, Vol. 100 No. 1, pp. 33-46, doi: 10.1016/j.jpsychires.2018.02.014.
- Milam, E.C. and Rieder, E.A. (2016), “An approach to cosmeceuticals”, *Journal of Drugs in Dermatology: JDD*, Vol. 15 No. 4, pp. 452-456, doi: 10.1111/j.0022-202X.2004.23550.x.
- Monteverde, G. (2016), “Kardashian komploticity: performing post-feminist beauty”, *Critical Studies in Fashion and Beauty*, Vol. 7 No. 2, pp. 153-172, doi: 10.1386/csfb.7.2.153_1.
- Mori, S. and Lee, E.H. (2019), “Beyond the physician’s perspective: a review of patient-reported outcomes in dermatologic surgery and cosmetic dermatology”, *International Journal of Women’s Dermatology*, Vol. 5 No. 1, pp. 21-26, doi: 10.1016/j.ijwd.2018.08.001.
- Nanjwade, B., Bellad, K., Kamble, M., Srichana, T. and Idris, N. (2017), “Development of cosmeceuticals”, *World Journal of Pharmacy and Pharmaceutical Sciences*, Vol. 6 No. 4, pp. 643-691, doi: 10.20959/wjpps20174-8927.
- Ng, J.H. and Luk, B.H. (2019), “Patient satisfaction: concept analysis in the healthcare context”, *Patient Education and Counseling*, Vol. 102 No. 4, pp. 790-796, doi: 10.1016/j.pec.2018.11.013.
- Ok, S., Suy, R., Chhay, L. and Choun, C. (2018), “Customer satisfaction and service quality in the marketing practice: study on literature review”, *Asian Themes in Social Sciences Research*, Vol. 1 No. 1, pp. 21-27, doi: 10.18488/journal.139.2018.11.21.27.
- Oliver, R.L. (1980), “A cognitive model of the antecedents and consequences of satisfaction decisions”, *Journal of Marketing Research*, Vol. 17 No. 4, pp. 460-469, doi: 10.2307/3150499.
- Oliver, R.L. (1997), *Satisfaction: A Behavioral Perspective on the Consumer*, Irwin-McGraw-Hill, New York, NY.
- Oliver, R.L. (2014), *Satisfaction: A behavioral Perspective on the Consumer*, Routledge, New York, NY.
- Olsen, L.L., Witell, L. and Gustafsson, A. (2014), “Turning customer satisfaction measurements into action”, *Journal of Service Management*, Vol. 25 No. 4, pp. 556-571, doi: 10.1108/JOSM-01-2014-0025.
- Pandey, A. and Sonthalia, S. (2019), *Cosmeceuticals*, StatPearls Publishing, Treasure Island, FL, available at: <https://www.ncbi.nlm.nih.gov/books/NBK544223/>

- Parasuraman, A., Zeithaml, V. and Berry, L. (1985), "A conceptual model of service quality and its implications for future research", *Journal of Marketing*, Vol. 49 No. 4, pp. 41-50, doi: 10.2307/1251430.
- Parasuraman, A., Berry, L.L. and Zeithaml, V.A. (1991), "Perceived service quality as a customer-based performance measure: an empirical examination of organizational barriers using an extended service quality model", *Human Resource Management*, Vol. 30 No. 3, pp. 335-364, doi: 10.1002/hrm.3930300304.
- Peppers, D. and Rogers, M. (2016), *Managing Customer Experience and Relationships: A Strategic Framework*, John Wiley & Sons, Hoboken, NJ.
- Ramya, N., Kowsalya, A. and Dharanipriya, K. (2019), "Service quality and its dimensions", *EPR International Journal of Research and Development*, Vol. 4 No. 2, pp. 38-41.
- RAND Corporation (2019), "Patient satisfaction questionnaire 18", *Marshall and Hays*, available at: <https://www.rand.org/content/dam/rand/pubs/papers/2006/P7865.pdf>
- Sarstedt, M., Hair, J.F., Pick, M., Liengaard, B.D., Radomir, L. and Ringle, C.M. (2022), "Progress in partial least squares structural equation modeling use in marketing research in the last decade", *Psychology and Marketing*, Vol. 39 No. 5, pp. 1035-1064, doi: 10.1002/mar.21640.
- Sekaran, U. and Bougie, R. (2016), *Research Methods for Business: A Skill Building Approach*, John Wiley & Sons, Hoboken, NJ.
- Shehan, J.N., Ryll, L.S., LeClair, J. and Ezzat, W.H. (2023), "Current practices and trends in midface rejuvenation", *Annals of Plastic Surgery*, Vol. 90 No. 2, pp. 118-122.
- Simon, M.K. and Goes, J. (2013), "Assumptions, Limitations, Delimitations, and Scope of the Study", Doctoral dissertation, Dissertation and scholarly research: Recipes for success, LLC, Seattle, WA, Doctoral dissertation, Dissertation Success.
- Sivakumar, K., Li, M. and Dong, B. (2018), "Service quality: the impact of frequency, timing, proximity, and sequence of failures and delights", *Journal of Marketing*, Vol. 78 No. 1, pp. 41-58, doi: 10.1509/jm.12.0527.
- Valdes, K., Kannas, S., Kakar, S., Veneziano, J., Dake, T. and Sierra, F. (2021), "Patient satisfaction of hand therapy services", *Journal of Hand Therapy*, Vol. 34 No. 4, pp. 585-590, doi: 10.1016/j.jht.2020.07.006.
- Vogt, W.P. (2007), *Quantitative Research Methods for Professionals in Education and Other Fields*, Allyn & Bacon, Boston, MA.
- Vogt, W.P., Gardner, D.C., Haeffele, L.M. and Vogt, E.R. (2014), *Selecting the Right Analyses for Your Data: Quantitative, Qualitative, and Mixed Methods*, Guilford Publications, New York, NY.
- Walker, C.E., Krumhuber, E.G., Dayan, S. and Furnham, A. (2021), "Effects of social media use on desire for cosmetic surgery among young women", *Current Psychology*, Vol. 40 No. 7, pp. 3355-3364, doi: 10.1007/s12144-019-00282-1.
- White, M.G. (2020), "Why human subjects research protection is important", *Ochsner Journal*, Vol. 20 No. 1, pp. 16-33, doi: 10.31486/toj.20.5012.
- Williams, C. (2015), *Effective Management*, Cengage Learning, Boston, MA.
- Wirtz, J. and Ehret, M. (2017), "Capturing value in the service economy", *SMR-journal of Service Management Research*, Vol. 1 No. 1, pp. 22-38, doi: 10.15358/2511-8676-2017-1-22.
- Wissinger, E. (2016), "Glamour labor in the age of Kardashian", *Critical Studies in Fashion and Beauty*, Vol. 7 No. 2, pp. 141-152, doi: 10.1386/csfb.7.2.141_1.

