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## Journal Profile

The *Journal of Research in Business Information Systems* (JRBIS) is a national blind-reviewed, refereed publication published annually by the Association of Business Information Systems. This refereed journal includes articles from fields associated with business information systems focusing on theory, problems associated with information systems and information resources in education, business and industry, government, and the professions.

Manuscripts are selected using a blind review process. The first issue of the Journal was available Spring 2008. The Journal is listed in the ERIC Database and Cabell's Directory of Publishing Opportunities in Accounting, Computer Information Systems, Education, Instructional Technology, and Management.

## 2024 Editorial Reviewers



## Circulation/Readership

The readership is comprised of college and university faculty, administrators, staff, practitioners, and students engaged in business information systems or preparing for careers in fields related to information resources. The journal is distributed electronically annually to all Association of Business Information Systems members as part of conference registration or membership. The journal is also available online at http://www.abis-fbd.org.

# *2024 Journal of Research in Business Information Systems (JRBIS)*

# Call for Manuscripts

## Deadline: July 31, 2024

We invite you to submit manuscripts for publication consideration in the 2024 issue of the *Journal of Research in Business Information Systems (JRBIS)*, a national blind-reviewed, refereed journal published annually by the Association of Business Information Systems (ABIS). According to the Constitution and Bylaws of ABIS, the published articles of *JRBIS* are limited to the papers presented at the previous ABIS Annual Conference or published in the *ABIS Proceedings*.

This refereed journal includes articles from fields associated with business information systems focusing on theory; issues related to information systems; and information resources in education, business and industry, government, and the professions. Manuscripts should address topics of interest to the wide-ranging interdisciplinary and practitioners who read *JRBIS*. The readership includes college and university faculty, administrators, staff, practitioners, and students engaged in business information systems or preparing for careers in fields related to information resources. The journal is distributed electronically annually to all Association of Business Information Systems members for conference registration or membership. The journal is also available on the ABIS website for public scrutiny.

Submissions of manuscripts relating to topics, along with research findings, theoretical and practical applications, discussions of issues and methods for teaching and assessing instructional technology, and reviews of textbooks are encouraged. Manuscripts will be selected using a blind review process. Manuscripts should not have been published or be under current consideration for publication by another journal.

### Submission and Formatting Guidelines

Submit abstracts electronically in Microsoft Word format. Manuscripts, citations, and references must use the **APA 7th edition** style format.

Submissions should include a <u>separate file attachment</u> for the title page that contains the following information in this exact order:

- Title of the manuscript
- Each author's full name; position/title; institutional affiliation, including address, city, state, zip code; home, office, and cell phone numbers; and e-mail addresses (identify the main author who should receive all correspondence).
- Number of words in the article (including all parts–everything)
- Biographical paragraph (50-60 words) for each author
- Any acknowledgments or information about manuscript history (e.g., based on a conference presentation)

The second <u>separate file attachment</u> should be the manuscript file that begins with the title of the article, a 50-100 word abstract, 3-5 keywords or phrases describing the focus of the article, and the body of the manuscript. **Do not include any personal or institutional affiliation information in this file.**

The manuscript body must adhere to the following guidelines:

- 10-25 double-spaced pages (3,000-6,000 words)
- 1" margins all around
- Times New Roman, 12 pt. font-size text within the article
- Bold and center primary headings, with major words capitalized
- Bold and left-align secondary headings, with major words capitalized
- No footnotes or endnotes
- No page numbers or headers or footers

Tables and figures may have varying font sizes (but must adhere to APA Style). Include tables or figures formatted and placed correctly within the manuscript.

Include the References page at the end of the manuscript, followed by appendix information, if necessary.

All submissions will be reviewed by the editor and at least two reviewers, using a blind review process. Authors will receive feedback 6-8 weeks after the initial peer review. Manuscripts will be “accepted,” “accepted with minor revisions,” “possibly accepted after major revision and resubmission for further peer review,” or “rejected.”

The editor reserves the right to edit selected/accepted manuscripts for publication as deemed appropriate and necessary to optimize journal publication and format. The manuscript’s author retains responsibility for the accuracy of a manuscript published in the *Journal of Research in Business Information Systems*.

To ensure your manuscript is considered for publication in the *2024 Journal of Research in Business Information Systems*, submit the manuscript by July 31, 2024, to the JRBIS journal editor.

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# Journal of Research in Business Information Systems

**Volume 17, Number 1**
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*Distinguished Paper Award (2024)*

# Project Quality Culture in MIS and Organizational Performance:

# A Comprehensive Analysis

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**Abstract**

This research addresses the problem of evaluating the impact of establishing a quality culture on organizational performance. It uses Schein's Theory of Organizational Culture and the Theory of Organizational Excellence as guiding frameworks. A qualitative systematic review method is used to synthesize findings from various databases such as Cochrane Library, PubMed, EBSCO Host, Web of Science, and EMBASE, revealing the significance of a quality culture. A thematic analysis has been conducted to analyze the collected data. The study's findings indicate that organizational values, leadership commitment, and employee development are the key factors that influence the formation of a quality culture and stress the significant positive impact of a quality culture on numerous organizational performance dimensions such as customer satisfaction, operational efficiency, employee engagement, long-term competitive advantage, and innovation. In conclusion, the study highlights the need for organizations to align their values with practices, prioritize consumer-centric approaches and invest in leadership commitment to foster a quality culture for continued optimal productivity.

## Introduction

### Background and Rationale

This research purposes to address the problem of evaluating the impact of establishing a quality culture on organizational performance. In the current vastly competitive business environment, numerous firms across diverse industries continuously search for sustainable growth and a competitive advantage. In this case, one key facet that has gathered upsurging attention in organizations is the development of a quality-oriented culture (Syaifuddin & Sumartik, 2022). Seo & Jung (2021) suggest that a quality culture is the values, shared beliefs, and behaviours in a firm that prioritizes promoting stakeholders' commitment to quality in every aspect of a firm's functioning. Research indicates that organizational culture norms significantly impact all stakeholders involved with an organization (Ratna et al., 2020).

Besides, it incorporates aspects such as the quality of services and products, quality communication, processes, and internal and external relations. An emphasis on quality organizational culture has increasingly become a key concern in an organization's everyday operation because it stems from its potential to impact organizational performance relevantly and eventually contribute to improving a competitive advantage (Bashayreh, 2019). In addition, research indicates that since the fundamental goal of any organization is to ensure profitability, one of the best places to begin advancements is by examining an organization's work culture (Roreng, 2020). In his study, Bashayreh (2019) suggests that organizations that mainly prioritize quality are regularly better armed to meet the needs and expectations of clients, decline errors and defects, ensure effectiveness, foster innovation, decision-making, internal flexibility, ensure better utilization of human capital, leadership, policy formulation and promote an organization’s overall working conditions. These elements collectively improve an organization’s overall performance, which in turn, is vital for the long-term fruitfulness. As the quality of organizational culture continues to gain more recognition as a perilous driver of organizational performances and fruitfulness, it has become imperative to carry out comprehensive analysis research to comprehend its impact, identify factors influencing its establishment, as well as the dimension of organizational performance (Syaifuddin & Sumartik, 2022).

While some research has touched on the influence of quality culture on an organizational performance, this area remains underexplored. Thus, the problem addressed by this research is the need for organizations to improve their performances in the speedily changing business setting. It proposes that developing a quality culture is crucial to superior organizational performance. The cause of the issue lies in the need for a quality culture that can negatively influence stakeholder returns and organizational performance. The study will use a qualitative systematic review to comprehend the relationship between performance and quality culture. Information will be drawn from the theoretical framework provided by Schein's Theory of Organizational Culture and the Theory of Organizational Excellence. Data will be gathered from reputable sources such as Cochrane Library, PubMed, EBSCO Host, Web of Science, and EMBASE and data analysis conducted via the thematic analysis techniques. Besides, it will be intended for managers, researchers, business leaders, and quality professionals interested in ensuring organizational performance through quality culture.

## Research Question

How does establishing a quality-oriented culture within an organization impact its overall performance and competitive advantage?

## Research Objectives

**RO1**. To explore the key elements and features of a quality-oriented culture within organizations.

**RO2**. To investigate the key dimensions of organizational performance impacted by a quality culture.

**RO3**. To explore the factors influencing the establishment of a quality culture.

**RO4**. To recognize the effects of quality culture on organizational performance.

**Scope**

The scope of the paper includes a deep investigation of Schein's Theory of Organizational Culture and the Theory of Organizational Excellence as the primary approaches for comprehending quality culture. The paper will also delve into the empirical evidence associated with the influence of quality culture on several organizational performance dimensions. It will analyze profitability, liquidity, growth, and stock market performance. Additionally, it will explore some critical factors that influence the development of a quality culture, including organizational structure, leadership commitment, and employee engagement.

**Significance of the Study**

The paper significantly contributes to empirical evidence and existing knowledge by offering strategies crucial for designing a quality culture in an organization (Syaifuddin & Sumartik, 2022). It purposes to provide an actionable understanding that organizations and individuals can use to transform the findings into skills and knowledge, advancing an organization's competitive edge in the marketplace. The paper significantly contributes to the field of organizational management by providing a comprehensive exploration of the relationship between quality culture and organizational performance. The importance of these contributions lies in their potential to guide organizations in fostering and sustaining quality cultures that can enhance their competitiveness and long-term sustainability and equip stakeholders, including researchers, managers, and practitioners, with actionable knowledge to align their practices and strategies with the principles of quality culture for improved results and stakeholder satisfaction.

The initial analysis indicates that organizations prioritizing quality culture are better equipped to steer business complexities. They experience an upsurge in consumer loyalty and satisfaction, enhanced operational efficiency, greater adaptability and innovation, improved employee engagement and productivity and a sustainable competitive advantage.

**Roadmap of the Research**

The paper will be structured as follows: In the succeeding parts, the paper will delve into the theoretical frameworks that inform the study, review the relevant literature, thoroughly discuss the methodology used, present study findings shedding light on how quality culture influences different dimensions of organizational performance and conclude with the implications and recommendations for firms interested in establishing a quality culture to advance their performances.

# Methodology

## Methodological Choice

The current study used a qualitative research method to obtain information on the issue of quality culture and organizational performance. The method is essential because it provides in-depth information for the research, scrutinizes ranks, and provides reliable and precise evidence on the research topic (Bhandari, 2023). Specifically, the research utilized systematic reviews, which enabled the researcher to summarize a large body of evidence to recognize, assess, and put together findings on all vital studies on quality culture and organizational performance. Additionally, systematic reviews enabled the researcher to obtain an all-ranging overview of the literature and assess prior works on the current study topic, enhancing transparency and declining errors and bias (Bhandari, 2023).

## Search Strategy

Research provides enough evidence that a well-designed search strategy is considered the heart of any systematic review. It encompasses terms that assist in retrieving resources to assess for inclusion and eligibility. In this case, the current study used an appropriate search strategy to facilitate accurate, valid, and reliable findings from the study reviews (Mtisi, 2022). The research used numerous databases such as Cochrane Library, PubMed, EBSCO Host, Web of Science, and EMBASE. The databases were the most effective for the current research as they include resources with vital information on diverse issues and because they often post journals and articles. They have filters that assist in narrowing the research and producing sources linked to the study topic.

### Search Terms

The search terms used in the current research include quality culture, organizational performance, organizational performance dimensions, as well as the impacts of quality culture on organizational performance.

### Inclusion and Exclusion Criteria

An inclusion criterion is essential because it identifies resources that should be incorporated into a systematic review. In contrast, an exclusion criterion encompasses resources that should not be used in a review's scope. As such, the research included studies published in English, published in 2013 or later, and those incorporating information on the study topic. However, the exclusion criteria included journals and articles not published in English those published before 2013 and did not include information on the research topic.

### Data Analysis

The current research used a thematic data analysis technique to analyze data. The technique is utilized to recognize and analyze themes within an overt dataset. The method was essential for the research because it allowed the researcher to hinge on an explanation of the study topic from numerous systematic reviews (Lochmiller, 2021). First, the researcher familiarized with the information by reading and re-reading journals and articles to attain a comprehensive study topic. Codes were generated by labelling data segments vital to the study topic; themes searched within the coded texts by comparing the codes, and themes reviewed and refined to determine their uniqueness, coherence, and significance. The next steps involved naming and defining themes to compel evidence that sufficiently and suitably answered the research topic and sufficiently answered the study topic and designing a coding scheme demonstrating the relationship between codes, sub-themes, and overarching themes. The codes and themes were assigned to numerous groups, assessed, and validated to ensure credibility and reliability. Further, a logical, concise, and coherent report on the issue of quality culture and organizational performance was developed.