About the author

Dr Mariah C. Bond, based in New Orleans, Louisiana, holds a Bachelor of Science in Marketing, a Master of Business Administration and a Doctor of Business Administration. Professionally, she currently serves in Executive Relations at Amazon and curator of an antique gallery and also contributes her expertise to the nonprofit sector as a board member of AfricaStrong. Specializing in marketing and communications, Dr Bond's research interests focus on the integration of creativity and analytics to

develop effective marketing and business practices. Her professional achievements are complemented by her work as a published author and avid traveler, which provides her with a deep understanding of global cultures that informs her marketing strategies. Dr Bond's interest in popular sociocultural environments enhances her narrative skills, contributing to authentic storytelling in her work. Committed to continuous learning and innovation, Dr Bond addresses industry challenges with advanced solutions, aiming to make a significant impact on both the academic and professional marketing landscapes. Mariah C. Bond can be contacted at: mariah.c.bond@gmail.com

Management
Matters

77

For instructions on how to order reprints of this article, please visit our website:
www.emeraldgroupublishing.com/licensing/reprints.htm
Or contact us for further details: permissions@emeraldinsight.com

The current issue and full text archive of this journal is available on Emerald Insight at:
<https://www.emerald.com/insight/2279-0187.htm>

MANM
21,1

78

Received 20 March 2024
Revised 29 April 2024
Accepted 14 May 2024

Redefining resilience: insights into project management's capabilities of organisations through the pandemic and beyond

Sheraz Alam Malik and Rami Bustami

*Operation and Project Management Department, College of Business,
Alfaisal University, Riyadh, Saudi Arabia*

Abstract

Purpose – To better understand the resilience of project management (PM) companies post-pandemic and gain insights into the interplay of the level of preparation, the status of the project and the size of the company.

Design/methodology/approach – Logistic regression was used to analyse the data from 285 companies belonging to more than 7 sectors to understand the crucial factors required to have above-standard project performance post-pandemic.

Findings – Higher project performance was observed in companies with more than 30 years of experience, whereas company history, target group or PM activity did not predict better project performance. The retail sector is leading across all the sectors, whereas the majority of companies have still not recovered from the pandemic.

Research limitations/implications – New factors like planning and controlling phases in PM are identified in Gulf Cooperation Council (GCC) settings to be most impacted post-pandemic, whereas size and length of being in business are other key variables highlighted in this research for better PM performance post-pandemic.

Originality/value – A large-scale analysis of 285 Saudi companies is quite novel in scale and innovation. This cross-sector empirical research highlights key areas of consideration post-pandemic, which were missing from the narrative due to access and emerging issues earlier.

Keywords Resilience, Project management, Post-pandemic

Paper type Research paper

1. Introduction

A lot has been said about the COVID-19 pandemic in current literature, resulting in information overload. However, the pandemic's long-term impacts, status of the project and lessons learnt are still being established (Müller and Klein, 2020). This is especially true in the project management (PM) domain in Gulf countries, where data about a project's status, long-term plans and company direction for execution is not available (Ghandour, 2020). Also, a sector-wide analysis of large-scale PM companies is missing. Scale is important to better understand the future planning and execution of mega projects like Vision 2030 (Al Moslih *et al.*, 2021).

Post-pandemic project analysis is key to designing policies in both the private and public sectors that are resilient to the pandemic and any other natural/unnatural calamities. Scant literature is available, mostly in the construction sector of the UAE, and it tends to be



Management Matters
Vol. 21 No. 1, 2024
pp. 78-90
Emerald Publishing Limited
e-ISSN: 2752-8359
p-ISSN: 2279-0187
DOI 10.1108/MANM-03-2024-0016

© Sheraz Alam Malik and Rami Bustami. Published in *Management Matters*. Published by Emerald Publishing Limited. This article is published under the Creative Commons Attribution (CC BY 4.0) licence. Anyone may reproduce, distribute, translate and create derivative works of this article (for both commercial and non-commercial purposes), subject to full attribution to the original publication and authors. The full terms of this licence may be seen at <http://creativecommons.org/licenses/by/4.0/legalcode>

outdated (Shahril and Kamaruding, 2022). Cross-sectoral project analysis is important to study the depth and breadth of the pandemic's impacts and their associated factors. Saudi Arabia, being the largest economy in the Gulf Cooperation Council (GCC), is an excellent candidate for this exploration (Malik and Bustami, 2023). Considerable time has passed since the pandemic and studying its ripple effects on PM will offer novel insights around the interplay between level of preparation, project status and company size and its impact on overall project performance. These findings will in turn establish new variables about resilience in PM for companies.

Key questions about current PM practices need to be answered, given that the literature has identified new questions regarding situational contingencies (Müller and Klein, 2020). These include questions pertaining to whether company history or size matters, which PM activities were most impacted and which sector was most resilient (Alsharif *et al.*, 2021). Resolving these debates will reduce uncertainty around the future direction of PM, where proactive use of key resources is critical to gaining competitive advantage.

Therefore, this research aims to answer the following questions:

- RQ1. What are the key post-pandemic factors affecting higher PM performance in companies of different sizes?
- RQ2. How do these key factors vary across different sectors, affecting the resilience of PM activities?

The remaining paper will be structured into a literature review to understand the critical aspects of project performance at different stages of PM during the pandemic from developing countries' perspectives; development of a conceptual framework; data collection and methodology; logistic regression; and an exploration of existing limitations as well as recommendations.

2. Literature review

Li *et al.* (2023) reviewed literature from 35 countries to understand the pandemic from a project life cycle point of view in construction management. They highlighted that GCC countries, especially Saudi Arabia, have very scant literature in this arena. COVID-19 affected the execution phase the most, and project standards and contracts faced the greatest impacts. They advocated paying closer attention to the both the company's external and internal environment. They reviewed multiple factors affecting quality performance in different countries. However, a more holistic approach is needed to identify risks and mitigation strategies post-pandemic. Such an approach involves finding urgent post-pandemic solutions to improve project performance, work efficiency and technical capacity of workforce and to apply new sustainability technologies that will boost the resilience of future PM.