### Ethical Considerations

The researcher observed numerous ethical considerations linked to secondary research. As such, the researcher followed ethical considerations of intellectual property rights, sought consent from the authors to utilize and evaluate their work, and evaded cases of plagiarism (Naufel & Edwards, 2022). Consequently, the information indicated in the research was credible and transparent.

## Literature Review

### Theoretical Framework

Numerous models have been designed to indicate the integral connection amongst quality culture and organizational performance. In this research, key theories that helped inform the problem under study are the Theory of Organizational Excellence and Schein's Theory of Organizational Culture.

### Schein's Theory of Organizational Culture

MIT professor Edgar Schein founded the theory in 1980 (Cuofano, 2023). Cuofano (2023) suggests that it is founded on the belief that an organizational culture tends to develop over time. It encompasses three key domains: espoused values, underlying assumptions, and artifacts. As such, artifacts are the superficial levels of a firm’s tangible culture as well as the easily felt and seen manifestations such as the physical surroundings, products, technology, language ceremonies, and values (Cuofano, 2023). Besides, espoused beliefs and values incorporates strategies, goals, shared beliefs, norms, values, and perceptions implanted by founders and managers. The fundamental assumptions are regarded as the foundation level of a firm’s culture. They are the extremely-taken-for-granted, entrenched, and insentient joint assumptions with others in an organization (Cuofano, 2023).

Schein's framework is essential because it offers a valuable lens for comprehending how quality culture is embedded within an organizational culture. In addition, the theory stresses the most profound aspects of culture that impact quality, which might be the fundamental assumptions that are not readily visible. However, even if the theory assists in diagnosing existing culture (Cuofano, 2023), it fails to inherently offer prescriptive directions on ways organizations can foster or change the quality culture. Further, it may only partially capture the evolving and dynamic nature of diverse organizational cultures, which change occasionally.

Thus, the theory should be utilized with other approaches to efficiently guide the development of a quality culture for performance advancement.

### Theory of Organizational Excellence

The concept was founded by Thomas Peters and Robert Waterman in 2014 (Hung-Baesecke et al., 2021). According to Hung-Baesecke et al. (2021), It is founded on the notion that organizations accomplish excellence via a systematic approach to quality management and organizational success. A fruitful organization should be characterized by cultural practices that stress closeness to clients, actions, employee involvement, continuous improvement, productivity, entrepreneurship, simplicity, value-based efforts, economic resources use, and lean staff directly associated with quality culture. However, the theory might, in some cases, fail to entirely account for behavioural and cultural aspects of change, which is challenging to execute, does not address all performance and culture dimensions, and its efficiency varies across diverse organizational sizes and industries (Hung-Baesecke et al., 2021). Therefore, combining diverse theories to comprehend the connection between quality culture and organizational performance would be vital.

## Empirical Framework

### Quality Culture

Syaifuddin & Sumartik (2022) suggest that quality culture is a fundamental element in the realm of performance advancement and organizational management. In his research, Bashayreh (2019) notes that it involves designing shared beliefs, values, attitudes, and behaviours in an organization that promotes participation, trust, communication, and commitment to quality in all aspects of its operations. Numerous researchers have defined the concept differently depending on an organizational-specific focus and context (Seo & Jung, 2021; Syaifuddin & Sumartik, 2022). According to Bashayreh (2019), quality culture refers to how a firm's values are translated into practice. However, the author stated that the definition needs to delve deeper into the practical aspects of how values translate to behaviours and actions (Bashayreh, 2019). Besides, Adler (2022) indicates that quality culture is synonymous with an organizational commitment to continuous advancement to better products, processes, and outcomes. In addition, Roreng (2020) defines organizational culture as the unwavering focus to meet and surpass consumer’s expectations. The author notes that it involves organizational leadership setting a tone by displaying their commitment to providing quality products and services via their decisions, actions, and support for quality initiatives (Roreng, 2020). However, Ratna et al. (2020) stated that a definition solely centered on leadership does not effectively address employee's roles and their contribution to quality culture. Therefore, defining a quality culture should consider such facets as shared value, leadership commitment, employee engagement, and the client's focus on organizational objectives and difficulties (Ratna et al., 2020).

**Dimensions of Organizational Performance**

Comprehending how quality culture impacts diverse dimensions of organizational performance is essential for organizations striving to be fruitful in an incredibly competitive corporate setting (Olabamiji, 2019). Shamsudin et al. (2022) provides enough evidence that the key dimensions include liquidity, profitability, growth, stock market performance and growth. The researchers indicated that profitability is crucial in measuring a firm's aptitude to produce income according to its investments and expenses (Shamsudin et al., 2022). Research provides enough evidence that a quality culture significantly influences organizational profitability via increased consumer loyalty, cost reduction, advanced service and product quality, and enhanced reputation (Olabamiji, 2019). However, it can be impacted by other factors, such as competition and the condition of the market (Hamann & Schiemann, 2021). Therefore, separating the direct impact of quality culture on profitability is challenging.

Liquidity is another key dimension of organizational performance (Olabamiji, 2019). Shamsudin et al. (2022) suggest that it measures a firm's ability to accomplish its short-term financial duties efficiently. Liquidity helps echo the availability of cash in an organization, and comprehending it is vital for operational flexibility and financial stability (Shamsudin et al., 2022; Olabamiji, 2019). In their study, Hamann & Schiemann (2021) indicate that a quality culture significantly influences liquidity via effective operations, which leads to declining working capital needs and an advancement in cash flow. Nevertheless, such factors as unexpected events and economic downturns can have an immediate impact (Hamann & Schiemann, 2021).

In addition, growth is an essential dimension of organizational performance because it helps evaluate an organization's development, expansion, and progress over an extended period (Olabamiji, 2019). It is measured via such metrics as market share increase, revenue growth, and new market expansion (Shamsudin et al., 2022). It shows an organization's ability to adapt to changes (Hamann & Schiemann, 2021). Olabamiji (2019) suggest that an organization's sustainable growth and quality culture increases a firm's competitive advantage, fosters a surrounding that encourages adaptability and innovation and enhances client loyalty and satisfaction. Nevertheless, in their conclusion, Hamann & Schiemann (2021) state that growth is influenced by other factors such as economic conditions, market saturation, and regulatory changes, and a sole emphasis on growth tends to neglect other crucial aspects of organizational performance.

Further, a firm's stock market performance is a crucial organizational performance dimension that helps echo how investors perceive an organization as well as how its shares are treasured in a financial market (Olabamiji, 2019). It offers valuable insights into investors' expectations and sentiments, which rewards organizations surpassing market expectations (Hamann & Schiemann, 2021). There are various components of stock market performance, which include market capitalization, stock price, dividend yield, price-earnings ratio, and earnings per share (Shamsudin et al., 2022). However, the researchers suggested that apart from the stock market performance contribution to a positive perception among investors, other vital factors play a pivotal role in determining the prices of stocks (Shamsudin et al., 2022). Therefore, the stock market performance should consider both long-term trends and short-term fluctuations, as well as the relationship between market sentiments.

**Factors Influencing the Establishment of a Quality Culture**

In their research, Gutzeit et al. (2020) note that leadership commitment is one of the key factors that influence how a quality culture is established in an organization. In this case, the researcher indicated that how leaders run a business significantly influences the rules, procedures, and policies set for all stakeholders (Gutzeit et al., 2020). In another research, Omar & Mahmood (2020) suggest that leaders who actively prioritize and demonstrate a quality culture set the tone for the whole workforce. As such, the author noted that leader's cases of inconsistencies tend to undermine efforts aimed at establishing a quality culture (Omar & Mahmood, 2020).

In addition, an organization's structure significantly impacts the development of a quality culture (Tulcanaza-Prieto et al., 2021). For example, an organization with a decentralized and flat structure regularly promotes responsiveness and agility to quality issues (Sumardi & Fernandes, 2020; Janićijević, 2020). However, Janićijević (2020) notes that those with rigid and hierarchical structures face numerous challenges through the processes of innovation and communication, making it difficult to develop a quality culture.

Organizational values and norms guide their behaviors and policies, which, in turn, assists in promoting a quality culture that everyone wants to be part of (Janićijević, 2020). In this interest, in his research, Šprajc et al. (2022) conclude that prioritizing quality increases an organizational likelihood to embrace quality culture. However, numerous research noted that a slight detachment between stated values and norms and the actual behavior has a higher likelihood of eroding trust and preventing the development of quality culture (Šprajc et al., 2022; Cera & Kusaku, 2020; Nneji & Asikhia, 2021).

In addition, Nneji & Asikhia (2021) note that continuous training and development, rewards, and recognition play a crucial role in equipping workers with knowledge, skills, reinforcements, and motivations essential for maintaining quality standards. Therefore, organizations should evaluate their unique contexts and actively perform to align the identified factors with their goals of quality culture (Kairiša & Lapiņa, 2019; Hasan, 2023).

## Impact of Quality Culture on Organizational Performance

### Operational Efficiency and Process Improvement

Hasan (2023) indicates that quality culture forms a foundation to lead a company toward continuous advancement and operational excellence. The researchers concluded that it encourages continuous improvement insights where workers at all levels are motivated to recognize and address defects in an organizational operation (Hasan, 2023). Besides, Syaifuddin & Sumartik (2022) suggest that the emphasis on process advancements causes an upsurge in operational efficiencies. However, research indicates that accomplishing efficiency in operations via quality culture demands allocating vital resources and ongoing commitments (Syaifuddin & Sumartik, 2022; Seo & Jung, 2021).

### Customer Satisfaction and Loyalty

Bashayreh (2019) suggests that a quality culture is essential to an organization because it focuses on comprehending, meeting, and surpassing consumer's expectations. In addition, Adler (2022) concluded that attitudes and behaviors exhibited within a robust organizational culture influence consumer relation. When interacting with an organization, they drive what clients hear, see, and feel (Roreng, 2020). Research indicates that if a company has a quality culture, it strengthens the consumer's satisfaction and loyalty as well as positive word-of-mouth for referrals by developing a lasting and positive impression on them (Ratna et al., 2020; Nneji & Asikhia, 2021). Nevertheless, the authors indicated that continually meeting and surpassing clients' expectations requires more investments in client service advancements and feedback mechanisms (Nneji & Asikhia, 2021).

### Employee Engagement and Productivity

A positive quality culture is key to accomplishing an organization's goals (Nneji & Asikhia, 2021). Research provides enough evidence that how workers behave in an organization depends on how happy and in place they feel regarding its culture (Kairiša & Lapiņa, 2019). Besides, Cera & Kusaku (2020) indicate that practicing an engaged culture enables a firm to retain top talents by making them feel as if they are cherished and valued, enabling them to work hard to increase productivity. In addition, Šprajc et al. (2022) indicate that developing employee engagement needs an effective leadership system, a supportive work environment, and chances for continuous training.

### Innovation and Adaptability

Organizations with a culture that fosters collaboration, flexibility and encourages employee satisfaction enable them to be more innovative and adaptable to the changing market conditions (Šprajc et al., 2022; Janićijević, 2020). Sumardi & Fernandes (2020) outlines that a workplace culture that connects people emotionally to an organization's strategic directions and fosters a continuous flow of ideas supports employees' innovation and adaptability efforts, ensuring a firm stay competitive. However, the researcher notes that designing a culture of innovation experiences resistance in a traditional organization and requires learning from failures (Sumardi & Fernandes, 2020).

### Competitive Advantage and Long-Term Sustainability

A quality culture enhances a sustainable competitive advantage by nurturing fueled innovation and creativity and facilitating decision-making and team-based problem-solving (Tulcanaza-Prieto et al., 2021). In this case, constantly providing high-quality products and services is vital because it sets a firm apart in a market and develops a reputation for excellence and reliability (Omar & Mahmood, 2020). Nevertheless, Tulcanaza-Prieto et al. (2021) pointed out that nourishing a competitive advantage for a long time needs continuous adaptation and effort. Additionally, changes in competition and market conditions demand ongoing advancements and innovation (Tulcanaza-Prieto et al., 2021; Janićijević, 2020; Cera & Kusaku, 2020).

## Research Gap

Even with the wide-ranging reviewed literature, there is still a need for more context-specific and comprehensive research on the need for an all-ranging understanding of how the formation of a quality culture impacts an organization's overall performance. While existing literature has investigated the theoretical foundations and underscores the possible impacts of quality culture on numerous organizational performance dimensions, there is a gap in synthesizing empirical evidence to offer an actual understanding of how firms can efficiently cultivate and uphold a quality culture to accomplish tangible advancements in such areas as customer satisfaction, profitability, long-term competitiveness and employee engagement. Thus, bridging the gap would guide organizations to practical strategies to improve their performance via the execution of a quality culture.

## Findings

The literature review indicated that the quality culture focuses on translating organizational values into practices and on surpassing clients' expectations and continuous advancements. Numerous reviews highlighted several key dimensions of organizational performance, including liquidity, growth, profitability, and stock market performance (Shamsudin et al., 2022; Olabamiji, 2019). Hamann & Schiemann (2021) supported this by indicating that quality culture is found to have a noteworthy influence on the identified dimensions. Omar & Mahmood (2020), Tulcanaza-Prieto et al. (2021), Sumardi & Fernandes (2020) and Janićijević (2020) added that it can lead to an upsurge in an organization's profitability via reduction of costs and advanced quality of product, drive growth by advancing client's loyalty and satisfaction, boost liquidity via effective organizational operations and positively impact stock market performance through the development of investor's confidence.

Studies highlighted that some of the factors that influence quality culture include employee involvement, leadership commitment, communication, organizational structure, rewards and recognition, training, and development, and the alignment of a firm's norms and values (Janićijević, 2020; Šprajc et al., 2022; Cera & Kusaku, 2020; Kairiša & Lapiņa, 2019). The researchers emphasize the issue of leadership commitment as a pivotal facet in setting a tone for an organization's entire workforce (Nneji & Asikhia, 2021; Hasan, 2023).

Numerous researchers found that quality culture impacts organizational performance in numerous ways (Ratna et al., 2020); Roreng, 2020). Adler (2022), Bashayreh (2019), Syaifuddin & Sumartik (2022) mentioned that quality culture heartens continuous advancement, causing an upsurge in operational effectiveness. Besides, numerous studies emphasize meeting and surpassing clients' expectations, positively influencing consumer loyalty and satisfaction (Seo & Jung, 2021; Cera & Kusaku, 2020; Janićijević, 2020). In addition, Šprajc et al. (2022) pointed out that quality culture nurtures employee engagement through the involvement of workers in quality initiatives. Further, Kairiša & Lapiņa (2019), Sumardi & Fernandes (2020), Nneji & Asikhia (2021), and Roreng (2020) noted that organizations with quality cultures are more adaptable and innovative to changes have an increased sustainable competitive advantage.

## Implications for Research

### Contributions of the Research Paper to the Existing Body of Knowledge

The research paper makes numerous contributions to the existing body of knowledge on the connection between organizational performance and quality culture. It synthesizes empirical evidence, key theories, and factors that impact quality culture, offering a wide-ranging understanding of its effect on several organizational performance dimensions. In addition, the paper sheds light on the importance of organizational values, innovation, leadership commitment, and employee engagement in shaping quality culture. Further, it provides an organized review of relevant literature, consolidating existing knowledge on the study subject.

### Implications for Management

The study shows that Firms are required to prioritize the development and sustenance of a quality culture. In this case, managers should enthusiastically show their obligation to quality principles to encourage the entire workforce. Also, the research indicates that managers should invest in programs vital for employee training and development to equip them with knowledge and skills essential to maintain organizational quality standards. They should foster innovation and adaptability to provide a competitive advantage and emphasize customer satisfaction by aligning services, products, and operations with client's needs and prospects to reinforce loyalty and satisfaction. The study provides an understanding of why managers should learn that a quality culture is a practical necessity for the success of organizations, understand the importance of cultivating a culture of constant operational excellence and continuous improvement and comprehend that worker empowerment and engagement are key drivers for a quality culture.

CEOs and the Board of Directors should understand that, as leaders, it is important to champion the growth of a quality culture aligned with a firm's strategic goals. The unwavering quality commitment, investment in employee development, and a culture of innovation will help secure the leader's position, ensuring long-term success.

## Limitations of the Study

There is no research without limitations. In this case, the study's current research findings may only generally apply to some organizations because culture tends to vary. Besides, the research relied on research from various researchers, which may introduce potential biases. Further, the paper recognizes that the effect of quality culture on organizational performance can be impacted by various contextual factors that have yet to be extensively explored in this review.

## Directions for Future Research

To extend this research, future research should delve into empirical explorations to authenticate the conceptual relationships identified in the current paper. Discovering case studies across diverse organizational sizes and industries would offer crucial acumens into the practical implications of nurturing a quality culture. Furthermore, investigating the role of digital transformation and technology in designing a quality culture and its succeeding impact on performance could be an auspicious avenue for further research. Thus, researchers should continue to explore the association between quality culture and organizational performance, using a variety of methodologies and contexts to deepen our understanding of the issue under study.

## Conclusion

This research highlights the relevance of cultivating a quality organisational culture to increase stakeholder performance. Besides, the research stresses the importance of aligning stated values with actual practices, focusing on leadership commitment, consumer satisfaction and investing in employee development. Nevertheless, it is important to recognize the study's limitations, which include potential variation in results across diverse organizational settings. Implications of the research incorporate the need for organizations to carry out culture evaluations, emphasize consumer feedback mechanisms and invest in leadership training. Moreover, researchers are heartened to investigate the complex relationship between organizational performance and quality culture using different methodologies and settings. Organizations should acclimatize, be committed to, and align their cultures with organizational norms, goals, and values. Therefore, this research significantly contributes to the literature by underscoring the practical requirement of a quality culture in accomplishing more incredible organizational performance.

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**How Does a CEO Change Employees' Perceptions?**

**A BERTopic Modeling of Employees' Comments on Glassdoor.com**

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## Abstract

This study aims to examine how a CEO may change employees' perceptions on an organization. We focused on current employee perceptions at the company X, formerly Twitter. Using BERTopic modeling, we examined reviews from Glassdoor.com from before and after Elon Musk became the CEO. BERTopic modeling showed that six negative topics emerged before Musk became CEO, and nineteen negative topics were identified after he became CEO. Further information was provided through data visualizations such as hierarchical clustering graph and similarity matrix. Additional details are provided that show how BERTopic modeling is an effective tool for educators and professionals alike.

*Keywords*: CEO leadership, BERTopic modeling, topic word scores, hierarchical clustering, similarity matrix

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*Keywords*: CEO leadership, BERTopic modeling, topic word scores, hierarchical clustering, similarity matrix

## Introduction

Business intelligence (BI) is a set of processes, methods and technologies that collect and transform raw data into usable information. This information can then be used by businesses to make strategic decisions (Zheng, 2017). Data visualization is an extension of business intelligence practices. Through data visualization, as the name implies, data is transformed into a visual representation, the output often being used for communication purposes. While the process may seem complicated, the concept is simple- convert complex and hard to understand data into easily understandable images. (Zheng, 2017). Data visualization is used throughout different types of industries and can be leveraged by several departments within an organization. This can be as simple as using charts within a PowerPoint presentation. Other data visualization outcomes include dashboards, reports, tree maps, and topic maps (Dudycz, 2010).

Today more than ever, companies have large amounts of data at their discretion. Data visualization is a great tool to make use of this data and turn it into interruptible results. Topic modeling is an effective way to review large amounts of data and identify patterns or connections between them, providing greater insight than the stand-alone data (Barde & Bainwad, 2017). In turn, these patterns can then be turned into a visual that can be shared within an organization.

This paper will review how to use BERTopic modeling to turn data into a usable visual. To demonstrate how this process can be used effectively, we examined Glassdoor.com reviews to gain greater insight into how a change of leadership, specifically that of a chief executive officer (CEO), impacted employee perceptions at X, formerly Twitter. An overview of BERTopic modeling will be presented as well as implications for businesses and educators.

## Theoretical and Methodological Background

In today's business world, a key source of data is social media. Former, current, and prospective employees alike flock to social media sites to gather and share information about companies. Glassdoor.com is a well-known social media job platform that is leveraged by both employers and job seekers. Through the platform, current and past employees can provide ratings and feedback on the culture, compensation, benefits, and interview process of a company. Current and former employees can also provide answers to whether they would recommend the company to a friend.

Glassdoor.com also serves as a platform to promote employer branding, defined as "the strategy that a company can use to differentiate its brand as an employer from its competitors, with the purpose to provide the company with good applicants and to maintain talent within the organization" (Gehrels & Looij, 2010, p. 3). Through the platform, companies adopt employer branding to attract human capital and maintain current employees to be engaged in corporate culture and business strategy of companies (Boella & Goss-Turner, 2019). In a similar vein, job seekers explore this platform to acquire valuable information that can help them decide if they want to seek employment at a given company (Hansen & Aditham, 2023).

Glassdoor.com also allows current and previous employees to rate the company's CEO. Glassdoor.com uses this CEO approval rating to measure the quality of the CEO (Stansell, 2019). Glassdoor.com has used this information to identify factors that make a good CEO. While the three largest predictors of CEO approval were employees' views on senior leadership, their views on culture and values, and having a positive business outlook, the least important predictor of CEO approval was work-life balance in that "most workers appear willing to trade work-life balance in exchange for working with great CEOs." (Stansell, 2019).

Reviews on sites like Glassdoor can give employers insight into the attitudes and perceptions of current employees. This may be particularly helpful during times of change, including when a change of leadership, such as a CEO, an executive, or board members, takes place. Knowing how employees perceive this change is imperative in managing the company's culture.

In our example, we focused on current employee perceptions at the company X, formerly Twitter. The X organization went through a very public and what may be considered hostile leadership change. While any change may lead to a shift in employee perception, the changing of a CEO may be even more impactful given the role they play within an organization.

CEOs are often seen as being "accountable for a firm's vision, strategic direction, policies, corporate communication and culture- the same major image variables that drive corporate reputation." (Flatt et al., 2013, p. 206). Likewise, CEOs are often seen as the face of the company and can have a direct impact on the company's overall reputation. While being a prominent or well-known CEO does not always equate to a positive company reputation, those who have won public awards have a stronger reputation (Love et al., 2017).

While research has shown a connection between the perception of the CEO and the reputation of the company, it provides this insight at a high generic level. By using BERTopic modeling, an organization, such as X, can see how such a change impacted the perception of their employees specifically.

**BERTopic Modeling**

BERTopic modeling is a technique that has recently evolved with the advancement of the big data analytics field (Egger & Yu, 2022). This tool is a Python code library that uses topic modeling to create easily interpretable topic categories. BERTopic considers the context of the text to determine the grouping of each topic. Each topic can then be further analyzed to determine its meaning.

## Methods and Results

For this paper, 1,700 Glassdoor comments for X, formerly Twitter, were analyzed using BERTopic modeling. Comments were limited to current employees and were broken into two-time frames to measure the impact of the change of CEO from Jack Dorsey to Elon Musk. The first timeframe included comments that were made by current employees one year leading up to Elon Musk becoming the CEO of then Twitter. The second timeframe includes comments that were made by current employees the year following Musk becoming CEO. Comments from the first six months of the transition were not included for analysis. Additionally, this technique considers the context of the reviews and determines if they were negative or positive. BERTopic modeling produces three visuals that can be used to explain data in a practical way: (a) topic word scores chart; (b) hierarchical clustering graph; and (c) similarity matrix