Involving all stakeholders and establishing a deeper understanding of how different factors like the type of customer, company profile and operating sector interact with each other is key in post pandemic PM. Isang and Ebiloma (2023) have conducted qualitative research on post-pandemic PM performance in Nigeria and highlighted that a lot of uncertainty exists around management strategies, which creates productivity issues. These issues are evolving over time and key challenges remain, related to project delays, sector-wide project contract reviews and cash flow issues. Due to the smaller sample size, this cannot be generalised, and a broader level of investigation is needed to identify the links between stakeholders, the business sector and size of the company.

Conducting an objective assessment of post-pandemic phenomenon for different projects in different sectors is required. Such an assessment will provide unique insights into stakeholders' roles in project performance, variations between different sectors and resilience

mechanisms. Ayat *et al.* (2023) studied closely the performance of construction projects in Pakistan during the pandemic. They noticed severely negative effects on project quality, cost and time due to supply chain disruptions, shortage of resources, price escalations and an increase in legal disputes.

Sami Ur Rehman *et al.* (2022) did an exploratory study on project performance in the UAE construction industry and demonstrated that the key challenges during the pandemic entailed schedule delays, approvals, inspections and equipment shortages. They have highlighted that the PM sector has shown great flexibility but has not recovered fully. Resource availability, contractual obligations and new standard operating procedures (SOPs) are modifying the way PM works. This requires new forms of risk assessment, mitigation and resilience building, as well as a comprehensive understanding of different stakeholders, to minimise negative impacts in future.

The history of a company carries weight when measuring success factors in PM post-pandemic, as highlighted by Hemadoshini (2021). He showed that improving project performance post-pandemic requires upskilling human resources (HR) and improving flexibility and adaptability in each company. This may vary by sector and understanding these differences in multiple sectors is a good starting point. An external environment with customers presents decides the success factors of a given project. In other words, superior project performance is achieved by understanding the external business environment where key customers are present and by showing an ability to change.

Enhancing the use of technology, creating effective communication and creating a more holistic picture of PM post-pandemic are critical. Shahril and Kamaruding (2022) investigated the Malaysian construction sector during the COVID-19 pandemic and observed that project delays, resource unavailability, financial problems and project cancellations placed the most critical impacts on business. There is a consistent pattern of similar problems across different developing countries, highlighting the need for more robust resilience building.

Alsharif *et al.* (2021) studied the pandemic's impacts on the construction industry of the United States and identified eight different factors, including material delays, litigations, increase in local demand and reduction in efficiency. They highlighted these as early impacts and argued that these factors should also be studied after the pandemic to analyse if any changes occurred post-pandemic. Thus, different scholars looking into different countries and sectors are advocating for similar in-depth analyses post-pandemic.

Blair *et al.* (2022) noted that the pace of change in projects has increased post-pandemic, especially in the public sector. They emphasised that organisations and stakeholders play an important part in delivering projects post-pandemic and are key elements of service delivery. An important part of their findings was to underscore the need to include key stakeholders in the learning process of the project, and companies have a key role in implementing this change. Though their study focusses on UK public sector projects post-pandemic, it carries important takeaways related to project performance and stakeholder value.

There is a need to include more countries for a multi-level approach towards PM, which will help us better understand the positive or negative impacts of flexible PM practices across different countries. Koch and Schermuly (2021) investigated both Germany and the United States to understand how PM interacted with stakeholders during the pandemic. They identified agile PM as a buffering resource in Germany only, whereas USA employees believe the demands of COVID-19 enhanced their exhaustion when using agile PM. This finding shows that despite both being developed countries, the dynamics of PM are different in both. This can be due to different levels of autonomy; delivery mechanisms and project demands in both countries. They considered agile PM as a moderating factor in managing unfinished tasks and pandemic demands. The study underscores the need to understand macro-organisational changes in each company/sector so that employees can perform better during testing times.

A more holistic picture is missing, where we can determine how a comprehensive understanding of stakeholders can improve different stages of project activities and consequently result in better performance. Bushuyev *et al.* (2020) proposed agile PM to manage stakeholder's post-pandemic. They attributed inferior PM performance to a lack of information about stakeholders and their actions at different stages of PM. A significant drop in performance was observed during the execution stage of projects, which warrants looking at PM activities in detail.

Kek *et al.* (2022) investigated the ripple effect of the copper melting project across the globe from Tanzania to Saudi Arabia after the pandemic. They found lack of communication amongst stakeholders and an absence of resilience in all stages of the project to be the main disruptors to optimum performance. They advocated using proper management tools like interactive dashboards, collaborative planning and integrated execution. Though the recommendations broadly point in the right direction, they do not address specific issues arising in PM across different sectors and do not identify uniform policies to mitigate risks post-pandemic.

Sharma *et al.* (2022) studied 18 critical factors impacting agile PM during the pandemic and highlighted lack of motivation, delayed duration of projects and non-availability of skilled labour as key factors hampering the implementation of agile PM. They emphasised that these factors must be validated in developing countries and recommended that additional factors like dynamic environment, expert opinion and cross-sector analysis be added for a more comprehensive analysis. They argued that adaptability towards scepticism and digital development are key to surviving the new normal of post-pandemic PM.

Post pandemic PM performance is affected by cost and schedule overruns especially in GCC countries. This can be due to improper risk management and lack of structured approach to PM. Waheeb *et al.* (2023) showed how different Gulf companies managed their projects in pandemic and attributed geographical, economic and technological problems as main causes of subpar PM performances.

Müller and Klein (2020) identified four different research themes arising from PM after the pandemic. The approach involves understanding current practices, anticipating required changes and developing new practices and theories. This multi-faceted PM pandemic research sheds light on lessons learnt from the current state of practice so that new values like resilience can be developed. This requires diverse situational contingencies and new theories of collaboration for higher resilience across different industry sectors. The pandemic has exposed the strengths and weaknesses of different contingencies for different companies resulting in deeper reflections and insights for the future. Global experience, especially from developing countries, must be shared so that we are better prepared for future eventualities.

Gaps exist in the literature in terms of understanding the complex interplay of factors affecting PM performance post-pandemic. Either individual factors like sector-wide analysis or the types of stakeholders involved are missing. Collective factors like the status of the project, size of the company and specific PM activities are missing. These gaps limit our understanding of what happened after the pandemic in different sectors across the globe, especially in the developing countries of the Gulf region. Filling these gaps from both theoretical and empirical perspectives is important, as new themes have emerged, more resilience practices are being adopted, different sized companies started using new technologies to manage risks and new theories for collaboration and coordination towards greater resilience have been discussed. A more comprehensive understanding is needed to identify the factors that affected PM performance during the pandemic, impacting the overall resilience of companies, especially in developing countries.

3. Research framework

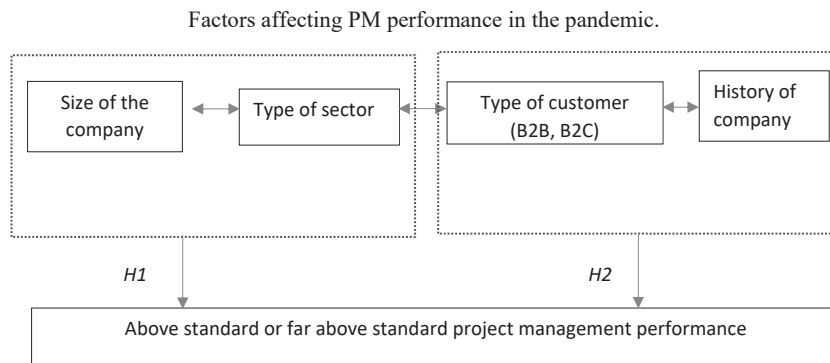
To address the gaps identified above, a research framework is created to better understand the post-pandemic factors affecting PM performance in given sectors. This framework will enhance our understanding of resilience in the management domain, especially in developing countries. As Koch and Schermuly (2021) highlighted, a company’s size and the country’s perspective matter in PM. Ghandour (2020) also supported this idea, especially when measuring performance in uncertain times. The status of the project, the company’s preparation level and the overall size of the company were also key factors that Alsharaf *et al.* (2021) and Li *et al.* (2023) highlighted. This framework will be tested against background of developing countries in the GCC region. A large-scale understanding of resilience in PM in GCC countries requires detailed insight into different complex factors. These factors concern the history of the company, sector type, company size and type of customer. The interplay of these factors on the overall performance of PM will be measured.

As shown in Figure 1, the identified factors not only impact overall PM performance but also interact with each other, thus defining the true resilience of PM in each sector. The context here is unique to GCC countries due to their peculiar projects and management practices. The literature discussed above repeatedly reveals the significance of context of gulf countries. Post-pandemic factors in PM are quite complex and require deeper understanding, which can lead to crucial insights. To this end, the following are the key hypotheses arising from the research framework.

H1. The size of the company in each operating sector impacts its post-pandemic PM performance.

This proposition, which connects the size of the company and its sector with its post-pandemic performance, has been amply highlighted in the literature. Kek *et al.* (2022) and Hemadoshini (2021) emphasised how different companies have shown variable levels of project performance post-pandemic and how this can significantly impact our understanding of future projects. Therefore, the interplay between a given sector and the size of a company operating in that sector has far-reaching consequences on project performance. This raises questions regarding other key matters, e.g. do the history of the company and the type of customer it is dealing with for the project have any effect on the performance of the project? On this note, the next hypothesis is below.

H2. Company history and customer type impact a company’s post-pandemic PM performance.



Source(s): Authors own

Figure 1.
Factors affecting
project management
performance post-
pandemic

Ayat *et al.* (2023) and Sami Ur Rehman *et al.* (2022) highlighted how different stakeholders, like internal and external customers, play an important role in PM performance. This was observed across different countries and sectors. It reveals that superior performance is linked to customer types and that it is worth exploring links to company history as well.

4. Data and methods

A questionnaire was developed and administered to project managers in Saudi Arabia working in various firms with adequate operational decision-making authority. The questionnaire aimed to provide insights into the impacts of COVID-19 in Saudi Arabia on recovery and future direction in PM. The questionnaire consists of 21 items and is divided into two sections: 10 items related to the demographics of participating firms and 11 mostly Likert scale type items measuring impact, recovery and future direction for PM following COVID-19. PM performance in handling COVID-19, its recovery and future management were measured at a 5-point Likert scale: Far above standard, above standard, meet standard, below standard and far below standard.

Participants were provided with an electronic copy of the questionnaire and were given enough time to complete it (self-answered). The completed questionnaires were collected and safely stored. Data were uploaded and saved into an appropriately designed Excel spreadsheet. Data were processed following best practice for raw data management to identify any inaccuracies or incompleteness before the statistical analyses. Responses to all items in the questionnaire were checked and compared against the possible minimum and maximum values of each variable and items with implausible values were flagged. A similar process was applied to demographic variables to identify any potential anomalies by running general frequency analyses.

Descriptive statistical analyses were performed on the data for the study's participants. Continuous variables were summarised using mean and standard deviation (SD), median and inter quartile range (IQR) and proportions were used for nominal and ordinal variables. The outcome of interest: Good PM performance in handling COVID-19 was indicated by either far above or above standards. This variable was analysed and compared by company-related factors (sector/industry, length of service in firm (years) and the number of employees). Comparisons were made using the chi-square test or ANOVA. A log-linear regression model was utilised to examine the independent effect of supply and demand side factors on employees' perception of integration. The model controlled for the sector, length of service and number of employees. Statistical significance was considered at $p < 0.05$. All statistical analyses were performed using IBM SPSS 29.0.

5. Results

A total of 285 of 300 participants in different companies completed the questionnaire (95%). The content validity of the questionnaire items measuring the impact of COVID-19, recovery and future direction of PM was established by two experts who examined the appropriateness of the content, after making necessary modifications to items, to ensure they were comprehensive, accurately assessed and measured attitudes. In addition, the reliability of the questionnaire was examined using Cronbach's alpha (α), which is a measure of internal consistency, indicating how closely related a set of items is as a group. The Cronbach's α value was 0.72, indicating an acceptable level of internal consistency.