### Topic Word Score Chart

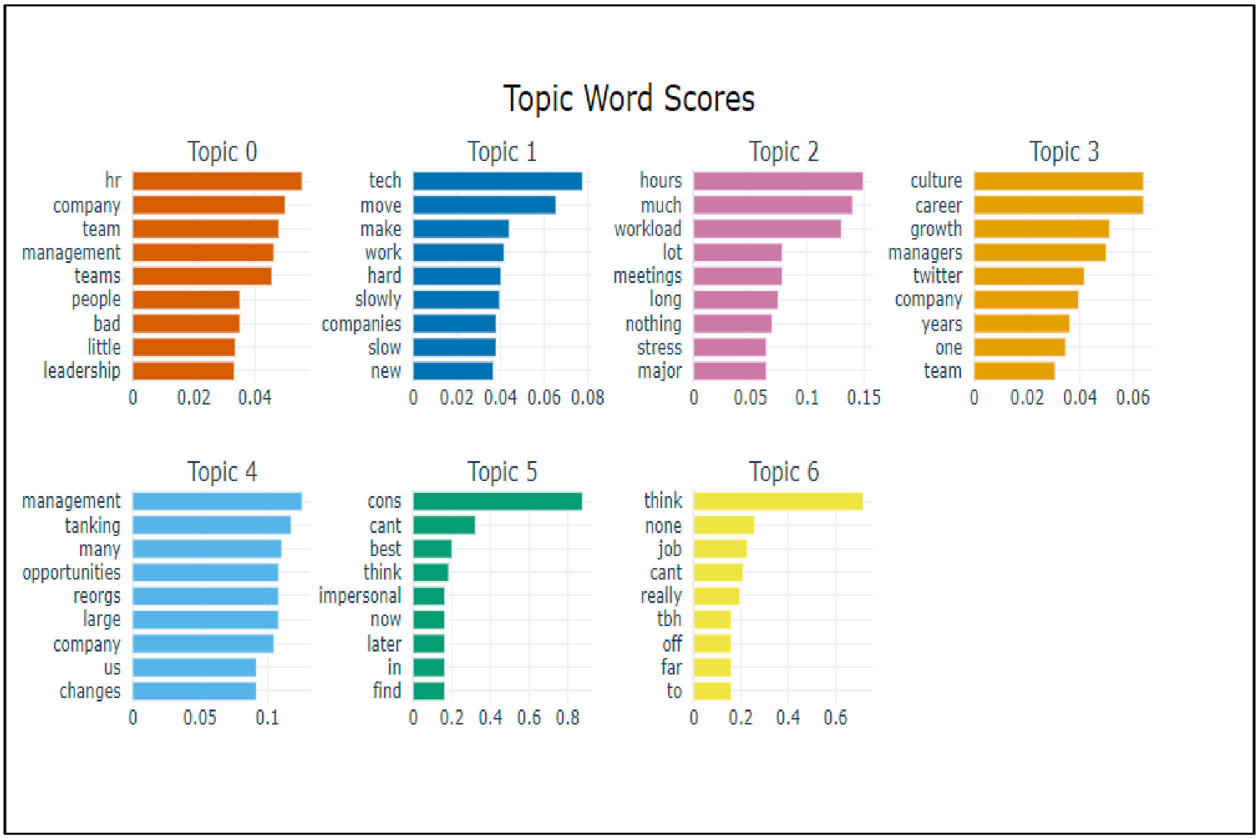
With BERTopic Modeling, each word is assigned a c-TF-IDF score. Words are then grouped into topics based on their corresponding scores. The scores indicate the weight or importance of each word within the topic. This is represented by the lengthy of the bar associated with each word. A longer bar means the word is more significant in defining the topic within the dataset.

Once the topics have been created, they can be further analyzed to define the topic groupings. In the given scenario, Topic Word Score Charts were created to show both the negative and positives of working at Twitter/X for the two distinct timeframes- before and after Elon Musk became CEO.

Figure 1 and 2 show the topic word score and their associated interpretation for negative comments that were analyzed both before and after Elon Musk became CEO.

**Figure 1**

*Topic Word Scores of Negative Reviews before Elon Musk*




As presented in Figure 1, six negative topics were identified before Elon Musk became CEO, excluding topic 0. Topic 1 is associated with technology and the pace of work, such as how companies or projects are moving forward or developing slowly. Topic 2 tends to address work-related issues like long hours, heavy workload, stress, and the impact of meetings on work. Topic 3 appears to focus on company culture, growth, and managerial aspects, suggesting discussions around corporate development and team dynamics. Topic 4 is likely to be related to management, possibly in the context of banking or corporate reorganizations, and the opportunities or changes these bring. Topic 5 contains words that could indicate negative sentiments about impersonal experiences or bureaucracy (“cons”, “cant”, and “impersonal”). Lastly, topic 6 features words suggesting a negative or skeptical view of work (“think”, “none”, “job”, “cant”, “really”, “tbh”).

**Figure 2**

*Topic Word Scores of Negative Reviews after Elon Musk*

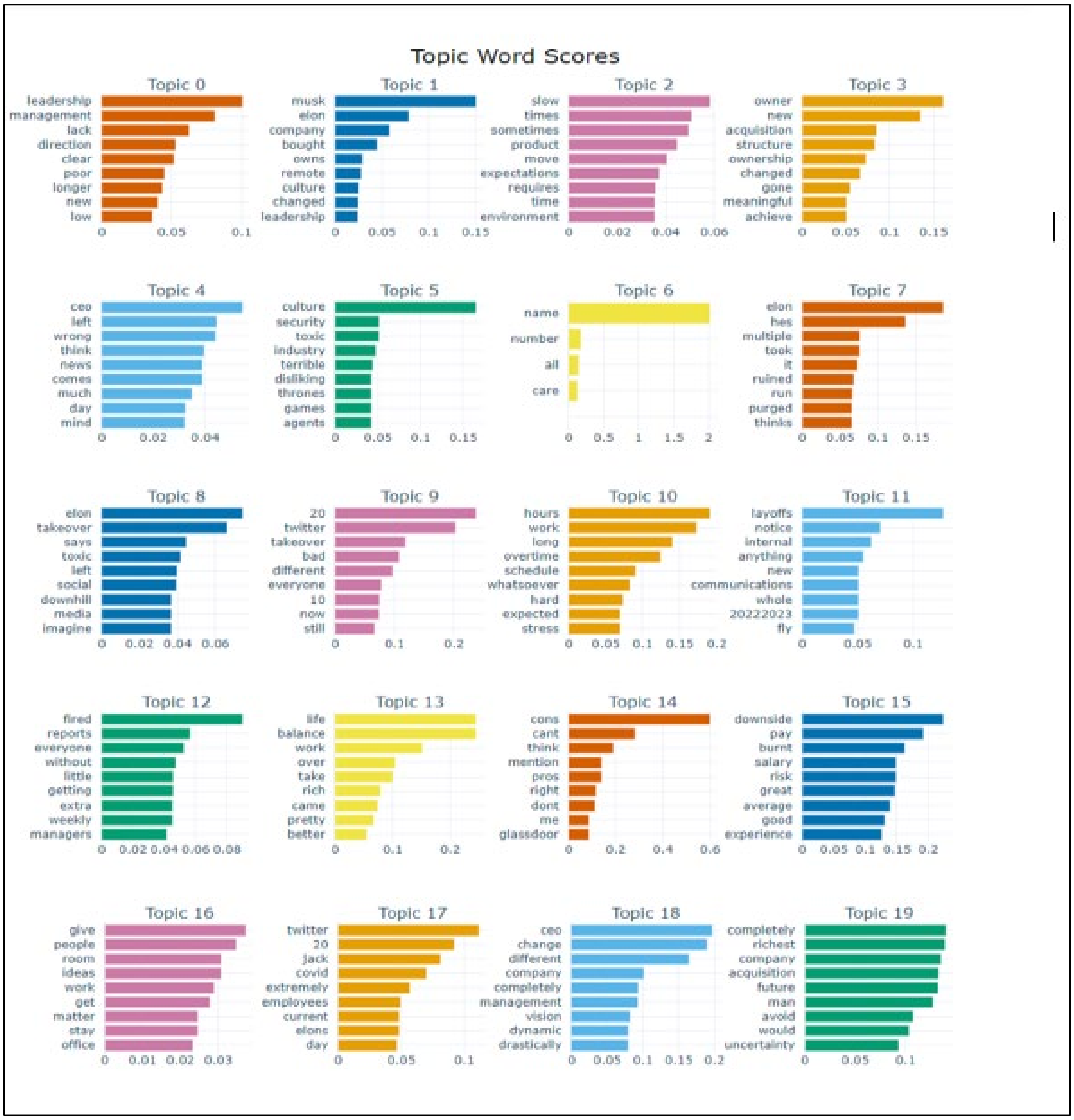


Figure 2 shows that 19 negative topics were determined after Elon Musk became CEO, excluding for topic 0. Topic 1 tends to be involved in a discussion about a prominent figure of Elon Musk and aspects related to a company where he is involved with. Topic 2 could be discussing product development, innovation, and market expectations. Topic 3 appears to relate to business topics like ownership, acquisition, and company structure. Topic 4 reveals CEOs and leadership, with terms suggesting opinions or news related to top management. Topic 5 seems to focus on security, culture, and industry, potentially discussing issues related to the workplace or external threats. Topic 6 is likely to be about personal names and numbers, suggesting it could be related to data or statistical analysis. Topic 7 is related to centers around an individual (Elon Musk), with words like “helps”, “multiple”, and “ruined”, indicating various opinions or news about his actions. Topic 8 is also related to Elon Musk, likely discussing his activities on social media platforms like Twitter. Topic 9 focuses on the topic of work hours, overtime, and associated stress. Topic 10 tends to deals with layoffs and internal company communications, possibly related to corporate restructuring or downsizing. On topic 11, the single term “20220223” is unclear but could reference a specific date and its significance to the data set. Topic 12 shows  workplace reports, getting fired, and possibly dissatisfaction with managers. Topic 13 discusses work-life balance, time off, and career satisfaction. Topic 14 examines the presence of the word “glassdoor”, suggesting that it may include reviews or opinions shared on the Glassdoor website. Topic 15 is related to compensation and employee satisfaction with their salary and experience.

Topic 16 seems to revolve around giving feedback or sharing ideas and thoughts, potentially in a workplace or social context. Topic 17 includes “Twitter”, “Jack”, “COVID”, possibly discussing the platform’s role or response during the COVID-19 pandemic. Topic 18 discusses significant changes in company management or structure. Lastly, topic 19 tends to touch on wealth, acquisition, and perhaps the future planning of a company.

The topic word score charts provide a pictorial overview of the shift in employee perceptions. Before the change of CEO, six negative topics emerged from the BERTopic modeling. After the change of CEO, 19 negative topics were evident. Positive topics went from 15 identified positive topics when Dorsey was CEO to 8 positive topics when Musk was CEO. Even without further analysis, the figures show that the overall sentiment became more negative after Elon Musk became CEO. However, to understand the impact and potential contributing factors to the shift of perceptions, the additional visual outputs of BERTopic must be analyzed.

**Hierarchical Clustering**

Another outcome of BERTopic modeling is hierarchical clustering, presented in Figure 3 and 4. This process can reduce the number of topics by merging those that are in effect related. Likewise, it also shows which topics are unrelated to the others. Hierarchical clustering first groups similar topics together and then shows which groupings are related to one another.

The more topics included in the output, the more impactful hierarchical clustering may become. These examples reduce the number of topics to consider from 19 to 10 when looking at the negative reviews after Elon Musk became CEO. This clustering of topics provides professionals greater focus when determining how to act on the data.

**Figure 3**

*Hierarchical Clustering of Negative Reviews before Elon Musk)*

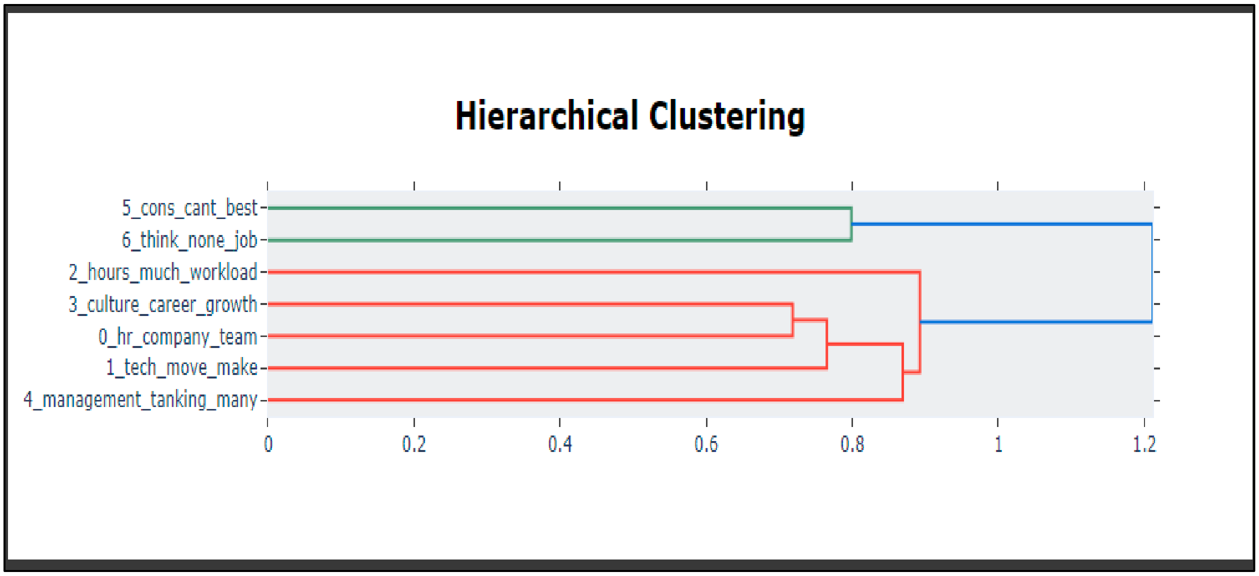
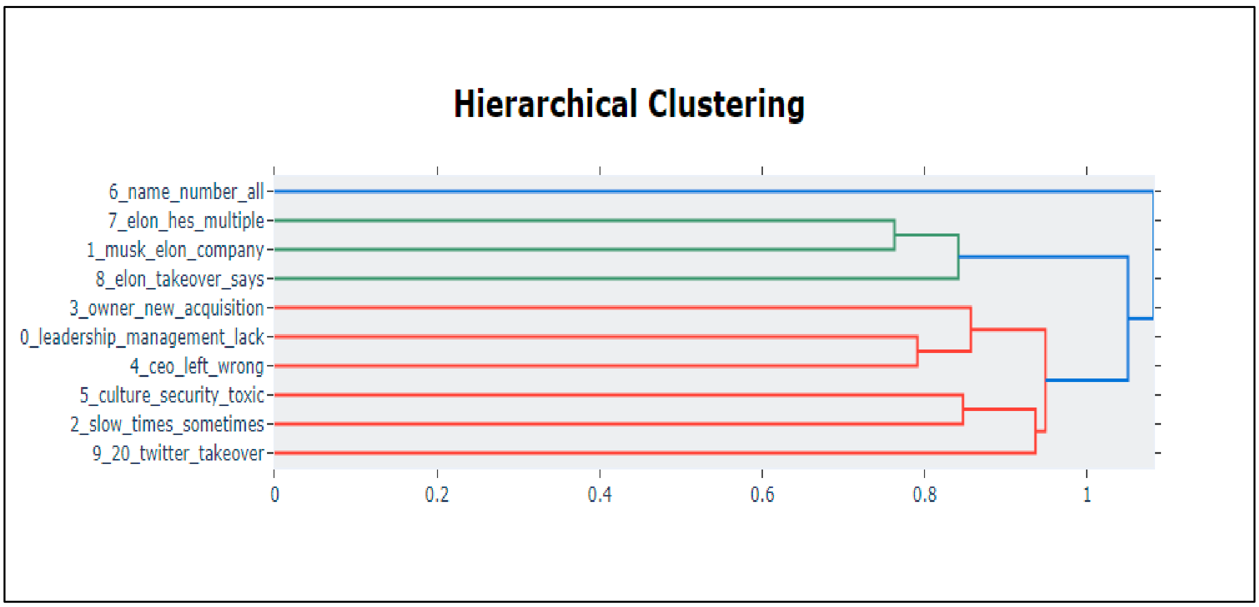



**Figure 4**

*Hierarchical Clustering of Negative Reviews after Elon Musk*




**Similarity Matrix**

A similarity matrix is another way to reduce the number of topics to review. Each row and column of the matrix represents a topic identified within the dataset, labeled with leading keywords for identification (e.g., “0_hr_company_team” represents topic 0 with keywords “hr”, “company”, and “team”). The colors in the matrix represent the level of similarity between the topics, with the color scale on the right side indicating the similarity score. Darker colors (closer to 1 on the scale) indicate higher similarity between topics. If two topics have a dark-colored square at their intersection, it suggests they share more thematic content. On the other hand, lighter colors (closer to 0 on the scale) represent lower similarity, implying that the topics have less in common.

**Figure 5**

*Similarity Matrix of Negative Reviews before Elon Musk*

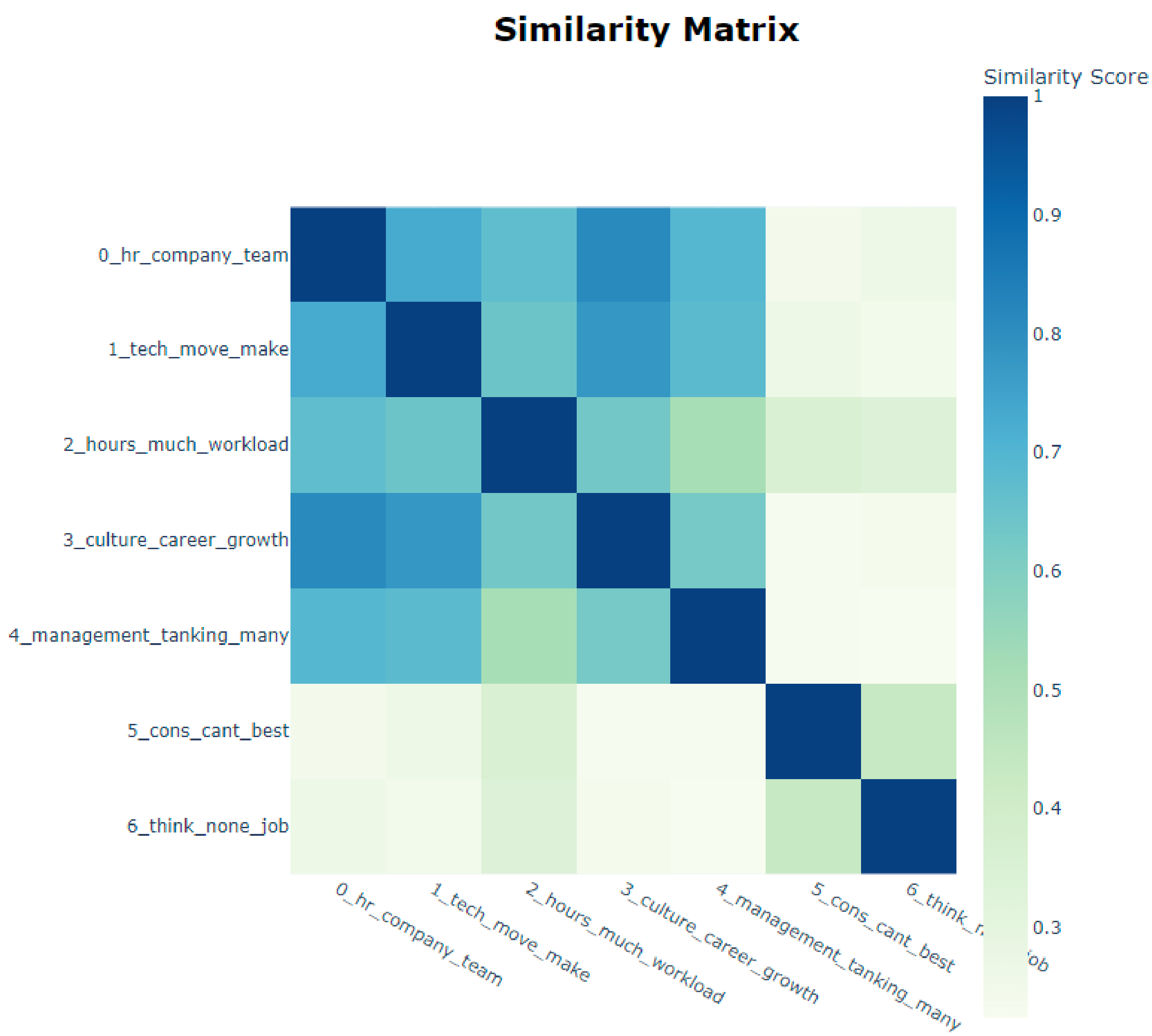


**Figure 6**

*Similarity Matrix of Negative Reviews after Elon Musk*

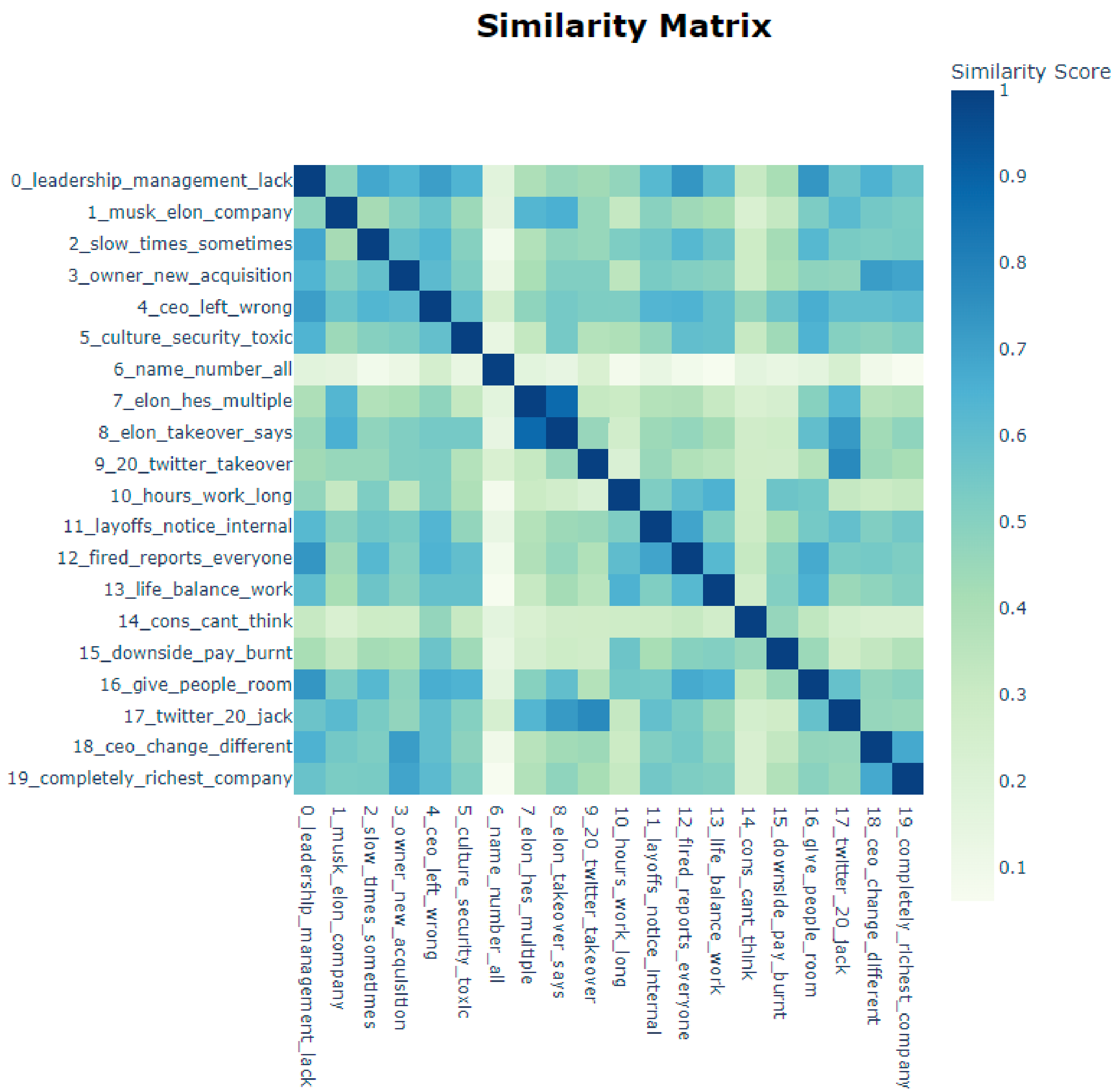



Figure 5 depicts the similarity matrix for the topics identified in the negative reviews before Elon Musk became CEO. Given that darker colors represent higher similarity, topic 0 (“0_hr_company_team”) tends to have a moderate similarity with topic 4 (“4_management_tanking_many”), possibly because both discuss aspects of management and team dynamics within a company. Topic 5 ("5_cons_cant_best") seems to have low similarity with almost all other topics, which could suggest it contains unique thematic content not widely shared with the other topics. Topics 3 ("3_culture_career_growth") and 6 ("6_think_none_job") may have a higher degree of similarity, which could indicate they both discuss aspects related to job satisfaction, career growth, or workplace culture.

On the other hand, Figure 6 presents the similarity matrix for the topics identified in the negative reviews after Elon Musk became CEO. Given that darker colors represent

negative reviews before Elon Musk became CEO. The topics related to "Elon Musk" (topic 1, 7, and 8) tend to show higher similarity among themselves because they share a common subject. The topics discussing workplace issues like work-life balance (13) and workload (10) might be similar if they share terminology related to employment conditions. The topics with very distinct themes, such as leadership (0) and Twitter (17), are likely to show low similarity.

## Limitations of BERTopic

As with each method, there are limitations of BERTopic modeling that should be discussed. While it does consider the context of the comments when creating the topics, BERTopic does not consider the external factors that may be contribute to the creation of the comments. In the given example, it can show which words may fit together, but it does not consider how the change itself may impact employee comments. The hierarchical and similarity matrixes are useful to show which topics are related or correlated, but it is important to note that these charts do not show causality. Likewise, these measures do not quantify the impact of each topic, so it is impossible to tell how much a given topic has impacted an organization either positively or negatively.