Table 1 shows descriptive statistics for demographic and company-related characteristics. One hundred and thirty-three respondents reported above standard/far above standard PM performance (46.7%). The majority of the companies' headquarters were located inside Saudi Arabia (82%). The distribution across sectors was as follows: retail 26.0%, accountancy/banking/finance 34 11.9%, property/construction 10.9%, business

Characteristic	Value
<i>Company headquarters n (%)</i>	
Inside Saudi Arabia	236 (82.2%)
Outside Saudi Arabia	49 (17.2%)
<i>Sector n (%)</i>	
Retail	28.97 ± 5.32
Accountancy/Banking/Finance	74 (26.0%)
Property/Construction	34 (11.9%)
Business Consulting/Management	31 (10.9%)
Information Technology	29 (10.2%)
Engineering/Manufacturing	23 (8.1%)
Other	22 (7.7%)
	72 (25.3%)
<i>Target group n (%)</i>	
Consumers	54 (18.9%)
Business	65 (22.8%)
Both	166 (58.2%)
<i>Company history n (%)</i>	
1–5 years	53 (18.6%)
6–10 years	46 (16.1%)
11–30 years	101 (35.4%)
More than 30 years	85 (29.8%)
<i>Company size n (%)</i>	
Small	27 (9.5%)
Medium	138 (48.4%)
Multinational	120 (42.1%)
<i>Respondent's years of experience</i>	
<1 year	53 (18.6%)
1–5 years	126 (44.2%)
More than 5 years	106 (37.2%)
Note(s): Number of respondents = 285	
Source(s): Table by authors	

Table 1.
Demographic and
company-related
characteristics

consulting/management 10.2%, information technology 8.1%, engineering/manufacturing 7.7% and other 25.3%. Most companies (65.0%) have been operating for more than 10 years, and their target group includes both consumers and businesses (58.2%). About 90% of the companies are classified as large.

Table 2 shows descriptive statistics for PM impact, challenges and preparedness during COVID-19. About 67% of respondents reported moderate or severe impacts of COVID-19. Activities impacted include planning (29%), scheduling (32%) and controlling (26%). PM preparedness was reported by only 35% of respondents and about 70% indicated that their companies faced challenges related to delaying or losing projects. Only 33% of respondents reported that their companies' projects fully recovered.

Table 3 shows comparisons of PM performance by demographic/company-related characteristics, as well as COVID-19 PM factors. A significantly higher percentage of above-standard PM performance was observed for companies in the engineering/manufacturing sector, for companies operating for more than 30 years and for those classified as multinational. The percentage of above-standard PM performance was also significantly higher for companies experiencing only a mild impact of COVID-19 (48.4%), with an impact on controlling projects (41.9%), as well as for companies reporting PM preparedness (46.5%).

Factor	Value	Management Matters	
<i>COVID-19 impact level n (%)</i>			
Mild	93 (32.6%)	85	
Moderate	106 (37.2%)		
Severe	86 (30.2%)		
<i>PM activity impacted n (%)</i>			
Planning	83 (29.1%)		
Scheduling	92 (32.3%)		
Controlling	74 (26.0%)		
Other	36 (12.6%)		
<i>PM preparedness n (%)</i>			
No planning	77 (27.1%)		
Limited planning	107 (37.5%)		
Prepared	101 (35.4%)		
<i>Challenges n (%)</i>			
Delayed projects	152 (53.3%)		
Losing projects	46 (16.1%)		
Lack of flexibility	37 (13.0%)		
Other	50 (17.5%)		
<i>Current projects situation n (%)</i>			
Not recovered	191 (67.0%)	Table 2. Project management impact, challenges and preparedness during COVID-19	
Recovered	94 (33.0%)		
Note(s): Number of respondents = 285			
Source(s): Table by authors			

Table 4 shows results from logistic regression analysis. The logistic regression equation of the final model in Table 4 is as follows:

$$\ln\left(\frac{\hat{p}}{1-\hat{p}}\right) = -0.20 - 0.32 \times \text{Sector}_{\text{ABF}} - 1.66 \times \text{Sector}_{\text{PC}} - 0.16 \times \text{Sector}_{\text{BCN}} \\ - 1.62 \times \text{Sector}_{\text{IT}} - 0.68 \times \text{Sector}_{\text{EM}} - 0.21 \times \text{Sector}_{\text{Other}} \\ - 1.10 \times \text{CompanySize}_{\text{Small}} + 0.60 \times \text{CurrentProjectsSituation}_{\text{Recovered}} \\ + 1.3 \times \text{PMPpreparedness}_{\text{Prepared}}$$

Where \hat{p} is the expected probability that the outcome (PM performance being above or far above standard) is present. In the above regression equation, the outcome is the expected log of the odds that the outcome is present and is expressed in terms of the regression coefficients of the independent variables. Those variables are as follows:

- (1) Sector_{ABF} – binary indicator for the sector – accounting, banking and finance
- (2) Sector_{PC} – binary indicator for the sector – property and construction
- (3) Sector_{BCN} – binary indicator for the sector – business, consulting and management
- (4) Sector_{IT} – binary indicator for the sector – information technology
- (5) Sector_{EM} – binary indicator for the sector – engineering and manufacturing

Factor	N	Above-standard performance	%	p-value*
<i>Demographic and company-related characteristics</i>				
<i>Sector</i>				0.14
Retail	74	22	29.7%	
Accountancy/Banking/Finance	34	12	35.3%	
Property/Construction	31	9	29.0%	
Business Consulting/Management	29	6	20.7%	
Information Technology	23	7	30.4%	
Engineering/Manufacturing	22	13	59.1%	
Other	72	25	34.7%	
<i>Company history</i>				0.087
1–5 years	53	17	32.1%	
6–10 years	46	16	34.8%	
11–30 years	101	25	24.8%	
More than 30 years	85	36	42.4%	
<i>Company size</i>				0.025
Small	27	6	22.2%	
Medium	138	38	27.5%	
Multinational	120	50	41.7%	
<i>COVID-19 and project management (PM) factors</i>				
<i>COVID-19 impact level</i>				<0.001
Mild	93	45	48.4%	
Moderate	106	25	23.6%	
Severe	86	24	27.9%	
<i>PM activity impacted</i>				0.023
Planning	83	22	26.5%	
Scheduling	92	24	26.1%	
Controlling	74	31	41.9%	
Other	36	17	47.2%	
<i>PM preparedness</i>				<0.001
Not prepared	184	47	25.5%	
Prepared	101	47	46.5%	
<i>Challenges</i>				0.017
Delayed projects	152	45	29.6%	
Losing projects	46	12	26.1%	
Lack of flexibility	37	11	29.7%	
Other	50	26	52.0%	
Note(s): Number of respondents = 285 *Based on the chi-square test or t-test/Mann–Whitney U test				
Source(s): Table by authors				

Table 3.
Project management
performance by
company-related
characteristics and
COVID-19 factors

- (6) Sector_{Other} – binary indicator for the sector – other
- (7) CompantSize_{Small} – binary indicator for company size – small
- (8) CurrentProjectsSituation_{Recovered} – binary indicator for current projects situation – recovered.
- (9) CurrentProjectsSituation_{Recovered} – binary indicator for PM preparedness – prepared.