## Implications

## Implications for Organizations

This study provides practical implications for organizations. Methodologically, companies can adopt BERTopic modeling with Glassdoor.com comments to understand employees' perceptions about their organizational culture and leadership. HR managers and practitioners can acquire insights for better directions of change management and leadership development by analyzing the voice of employees and developing a trajectory of organizational culture influenced by leadership change. Based on those insights, they may provide HR interventions including change management, leadership development, and organizational restructuring. Employees who are frequently supposed to gather data through focus group interviews or the voice of customer also utilize BERTopic modeling for a better understanding of the results of analyses. They can deliver the results visualized by hierarchical clustering or similarity matrix so that their customers and stakeholders have a better understanding intuitively.

Conceptually, in terms of employer branding, organizations should be able to notice the importance of internal employer branding and ultimately utilize positive employee value propositions of current employees to appeal their company to potential candidates. It is certain that their effort to improve unsatisfied elements of current employees should be preceded. Finally, companies can strengthen a positive organizational identity so that they attract more competitive human capital and maintain current employees.

## Implications for Educators

This study also provides practical implications for educators or teachers. BERT topic modeling can be incorporated to class projects or assignments. When students do not have enough literature and need to identify the cause of a problem based on a phenomenon, they may have difficulty in conducting a survey or interview to gather data. Instead, they are able to acquire data through open sources such as social media or review portals and properly examine problems and causes through BERT topic modeling, which contributes to making a sound judgment for an appropriate solution. In addition, teachers in higher education, who teach non-engineering majored students, can adopt data visualization tools such as hierarchical clustering and similarity matrix in their classes to explain topics of liberal arts. These tools tend to provide more successful learning opportunities for students, especially Generation Z who prefer visual learning methods, than oral or written instructions.

## Conclusion

This study examines how CEO changes employees' perceptions on an organization. Reviews on Glassdoor.com can give employers insight into the attitudes and perceptions of current employees. This may be particularly helpful during times of change, including when a change of leadership, such as CEO, executive, or board members, takes place. Knowing how employees perceive this change is imperative in managing the company's culture. In our example, we focused on current employee perceptions at the company X, formerly Twitter. The X organization went through a very public and what may be considered hostile leadership change. By using BERTopic modeling, before the change of CEO, six negative topics emerged but after the change of CEO, 19 negative topics were determined. Also, further information was provided through data visualizations such as hierarchical clustering graph and similarity matrix. Overall, BERTopic modeling is an effective tool for educators and professionals alike. In a world of big data, it translates data into an easily interpretable visual.

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**Managing Time Through a Crisis: Business Majors' Strategies Before and During COVID-19**

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**ABSTRACT**

The proposed study investigates whether significant differences exist in student responses for computer information systems, accounting, and business administration majors to a 19-question Likert scale Time Management survey before and during COVID-19 at a regional four-year public university in Louisiana.

Data collected in a longitudinal study was used to examine differences between business majors in three (3) time management dimensions: short-range planning, long-range planning, and time attitudes. Researchers hypothesize significant differences exist between majors and time management practices during the two pandemic stages. The current study will build on previous research that supports the significance of this study among School of Business majors.

Keywords: Time Management, Pandemic, COVID-19, Business Students, Self-Regulation, Academic Success Skills

## Introduction

The COVID-19 pandemic influenced student behaviors as students faced new challenges in college, work, and home life. But did these challenges change how students viewed their time management skills?

Previous research supported the hypothesis that there are significant differences in perceived time management skills among business majors in accounting, business administration, and computer information systems. This research study seeks to explore and expand on the knowledge learned regarding time management skill differences among these business student groups by investigating how students answered a 19-question Likert scale time management survey in a longitudinal study that collected data before and during the COVID pandemic.

## Literature Review

In earlier studies (Nonis and Hudson 2006; Thibodeaux, Deutsch, Kitsantas, and Winsler 2017), researchers claimed that today’s higher education students were less equipped to manage the difficulty of college education and training than students in previous generations. In 2020, to determine if time management was an essential skill for business students’ academic success, a comparative longitudinal study of time management skills was undertaken by Hardy, Powell, and Pharris across three dimensions of time management among business majors. They determined significant differences between freshman and senior students in short-range planning but not in time attitudes and long-range planning. Additionally, it showed no significant differences between accounting, business administration, and computer information systems students in time management in terms of short- and long-range planning and time attitudes. In a more recent 2020 study, Pharris, Hardy, and Powell focused on the differences in self-regulated time management practices between three majors across age and gender. They discovered that, on average, female students responded significantly more positively to the short-range planning questions than male students, and there was no significant difference in time attitudes between genders. However, there was a significant difference among age groups and more than 50% of the responses generated significant differences between genders regarding overall time management.

A study conducted by Macan, Shahani, Dipboye, & Phillips (1990) reported that the coping strategy of time management is more complex than earlier believed and is one major issue among students in higher education influencing how they perceive and utilize time to manage academic tasks. They concluded that students who perceived themselves to have more control of time juggled their academic tasks more effectively. A study published in January 2022 reported an impact on student self-regulated time management related to the COVID-19 pandemic. Authors Alkhawaji and Orji (2022) explored the impact of COVID-19 on graduate and undergraduate students. Regarding time management behavior, they concluded most students recognized a low ability to control their time due to lifestyle changes and shifting from face-to-face to online platforms. This disruption led to significant shifts in daily schedules and a lack of concentration and motivation.

Alhasani et al. (2022) conducted a study exploring the impact of the COVID pandemic on 502 student participants in higher education and captured their perceptions and attitudes toward time management. The perceptual factor in the study indicated that the students had a low perceived ability to control time during the pandemic. (Khanam et al. 2017; Chapman et al. 2008).

Napoles et al. (2023) conducted a five-point Likert scale study at Mindanao State University during the COVID pandemic with a sample population of 182 undergraduates. They reported that time management skills did not significantly affect students' school performance. Conversely, in a study conducted during COVID-19 by Heo, Bonk, & Doo (2021), 1200 students enrolled in a resident undergraduate program in South Korea. The study concluded that self-efficacy in time management had a significant positive impact on self-efficacy in an online learning environment and learning engagement, thereby suggesting that time management plays a major role in the success of online learning.

Recognizing the importance of students mastering time management to achieve academic success and based on previous research outcomes, the authors seek evidence that there will be a perceived difference in time management among business students based on study results gathered during the pre-COVID and COVID eras.

## Methodology

Table 1 is this study's 19-question Likert scale survey instrument on time management, divided into three factors. The questions are an adaptation from Britton and Tesser (1991) by using the term "semester" instead of "quarter." Question 14 is added to capture social media use that was nearly nonexistent in 1991. Participants selected one option for each question from 'never,' 'infrequently,' 'sometimes,' 'frequently,' and 'always.' The Likert scale for the options ranged from 1 to 5, where 1 is generally considered negative practice and 5 is positive. For most questions (1-7, 9, 12, 15-16, 18-19), 'never' receives the value 1, and 'always receives' the value 5; however, for questions 8, 10, 11, 13, 14, and 17, the researchers reversed the range because 'never' is a more positive practice.

The three factors include short-range planning (SRP), time attitudes (TA), and long-range planning (LRP). SRP (questions 1-7) focuses on planning the day and week. TA (questions 8-14) measure attitudes towards constructive time use. LRP (questions 15-19) focuses on items related to planning or working on a broader time window, like semester goals or avoiding procrastination. Researchers sum each factor and report the summation into a score ranging from 7 to 35 for SRP and TA and 5 to 25 for LRP. Additionally, researchers sum all questions into the time management score (TMQ) ranging from 19 to 75.

**Table 1**
*Time-Management Questionnaire Survey Instrument*

| |
|---|
| Short-Range Planning (SRP) |
| 1. Do you make a list of the things you have to do each day? |
| 2. Do you plan your day before you start it? |
| 3. Do you make a schedule of the activities you have to do on work/school days? |
| 4. Do you write a set of goals for yourself for each day? |
| 5. Do you spend time each day planning? |
| 6. Do you have a clear idea of what you want to accomplish during the next week? |
| 7. Do you set and honor priorities? |
| Time Attitudes (TA) |
| 8. Do you often find yourself doing things which interfere with your schoolwork simply because you hate to say "No" to people?[a] |
| 9. Do you feel you are in charge of your own time, by and large? |
| 10. On an average class day, do you spend more time with personal grooming than doing schoolwork?[a] |
| 11. Do you believe that there is room for improvement in the way you manage your time?[a] |
| 12. Do you make constructive use of your time? |
| 13. Do you continue unprofitable routines or activities?[a] |
| 14. On an average class day, do you spend more time on social media (Facebook, Twitter, Instagram, Snapchat, text messages, email, etc.) than doing schoolwork?[a] |
| Long-Range Planning (LRP) |
| 15. Do you usually keep your desk clear of everything other than what you are currently working on? |
| 16. Do you have a set of goals for the entire semester? |
| 17. The night before a major assignment is due, are you usually still working on it?[a] |
| 18. When you have several things to do, do you think it is best to do a little bit of work on each one? |
| 19. Do you regularly review your class notes, even when a test is not imminent? |

[a] Reversed score—'never' received a score of 5

This study investigates differences among business majors (accounting, business administration, and computer information systems) between the pre-COVID-19 and COVID-19 era. For that purpose, investigators define pre-COVID-19 as semesters before fall 2020 and

COVID-19 as semesters between fall 2020 and fall 2022. Spring 2020 is the semester of the COVID-19 outbreak. The survey data gathered during that semester was before the pandemic outbreak. Fall 2022 was the first semester students were returning to relatively normal operations. However, students faced significant personal and academic issues related to the pandemic.

**Hypothesis**

The research question is whether there is a difference in time management practices among business majors between pre-COVID-19 and COVID-19 times. The hypotheses are:

H1: There is a significant difference between pre-COVID-19 and COVID-19 semesters in (a) short-range planning, (b) time attitudes, (c) long-range planning, and (d) overall time management for all business students.

H2: There is a significant difference between pre-COVID-19 and COVID-19 semesters in (a) short-range planning, (b) time attitudes, (c) long-range planning, and (d) overall time management for students majoring in accounting.

H3: There is a significant difference between pre-COVID-19 and COVID-19 semesters in (a) short-range planning, (b) time attitudes, (c) long-range planning, and (d) overall time management for students majoring in business administration.

H4: There is a significant difference between pre-COVID-19 and COVID-19 semesters in (a) short-range planning, (b) time attitudes, (c) long-range planning, and (d) overall time management for students majoring in computer information systems.

**Subjects**

Participants include 18 years or older students majoring in a school of business at a Louisiana four-year public university during fall and spring semesters from fall 2017 to fall

2022, except for spring 2019, due to a data collection error. The survey was voluntary and confidential in a freshman-level introductory class and a senior-level capstone course. The university's institutional research office provided demographics using the participant's identification number. All procedures were IRB-approved. Table 2 shows the disbursement of 1027 participants during the semesters, which follows the general trend that spring semesters have lower enrollment than fall semesters. The demographics, Tables 3 and 4, align with the general diversity of the school of business and the university.