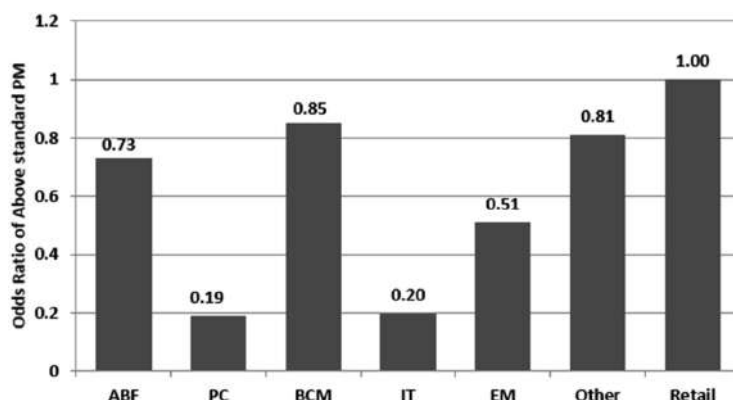
The results from logistic regression analysis showed that a higher likelihood of above-standard or far above-standard PM performance was significantly related to the retail sector, medium-size or multinational firms, PM preparedness and those firms with recovered projects ($p < 0.05$ for all odds ratios) as shown in Figure 2 below. Target group, company history, PM activity impacted and COVID-19 impact level did not independently predict PM performance (not shown).

Factor	Percent	OR	95% CI	p-value
<i>Sector</i>				
Retail	26.0%	1.00	Ref.	
Accountancy/Banking/Finance	11.9%	0.73	(0.29,1.82)	0.49
Property/Construction	10.9%	0.19	(0.06,0.56)	0.003
Business Consulting/Management	10.2%	0.85	(0.33,2.24)	0.75
Information Technology	8.1%	0.20	(0.06,0.62)	0.005
Engineering/Manufacturing	7.7%	0.51	(0.18,1.45)	0.20
Other	25.3%	0.81	(0.4,1.63)	0.56
<i>Company size</i>				
Small	9.5%	0.33	(0.12,0.94)	0.037
Medium/Multinational	90.5%	1.00	Ref.	
<i>PM preparedness</i>				
Not prepared	64.6%	1.00	Ref.	
Prepared	35.4%	3.87	(2.16,6.94)	<0.001
<i>Current projects situation</i>				
Not recovered	67.0%	1.00	Ref.	
Recovered	33.0%	1.82	(1.03,3.23)	0.040

Note(s): Number of respondents = 285. *OR: Odds ratio, CI: Confidence interval

Source(s): Table by authors

Table 4. Multivariate logistic regression model for PM performance



Note(s): ABF: accounting, banking and finance; PC: property and construction; BCM: business, consulting and management; IT: information technology; EM: engineering and manufacturing

Source(s): Figure by authors

Figure 2. Odds ratio of above standard PM by sector using the logistic regression model in Table 4

6. Discussion

As most of the companies (82%) were based in Saudi Arabia, the findings and their context are strongly linked with this region. Most of the respondents belong to retail, which is one of the largest sectors in the region, thus making this research generalisable. Another unique attribute of this dataset is its strong focus on both B2B and B2C, along with the fact that most companies are medium to large companies with the majority of the respondents having five or more years of experience. All the respondents acknowledge that the pandemic severely impacted their PM

activities and highlighted challenges they faced around resilience. But an interesting angle was revealed when only 35% of them claimed to have been prepared. Thus, whilst acknowledging the pandemic's impact, they also agree that their preparedness level for such a rare event is sub-par. Another key takeaway from these results is that most companies (70%) reported that the greatest challenge they faced during the pandemic was the loss of the project itself. This shows the level of uncertainty in this context, especially in the PM arena.

Despite reporting that they fear losing the whole project, companies report that they have not yet fully recovered. Sixty-seven percent of companies still have not recovered from the effects of the pandemic, which is an interesting outcome. The pandemic has not increased resilience in PM at companies, rather, they are still struggling in the aftermath of the pandemic. This is especially true in the planning and scheduling phases of PM, which are the early stages. So, challenges arose quite early on for businesses when executing PM activities during the pandemic. Resilience planning must therefore be adopted early as this will improve the overall management of projects, especially in the GCC region, which is strongly dependent on skilled labour and raw materials from the rest of the world.

The retail sector seems to stand out as compared to construction or services in this region in terms of higher PM performance during the pandemic. The retail sector has seemed to cope well despite shelf-life challenges, skilled manpower issues and raw material shortages. These sector-wide observations applied to both medium and large companies. The findings align with our earlier hypothesis (H1), which suggests that the size of the company and the type of the sector in which it operates affect the performance of projects post-pandemic. Whereas the history of a company, whether its work is B2B or B2C and the specific type of PM activity seem to play no part in above-average performance of PM in each sector. This negates our H2 hypothesis drafted earlier. These are interesting observations across the sector and in the GCC region, as typically companies are reluctant to share this information. The findings also highlight key intervention areas towards building PM resilience in companies across sectors.

This empirical work has strong implications for managers, as they are in the post-pandemic phase and resilience is high on their agenda. They need to understand the key factors which are affecting different stages of PM within different sectors. A common better performance bias appears in the IT and construction sector as they are mostly known to use PM. Despite comprising 60% of the sample, they seem to lag retail in the resilience of their PM practices. This may be unique for the GCC region; therefore, it is also important to conduct a region-wide analysis of post-pandemic PM performance.

7. Practical and theoretical implications

The implications of this research are quite far-reaching. Knowing that the company history, type of customer (B2B or B2C) and specific project activity have no impact on above standard PM performance in each sector of the GCC region, especially Saudi Arabia, is interesting. The findings will guide practitioners to focus on other important factors that significantly impact project performance. These factors include the size of the company (the larger the size the greater the resilience and hence superior PM performance), the relevant sector of the region and the planning and scheduling phases. These are the most important factors to be considered in post-pandemic resilience planning, as evidenced by Ghandour (2020) and Li *et al.* (2023). Similarly, the most adverse effects include project delays, inaccurate forecasting, managing manpower and regulatory delays. Construction, retail, IT and engineering stood out as the most resilient sectors, whereas banking, manufacturing and consulting appear to be lacking in this regard. Thus, from a policy point of view, more focus should be directed towards these sectors.