**Table 2**
*Participant counts per semester for pre-COVID-19 and during COVID-19 semesters.*

| ***Pre-COVID-19*** | | ***COVID-19*** | |
|---|---|---|---|
| **Semester** | **Total** | **Semester** | **Total** |
| Fall 2017 | 124 | Fall 2020 | 115 |
| Spring 2018 | 83 | Spring 2021 | 87 |
| Fall 2018 | 113 | Fall 2021 | 106 |
| Fall 2019 | 128 | Spring 2022 | 84 |
| Spring 2020 | 64 | Fall 2022 | 123 |
| **Total** | **512** | **Total** | **515** |

**Table 3**
*Participant counts per major, age, and gender for pre-COVID-19 and during COVID-19.*

| | | ***Pre-COVID-19*** | | | ***COVID-19*** | | |
|---|---|---|---|---|---|---|---|
| **Major** | **Age Group** | **Female** | **Male** | **Total** | **Female** | **Male** | **Total** |
| ACCT | 20 and Under | 25 | 22 | 47 | 23 | 10 | 33 |
| | 21-24 | 25 | 3 | 28 | 21 | 12 | 33 |
| | 25 and Up | 34 | 4 | 38 | 43 | 8 | 51 |
| BUAD | 20 and Under | 69 | 86 | 155 | 77 | 101 | 178 |
| | 21-24 | 39 | 19 | 58 | 38 | 26 | 64 |
| | 25 and Up | 37 | 21 | 58 | 37 | 12 | 49 |
| CIS | 20 and Under | 15 | 51 | 66 | 8 | 49 | 57 |
| | 21-24 | 8 | 6 | 14 | 6 | 10 | 16 |
| | 25 and Up | 15 | 33 | 48 | 7 | 27 | 34 |
| **Total** | | **267** | **245** | **512** | **260** | **255** | **515** |

**Table 4**
*Participant counts per ethnicity, major, and gender for pre-COVID-19 and during COVID-19.*

| Ethnicity Group | Female ACCT | Female BUAD | Female CIS | Male ACCT | Male BUAD | Male CIS | Total |
|---|---|---|---|---|---|---|---|
| ***Pre-COVID-19*** | | | | | | | |
| African American | 21 | 41 | 18 | 10 | 32 | 20 | 142 |
| Hispanic | 7 | 7 | 0 | 0 | 12 | 11 | 37 |
| Multi-ethnic | 5 | 13 | 0 | 0 | 5 | 3 | 26 |
| White | 47 | 76 | 17 | 18 | 69 | 50 | 277 |
| Other | 3 | 7 | 2 | 1 | 6 | 4 | 23 |
| Unknown | 1 | 1 | 1 | 0 | 2 | 2 | 7 |
| **Total** | **84** | **145** | **38** | **29** | **126** | **90** | **512** |
| ***COVID-19*** | | | | | | | |
| African American | 19 | 42 | 9 | 7 | 37 | 18 | 132 |
| Hispanic | 7 | 5 | 0 | 3 | 6 | 6 | 27 |
| Multi-ethnic | 2 | 5 | 1 | 2 | 6 | 6 | 22 |
| White | 58 | 86 | 11 | 17 | 77 | 53 | 302 |
| Other | 1 | 12 | 0 | 1 | 6 | 2 | 22 |
| Unknown | 0 | 2 | 0 | 0 | 7 | 1 | 10 |
| **Total** | **87** | **152** | **21** | **30** | **139** | **86** | **515** |
| **Grand Total** | **171** | **297** | **59** | **59** | **265** | **176** | **1027** |

## Results

The study used R Project for Statistical Computing and followed the statistical model in Britton and Tesser (1991), Trueman and Hartley (1996), Hardy et al. (2020), Powell et al. (2020), Pharris et al. (2021). Hypothesis testing used Welch's Two Sample t-test to compare all students and students within a major, assuming unequal variances as indicated by Levene's Tests for Equal Variances showing a mix of equal and unequal variances depending on the survey question. Table 5 shows all students' average responses to each question, aggregate scores, and t-test p-values. Tables 6 through 8 show responses for each major.

### All Students

When investigating the mean response to each question for the combined majors, most decreased, indicating more negative practices during COVID-19 than pre-COVID-19. The exceptions were in question 5 (daily planning), 7 (priority setting), 13 (discontinuing unprofitable routines), 14 (social media overuse), 15 (keeping your desk clear), and 17 (procrastination). However, researchers discovered that only two questions had significant differences. Daily goal setting has a significant difference with COVID-19 (M=2.5282, SD=1.1555) having a lower average than pre-COVID-19 (M=2.6855, SD=1.2452); t(1018.41)=-2.0992, p=0.0360. Over grooming also had a lower average during COVID-19 (M=3.9670, SD=0.9340) than pre-COVID-19 (M=4.1348, SD=0.8844); t(1022.57)=-2.9558, p=0.0032. Please note that the over-grooming question is reverse scored, implying that students reported over-grooming more during COVID-19.

**Table 5**
Comparing t-test results for the combined group of all participants pre- and during COVID-19.

| **All Students** | **Pre-COVID-19 N=512** | | **COVID-19 N=515** | | | |
|---|---|---|---|---|---|---|
| **Question** | **Mean** | **Std** | **Mean** | **Std** | **Mean Difference** | **p-value** |
| *Short-Range Planning* | | | | | | |
| 1. List making | 3.2656 | 1.1518 | 3.1961 | 1.1862 | -0.0695 | 0.3410 |
| 2. Pre-day planner | 3.6758 | 1.0224 | 3.5942 | 1.0156 | -0.0816 | 0.1997 |
| 3. Activity scheduling | 3.6777 | 1.1137 | 3.6718 | 1.0728 | -0.0059 | 0.9312 |
| 4. Daily goal setter | 2.6855 | 1.2452 | 2.5282 | 1.1555 | -0.1573 | 0.0360 * |
| 5. Daily planning | 3.2520 | 1.1125 | 3.2757 | 1.1373 | 0.0237 | 0.7350 |
| 6. Weekly planning | 3.7656 | 1.0523 | 3.7592 | 1.0175 | -0.0064 | 0.9211 |
| 7. Priority setter | 3.9062 | 0.9503 | 3.9359 | 0.9135 | 0.0297 | 0.6101 |
| **Total SRP Average** | **24.2285** | **5.5564** | **23.9612** | **5.3082** | **-0.2673** | **0.4307** |
| *Time Attitudes (TA)* | | | | | | |
| 8. Unable to say "no" [a] | 3.3574 | 1.0180 | 3.3107 | 1.0515 | -0.0467 | 0.4694 |
| 9. In charge of own time | 3.7598 | 0.9707 | 3.6505 | 0.9834 | -0.1093 | 0.0734 |
| 10. Over groomer [a] | 4.1348 | 0.8844 | 3.9670 | 0.9340 | -0.1678 | 0.0032 ** |
| 11. Room for improvement [a] | 1.8535 | 0.9931 | 1.7903 | 0.9203 | -0.0632 | 0.2903 |
| 12. Constructive use of time | 3.6621 | 0.7303 | 3.5942 | 0.7642 | -0.0679 | 0.1456 |
| 13. Unprofitable routines [a] | 3.2520 | 0.8674 | 3.2699 | 0.8904 | 0.0179 | 0.7436 |
| 14. Social media overuse [a] | 3.3633 | 1.0840 | 3.4019 | 1.0892 | 0.0386 | 0.5687 |
| **Total TA Average** | **23.3828** | **3.5098** | **22.9845** | **3.7077** | **-0.3983** | **0.0773** |
| *Long-Range Planning (LRP)* | | | | | | |
| 15. Keeps desk clear | 3.5156 | 1.1381 | 3.5573 | 1.1255 | 0.0417 | 0.5555 |
| 16. Semester goal setter | 3.6875 | 1.1821 | 3.6524 | 1.0847 | -0.0351 | 0.6205 |
| 17. Procrastination [a] | 2.7988 | 0.9176 | 2.8078 | 0.9542 | 0.0090 | 0.8784 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 18. Multitasking | 3.1387 | 1.0810 | 3.0621 | 1.1246 | -0.0766 | 0.2664 |
| 19. Regular note taker | 3.1172 | 0.9722 | 3.0660 | 1.0171 | -0.0512 | 0.4101 |
| **Total LRP Average** | **16.2578** | **3.0282** | **16.1456** | **2.9916** | **-0.1122** | **0.5505** |
| **Total TMQ Average** | **63.8691** | **9.1848** | **63.0913** | **9.2617** | **-0.7778** | **0.1769** |

[a] Reversed score—'never' received a score of 5
Significance codes: 0 '***', 0.001 '**', 0.01 '*', 0.05 '.'

**ACCOUNTING STUDENTS**

The responses to the questions for accounting majors show almost an even mix of increases and decreases of means, particularly with SRP generally increasing, TA decreasing, and LRP increasing. However, only one, question 14 on social media, shows a significant difference, with pre-COVID-19 having a lower average (M=3.2920, SD=1.0664) than during COVID-19 (M=3.6154, SD=1.0492); t(227.40)=2.3172, p=0.0214. Please note that the question is reverse scored, implying that students reported they felt they were not spending more time on social media than their schoolwork on average.

**Table 6**
Comparing t-Tests results for accounting majors pre- and during COVID-19.

| **ACCT Students** | **Pre-COVID-19 N=113** | | **COVID-19 N=117** | | | |
|---|---|---|---|---|---|---|
| **Question** | **Mean** | **Std** | **Mean** | **Std** | **Mean Difference** | **p-value** |
| *Short-Range Planning* | | | | | | |
| 1. List making | 3.5664 | 1.0763 | 3.5897 | 1.0517 | 0.0233 | 0.8679 |
| 2. Pre-day planner | 3.8496 | 0.9564 | 3.6838 | 1.0310 | -0.1658 | 0.2072 |
| 3. Activity scheduling | 3.8938 | 1.0637 | 3.8974 | 1.0203 | 0.0036 | 0.9790 |
| 4. Daily goal setter | 2.6372 | 1.2325 | 2.7265 | 1.0877 | 0.0893 | 0.5611 |
| 5. Daily planning | 3.4071 | 1.0908 | 3.6325 | 1.0875 | 0.2254 | 0.1181 |
| 6. Weekly planning | 3.8230 | 1.0457 | 3.9658 | 0.9643 | 0.1428 | 0.2832 |
| 7. Priority setter | 3.9735 | 0.9206 | 3.8718 | 0.8861 | -0.1017 | 0.3947 |
| **Total SRP Average** | 25.1504 | 5.1551 | 25.3675 | 5.1555 | 0.2171 | 0.7498 |
| *Time Attitudes (TA)* | | | | | | |
| 8. Unable to say "no" [a] | 3.2478 | 1.0397 | 3.1966 | 1.0687 | -0.0512 | 0.7130 |
| 9. In charge of own time | 3.6814 | 0.8688 | 3.5812 | 0.9847 | -0.1002 | 0.4135 |
| 10. Over groomer [a] | 4.1947 | 0.9147 | 4.0256 | 0.8853 | -0.1691 | 0.1560 |
| 11. Room for improvement [a] | 1.8230 | 0.9750 | 1.7863 | 0.9269 | -0.0367 | 0.7704 |
| 12. Constructive use of time | 3.6549 | 0.7168 | 3.6496 | 0.8021 | -0.0053 | 0.9579 |
| 13. Unprofitable routines [a] | 3.2743 | 0.8788 | 3.2564 | 0.8725 | -0.0179 | 0.8768 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 14. Social media overuse [a] | 3.2920 | 1.0664 | 3.6154 | 1.0492 | 0.3234 | 0.0214 * |
| **Total TA Average** | 23.1681 | 3.6910 | 23.1111 | 3.8434 | -0.0570 | 0.9087 |
| *Long-Range Planning (LRP)* | | | | | | |
| 15. Keeps desk clear | 3.5221 | 0.9829 | 3.6410 | 1.1482 | 0.1189 | 0.3992 |
| 16. Semester goal setter | 3.5752 | 1.1324 | 3.6923 | 1.1022 | 0.1171 | 0.4279 |
| 17. Procrastination [a] | 2.8319 | 0.8227 | 2.7179 | 0.9813 | -0.1140 | 0.3405 |
| 18. Multitasking | 3.0796 | 1.0534 | 3.1368 | 1.1738 | 0.0572 | 0.6979 |
| 19. Regular note taker | 3.0796 | 0.9462 | 3.0769 | 1.0840 | -0.0027 | 0.9838 |
| **Total LRP Average** | 16.0885 | 2.9537 | 16.2650 | 3.1056 | 0.1765 | 0.6592 |
| **Total TMQ Average** | 64.4071 | 8.7776 | 64.7436 | 9.7514 | 0.3365 | 0.7834 |

[a] Reversed score—'never' received a score of 5
Significance codes: 0 '***', 0.001 '**', 0.01 '*', 0.05 '.'

### Business Administration Students

Students majoring in business administration show more decreasing mean responses than increasing responses, with SRP and TA decreasing but LRP almost unchanged overall. However, responses to two questions did show significant differences. Question 4 on daily goal setting shows a significant difference with COVID-19 (M=2.5086, SD=1.1755) having a lower average than pre-COVID-19 (M=2.7085, SD=1.2352); t (551.95) =-1.9621, p=0.0503. Question 10 on over-grooming shows a significant difference with COVID-19 (M=3.9141, SD=0.9593) having a lower average than pre-COVID-19 (M=4.0701, SD=0.8854); t (559.96) =-2.0051, p=0.0454. Please note that the over-grooming question is reverse scored, implying that students reported over-grooming more during COVID-19.