New theoretical constructs can be developed in PM resilience literature. This includes understanding the interplay of company size and operating sector to manage increased risks

in the post post-pandemic era. This complex interaction must be studied against the dynamics of developing countries and in the specific context of a given business sector. This will bring to light new areas of collaboration based on different stages of project activities and relevant types of customers (Müller and Klein, 2020). This is important, as new information is emerging post-pandemic, which has the potential to reconfigure already established relationships like a company's history and size concerning its customers in different stages of PM.

8. Conclusion

Resilience in PM is a key consideration for all project managers post-pandemic. They need to understand how different sectors are coping, which PM activities are affected, the level of impact and how these factors relate to their level of preparedness. This is especially true for the GCC region where there is a dearth of studies in the area of post-pandemic PM. This study shows that most companies are now reporting mild to moderate effects on their PM activities, for which they were not prepared earlier. The study also reveals that companies are the most resilient in the retail sector. These impacts are not linked with a company's history or type of customer it is serving. Similarly, planning and scheduling are the activities most affected post-pandemic, highlighting challenges for the initial stages of PM. Another interesting finding was that medium- and large-sized companies are reporting above-average performance in their PM, with their biggest challenge being a lack of flexibility and delayed projects in the post-pandemic era.

9. Future areas of research and limitations

As PM evolves and new ways of managing projects are coming to light post-pandemic, it is important to learn key lessons from this rare event and generate new insights, practices and resilience goals. Doing so includes understanding risk management, recognising best practices and integrating new processes into existing ones. Developing countries should be at the forefront of this debate as accessing relevant information in this context is a key hurdle, particularly in the GCC region. Given the scale of companies (285) included in this research, replication studies should be performed in Asia and Africa to validate the key factors affecting the above-average performance of companies in the PM field.

A possible limitation of this research is that agile PM was not specifically considered. Agile PM is based on a philosophy of change, so any new practices that emerge or new ways of managing risk can be better understood. Also, other important sectors could be considered, like oil and gas, mining and the services sector. Considering other sectors would add more depth and quality to this analysis, opening avenues of broader resilience practices and coordination and collaboration to mitigate the pandemic's effects and would create new theories of risk and leadership.

References

- Al Moslih, S., Al Harbi, A., Al-Mousa, A., Al-Asmri, M. and Bahaitham, H. (2021), "Trends and emerging practices in healthcare project management: the role of corona crisis management room to control COVID-19 spread in Aseer Region, Saudi Arabia", *Middle East Journal of Family Medicine*, Vol. 7 No. 10, doi: 10.5742/mewfm.2021.94131.
- Alsharif, A., Banerjee, S., Uddin, S.J., Albert, A. and Jaselskis, E. (2021), "Early impacts of the COVID-19 pandemic on the United States construction industry", *International Journal of Environmental Research and Public Health*, Vol. 18 No. 4, p. 1559, doi: 10.3390/ijerph18041559.
- Ayat, M., Qureshi, S.M. and Kang, C. (2023), "The moderating role of emerging technologies on the impact of coronavirus disease 2019 and the performance of construction projects: the case of

- Pakistan”, *Journal of Engineering, Design and Technology*, Vol. ahead-of-print No. ahead-of-print, doi: 10.1108/jedt-01-2023-0033.
- Blair, G., Barratt, S. and Pagano, R. (2022), “Serving the public in the post-pandemic world’: a study of project management in the public sector”, *Journal of Advanced Research in Alternative Energy, Environment and Ecology*, Vol. 9 Nos 1-2, pp. 11-18.
- Bushuyev, S., Bushuiev, D. and Bushuieva, V. (2020), “Project management during infodemic of the COVID-19 pandemic”, *Innovative Technologies and Scientific Solutions for Industries*, Vol. 2 No. 2, pp. 13-21, doi: 10.30837/2522-9818.2020.12.013.
- Ghandour, A. (2020), “The impact of COVID-19 on project delivery: a perspective from the construction sector in the United Arab Emirates”, *Humanities and Social Sciences Reviews*, Vol. 8 No. 5, pp. 169-177, doi: 10.18510/hssr.2020.8516.
- Hemadoshini, S.A. (2021), “Mitigating the impact of the global pandemic post post-COVID-19 in managing projects”, Doctoral dissertation, UTAR.
- Isang, I.W. and Ebiloma, D.O. (2023), “Challenges and strategies for sustainable project performance in the post-Covid era in Nigeria: a thematic analysis approach”, *Frontiers in Engineering and Built Environment*, Vol. 3 No. 1, pp. 32-47, doi: 10.1108/febe-06-2022-0025.
- KEK, V., Nadeem, S.P., Ravichandran, M., Ethirajan, M. and Kandasamy, J. (2022), “Resilience strategies to recover from the cascading ripple effect in a copper supply chain through project management”, *Operations Management Research*, Vol. 15 Nos 1-2, pp. 440-460, doi: 10.1007/s12063-021-00231-x.
- Koch, J. and Schermuly, C.C. (2021), “Managing the crisis: how COVID-19 demands interact with agile project management in predicting employee exhaustion”, *British Journal of Management*, Vol. 32 No. 4, pp. 1265-1283, doi: 10.1111/1467-8551.12536.
- Li, Z., Jin, Y., Li, W., Meng, Q. and Hu, X. (2023), “Impacts of COVID-19 on construction project management: a life cycle perspective”, *Engineering, Construction and Architectural Management*, Vol. 30 No. 8, pp. 3357-3389, doi: 10.1108/ecam-10-2021-0873.
- Malik, S.A. and Bustami, R. (2023), “Understanding demand and supply side factors: a cross-sector analysis from Saudi Arabia”, *Management and Sustainability: An Arab Review*, Vol. 3 No. 1, pp. 30-42, doi: 10.1108/msar-12-2022-0058.
- Müller, R. and Klein, G. (2020), “The COVID-19 pandemic and project management research”, *Project Management Journal*, Vol. 51 No. 6, pp. 579-581, doi: 10.1177/8756972820963316.
- Sami Ur Rehman, M., Shafiq, M.T. and Afzal, M. (2022), “Impact of COVID-19 on project performance in the UAE construction industry”, *Journal of Engineering, Design and Technology*, Vol. 20 No. 1, pp. 245-266, doi: 10.1108/jedt-12-2020-0481.
- Shahril, N.L.M. and Kamaruding, M. (2022), “The impacts of COVID-19 on the construction business operation and strategies to overcome”, *Asian Journal of Research in Business and Management*, Vol. 4 No. 2, pp. 160-169.
- Sharma, M., Luthra, S., Joshi, S. and Joshi, H. (2022), “Challenges to agile project management during COVID-19 pandemic: an emerging economy perspective”, *Operations Management Research*, Vol. 15 Nos 1-2, pp. 461-474, doi: 10.1007/s12063-021-00249-1.
- Waheeb, R.A., Wheib, K.A., Andersen, B.S. and Al-Suhiili, R. (2023), “Impact of pandemic SARS COVID-19 on different construction project management: problems and solutions”, *Public Works Management and Policy*, Vol. 28 No. 3, pp. 306-338, doi: 10.1177/1087724x221113579.

Corresponding author

Sheraz Alam Malik can be contacted at: sheraz.alam.malik@gmail.com

For instructions on how to order reprints of this article, please visit our website:

www.emeraldgrouppublishing.com/licensing/reprints.htm

Or contact us for further details: permissions@emeraldinsight.com





Management Matters

Issue 1

- 1 Adoption of EdTech products among college students: a conceptual study
Bargavi Ravichandran and Kavitha Shanmugam
- 20 Promoting transparency and accountability towards anti-corruption in pharmaceutical procurement system: does e-procurement play a significant role?
Leticia Mahuwi and Baraka Israel
- 38 Game on for learning: a holistic exploration of Gamification's impact on student engagement and academic performance in educational environments
C. Neerupa, R. Naveen Kumar, R. Pavithra and A. John William
- 54 A quantitative analysis of cosmeceuticals: business service quality and client satisfaction
Mariah C. Bond
- 78 Redefining resilience: insights into project management's capabilities of organisations through the pandemic and beyond
Sheraz Alam Malik and Rami Bustami

Management Matters is the official journal of Loyola Institute of Business Administration, Chennai published biannually. The Aim of the journal is to focus on the contemporary issues and developments in all the major fields of management. The journal follows a double-blind, peer-review process as per Committee on Publication Ethics (COPE) and it covers a broad range of interdisciplinary topics under the contemporary management paradigm. The journal covers the multidisciplinary functional areas of management, including and not limited to:

- General Management
- Strategic Management
- Marketing & Advertising
- Operations Management
- Logistics & Supply Chain Management
- Financial Management & Accounting
- Human Resource Management
- AI and Analytics in Management
- Quality management
- Organizational studies
- Business ethics and Economics
- International Business
- Entrepreneurship
- Consumer Behavior
- Corporate Social Responsibility and Sustainability

Homepage: <https://www.emeraldgroupublishing.com/journal/manm>

EDITOR-IN-CHIEF

Fr. Dr. C Joe Arun SJ

Loyola Institute of Business Administration, Chennai, Tamilnadu, India

CO-EDITOR

Dr. Deepak Mathivathanan

Loyola Institute of Business Administration, Chennai, Tamilnadu, India

E-mail deepak.mathivathanan@liba.edu

ASSISTANT EDITOR

Dr. Sivakumar K

Loyola Institute of Business Administration, Chennai, Tamilnadu, India

E-mail sivakumar.kirubanandan@liba.edu

EDITORIAL BOARD

Prof. MJ Xavier

Loyola Institute of Business Administration, Chennai, Tamilnadu, India

Prof. PC Lakshmi Narayanan

Loyola Institute of Business Administration, Chennai, Tamilnadu, India

Prof. P Chandiran

Loyola Institute of Business Administration, Chennai, Tamilnadu, India

Dr. B Aiswarya

Loyola Institute of Business Administration, Chennai, Tamilnadu, India

Prof. Slawomir Wycislak

Jagiellonian University, Poland

Prof. Narayanan Janakiraman

University of Texas at Arlington, United States

Prof. Mario Marco Molteni

Catholic University of the Sacred Heart, Milan

Dr. M Ramasubramaniam

Loyola Institute of Business Administration, Chennai, Tamilnadu, India

Dr. Deepa Ittimani Tholath

Loyola Institute of Business Administration, Chennai, Tamilnadu, India

Dr. Andrea Appolloni

University of Rome Tor Vergata, Italy

Dr. Andrea Patrucco

Florida International University, Miami, United States

Prof. Atour Taghipour

Université Le Havre Normandie, France

Dr. Marcos Dieste

University of Padova, Italy

Dr. Ginevra Gravili

University of Bari, Italy

Dr. Sandeep Jagtap

Lund University, Sweden

Dr. Syed Mithun Ali

Bangladesh University of Engineering and Technology, Bangladesh

Dr. Kamalakanta Muduli

Papua New Guinea University of Technology, Papua New Guinea

Dr. Simon Peter Nadeem

University of Derby, United Kingdom

Prof. Tarik Saikouk

Excellia Business School, France

Dr. V Raja Sreedharan

Cardiff Metropolitan University, United Kingdom

Dr. Shilpa Taneja

University of Sheffield, United Kingdom

Dr. Santosh Venugopal

Brest Business School, France

Prof. Asif Mahbub Karim

Binary University of Management and Entrepreneurship, Malaysia

Prof. VG Venkatesh

EM Normandie Business School, France

e-ISSN 2752-8359

p-ISSN 2279-0187

© Loyola Institute of Business Administration

Emerald Publishing Limited

Floor 5, Northspring, 21–23 Wellington Street,

Leeds LS1 4DL, UK

Tel +44 (0) 113 3231381

E-mail emerald@emerald.com

For more information about Emerald's regional offices please go to

<http://www.emeraldgroupublishing.com/offices>

Customer helpdesk:

<https://emeraldpublishinggroup.freshdesk.com/support/solutions>

Tel +44 (0) 113 3231381

E-mail support@emerald.com

The Publisher and Editors cannot be held responsible for errors or any consequences

arising from the use of information contained in this journal; the views and opinions

expressed do not necessarily reflect those of the Publisher and Editors, neither does the

publication of advertisements constitute any endorsement by the Publisher and Editors

of the products advertised.

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

Emerald is a trading name of Emerald Publishing Limited