**Table 7**
Comparing t-test results for business administration majors pre- and during COVID-19.

| **BUAD Students** | **Pre-COVID-19 N=271** | | **COVID-19 N=291** | | **Mean** | |
|---|---|---|---|---|---|---|
| **Question** | **Mean** | **Std** | **Mean** | **Std** | **Difference** | **p-value** |
| *Short-Range Planning* | | | | | | |
| 1. List making | 3.1661 | 1.1949 | 3.1581 | 1.2102 | -0.0080 | 0.9374 |
| 2. Pre-day planner | 3.6531 | 1.0281 | 3.6254 | 1.0174 | -0.0277 | 0.7484 |
| 3. Activity scheduling | 3.6310 | 1.1207 | 3.6632 | 1.0716 | 0.0322 | 0.7280 |
| 4. Daily goal setter | 2.7085 | 1.2352 | 2.5086 | 1.1755 | -0.1999 | 0.0503 . |
| 5. Daily planning | 3.2177 | 1.1024 | 3.2027 | 1.1493 | -0.0150 | 0.8749 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 6. Weekly planning | 3.7970 | 1.0538 | 3.7148 | 1.0328 | -0.0822 | 0.3508 |
| 7. Priority setter | 3.9446 | 0.9233 | 4.0241 | 0.9300 | 0.0795 | 0.3105 |
| **Total SRP Average** | 24.1181 | 5.5559 | 23.8969 | 5.3275 | -0.2212 | 0.6307 |
| *Time Attitudes (TA)* | | | | | | |
| 8. Unable to say "no" [a] | 3.3432 | 1.0276 | 3.3265 | 1.0667 | -0.0167 | 0.8500 |
| 9. In charge of own time | 3.7897 | 0.9870 | 3.6873 | 0.9871 | -0.1024 | 0.2197 |
| 10. Over groomer [a] | 4.0701 | 0.8854 | 3.9141 | 0.9593 | -0.1560 | 0.0454 * |
| 11. Room for improvement [a] | 1.8893 | 1.0304 | 1.8488 | 0.9493 | -0.0405 | 0.6289 |
| 12. Constructive use of time | 3.6974 | 0.7282 | 3.6048 | 0.7556 | -0.0926 | 0.1396 |
| 13. Unprofitable routines [a] | 3.2657 | 0.8625 | 3.2990 | 0.9002 | 0.0333 | 0.6546 |
| 14. Social media overuse [a] | 3.2915 | 1.0920 | 3.3024 | 1.1008 | 0.0109 | 0.9063 |
| **Total TA Average** | 23.3469 | 3.5200 | 22.9828 | 3.6770 | -0.3641 | 0.2310 |
| *Long-Range Planning (LRP)* | | | | | | |
| 15. Keeps desk clear | 3.5351 | 1.1729 | 3.6220 | 1.1148 | 0.0869 | 0.3689 |
| 16. Semester goal setter | 3.7638 | 1.1720 | 3.6460 | 1.0931 | -0.1178 | 0.2193 |
| 17. Procrastination [a] | 2.7196 | 0.9163 | 2.8625 | 0.9729 | 0.1429 | 0.0733 |
| 18. Multitasking | 3.2288 | 1.0712 | 3.0928 | 1.0643 | -0.1360 | 0.1320 |
| 19. Regular note taker | 3.1439 | 0.9572 | 3.1581 | 1.0115 | 0.0142 | 0.8646 |
| **Total LRP Average** | 16.3911 | 2.9618 | 16.3814 | 2.9785 | -0.0097 | 0.9691 |
| **Total TMQ Average** | 63.8561 | 9.0446 | 63.2612 | 9.0892 | -0.5949 | 0.4373 |

[a] Reversed score—'never' received a score of 5
Significance codes: 0 '***', 0.001 '**', 0.01 '*', 0.05 '.'

### Computer Information Systems Students

Most questions had decreased mean responses for computer information system students, leading to decreased SRP, TA, LRP, and TMQ mean scores. However, only three questions show significant differences. First, question 1 on list making shows a significantly lower average during COVID-19 (M=2.8692, SD=1.1499) than pre-COVID-19 (M=3.2109, SD=1.0843); t(220.47)=-2.3286, p=0.0208. Second, question 4 on daily goal setting also shows a significantly decreased mean during COVID-19 (M=2.3645, SD=1.1525) compared to pre-COVID-19 (M=2.6797, SD=1.2855); t(231.84)=-1.9808, p=0.0488. Third, question 19 on regularly taking notes significantly decreased during COVID-19 (M=2.8037, SD=0.9157) compared to pre-COVID-19 (M=3.0938, SD=1.0305); t (232.11) =-2.2833, p=0.0233. The decreases in means within the LRP questions, led by the decrease in question 19, caused the LRP mean score to also decrease during COVID-19 (M=2.8037, SD=0.9157) compared to pre-COVID-19 (M=3.0938, SD=1.0305); t(232.75)=-1.9096, p=0.0574. Finally, all the decreases led to an overall lower average TMQ score during COVID-19 (M=60.8224, SD=8.8080) compared to pre-COVID-19 (M=63.4219, SD=9.8545); t(231.94)=-2.1340, p=0.0339.

**Table 8**
Comparing t-test results for computer information systems majors pre- and during COVID-19.

| **CIS Students** | **Pre-COVID-19 N=128** | | **COVID-19 N=107** | | | |
|---|---|---|---|---|---|---|
| **Question** | **Mean** | **Std** | **Mean** | **Std** | **Mean Difference** | **p-value** |
| *Short-Range Planning* | | | | | | |
| 1. List making | 3.2109 | 1.0843 | 2.8692 | 1.1499 | -0.3417 | 0.0208 * |
| 2. Pre-day planner | 3.5703 | 1.0550 | 3.4112 | 0.9805 | -0.1591 | 0.2327 |
| 3. Activity scheduling | 3.5859 | 1.1261 | 3.4486 | 1.0923 | -0.1373 | 0.3449 |
| 4. Daily goal setter | 2.6797 | 1.2855 | 2.3645 | 1.1525 | -0.3152 | 0.0488 * |
| 5. Daily planning | 3.1875 | 1.1484 | 3.0841 | 1.0826 | -0.1034 | 0.4790 |
| 6. Weekly planning | 3.6484 | 1.0543 | 3.6542 | 1.0104 | 0.0058 | 0.9660 |
| 7. Priority setter | 3.7656 | 1.0232 | 3.7664 | 0.8750 | 0.0008 | 0.9953 |
| **Total SRP Average** | 23.6484 | 5.8344 | 22.5981 | 5.0821 | -1.0503 | 0.1417 |
| *Time Attitudes (TA)* | | | | | | |
| 8. Unable to say "no" [a] | 3.4844 | 0.9719 | 3.3925 | 0.9882 | -0.0919 | 0.4754 |
| 9. In charge of own time | 3.7656 | 1.0232 | 3.6262 | 0.9764 | -0.1394 | 0.2872 |
| 10. Over groomer [a] | 4.2188 | 0.8505 | 4.0467 | 0.9151 | -0.1721 | 0.1399 |
| 11. Room for improvement [a] | 1.8047 | 0.9312 | 1.6355 | 0.8172 | -0.1692 | 0.1395 |
| 12. Constructive use of time | 3.5938 | 0.7470 | 3.5047 | 0.7445 | -0.0891 | 0.3627 |
| 13. Unprofitable routines [a] | 3.2031 | 0.8727 | 3.2056 | 0.8874 | 0.0025 | 0.9829 |
| 14. Social media overuse [a] | 3.5781 | 1.0619 | 3.4393 | 1.0744 | -0.1388 | 0.3223 |
| **Total TA Average** | 23.6484 | 3.3311 | 22.8505 | 3.6699 | -0.7979 | 0.0849 |
| *Long-Range Planning (LRP)* | | | | | | |
| 15. Keeps desk clear | 3.4688 | 1.1967 | 3.2897 | 1.0990 | -0.1791 | 0.2336 |
| 16. Semester goal setter | 3.6250 | 1.2423 | 3.6262 | 1.0508 | 0.0012 | 0.9938 |
| 17. Procrastination [a] | 2.9375 | 0.9861 | 2.7570 | 0.8670 | -0.1805 | 0.1369 |
| 18. Multitasking | 3.0000 | 1.1154 | 2.8972 | 1.2204 | -0.1028 | 0.5044 |
| 19. Regular note taker | 3.0938 | 1.0305 | 2.8037 | 0.9157 | -0.2901 | 0.0233 * |
| **Total LRP Average** | 16.1250 | 3.2361 | 15.3738 | 2.7933 | -0.7512 | 0.0574 . |
| **Total TMQ Average** | 63.4219 | 9.8545 | 60.8224 | 8.8080 | -2.5995 | 0.0339 * |

[a] Reversed scored—'never' received a score of 5
Significance codes: 0 '***', 0.001 '**', 0.01 '*', 0.05 '.'

## Discussion

This study investigated the differences in time management practices among business majors—accounting, business administration, and computer information systems—between the pre-COVID-19 and COVID-19 periods. The findings for the combined majors revealed that most students reported following more undesirable time management practices during the pandemic than before. While only two of the differences in means were significant, these overall findings are important because they illustrate the effect that major global events, like the COVID-19 pandemic, can have on essential academic skills such as time management. The decline underlines the struggle students experienced as they adapted to challenges brought about by the pandemic.

These findings convey that educators and business leaders should invest in strategies that better prepare students to face unexpected challenges in future academic and professional landscapes. Higher education institutions may benefit from incorporating customized time management training, workshops, and resources to assist students in navigating times of disruption. Curricula may need updating to include more time management skills and strategies, with additional emphasis on providing student support services to help students cope with stress while boosting their time management behaviors.

### Short-Range Planning

Short-range planning focuses on planning the day and week. Table 9 summarizes the significant differences in SRP when comparing pre-COVID-19 to COVID-19 for all students and each major. Only two questions had significant differences: “list making” and “daily goal setting.” CIS students showed significant decreases in both questions, and the BUAD students showed significant differences in only daily goal setting. However, the significant decrease in "list making" was not enough to generate a significant difference among all students, while the significant decrease in daily goal setting was enough. Overall, none of the differences were enough to generate a significant difference in SRP; therefore, we reject hypotheses H1(a), H2(a), H3(a), and H4(a).

The overall stability in SRP indicates a certain level of resilience and adaptability to the disruptions caused by the pandemic. Still, findings suggest that the SRP behaviors of CIS and BUAD students were affected, as seen in their list-making and daily goal-setting behaviors. This finding indicates the need for targeted educational interventions for CIS students to enhance academic and professional outcomes.

The SRP findings leave us with several unanswered questions. For instance, why were CIS students more significantly affected in SRP than other majors? What are the potential long-term impacts of these deficiencies in SRP on academic performance and career readiness? And last, what specific interventions are most effective in improving the SRP skills among students?

**Table 9**
Summary of significant differences found when comparing pre and during COVID-19

| Question | ALL | ACCT | BUAD | CIS |
|---|---|---|---|---|
| *Short-Range Planning* | | | | |
| 1. List making | | | | Yes |
| 4. Daily goal setter | Yes | | Yes | Yes |
| *Time Attitudes (TA)* | | | | |
| 10. Over groomer [a] | Yes | | Yes | |
| 14. Social media overuse [a] | | Yes | | |
| *Long-Range Planning (LRP)* | | | | |
| 19. Regular note taker | | | | Yes |
| **Total LRP Average** | | | | **Yes** |
| **Total TMQ Average** | | | | **Yes** |

**Time Attitudes**

Time attitude focuses on the constructive use of time. Table 9 summarizes the significant differences in TA when comparing pre-COVID-19 to COVID-19 for all students and each major. Only two questions had significant differences: “over groomer” and “social media overuse.” In the former, the BUAD students were the only group to see a significant decrease, which led to the significant difference of all the students. In the latter, only the accounting students had a significant increase, which was insufficient to generate a significant difference among all students. Overall, none of the differences were sufficient to generate a significant difference in TA; therefore, we reject hypotheses H1(b), H2(b), H3(b), and H4(b).

The results provide insights into the shifting priorities of students during the pandemic, which could inform broader educational strategies. Overall, the time attitudes of business students remained relatively stable. Even so, distinct behavioral patterns within specific business majors have been identified, including BUAD students with reduced grooming time and accounting students with increased social media use.

The observed decrease in grooming time of BUAD students may reflect several possible interpretations. One perspective is that individuals increased their focus on personal grooming relative to schoolwork. Alternatively, it could suggest a reduction in schoolwork compared to personal grooming. A broader interpretation is that the activities of personal grooming and schoolwork began to converge. This shift might represent a balancing effect, where individuals, confined at home, spent more time on activities that made them feel cleaner and healthier as a form of self-care or distraction from academic pressures. It is also possible that they began to view frequent hand washing and cleaning as part of their grooming routine rather than merely preventive measures.

These findings leave authors with questions regarding the underlying causes for the significant changes in these TA areas. Customized interventions focusing on specific behaviors for identified groups could improve students' constructive time use.

**Long-Range Planning**

LRP focuses on items related to planning or working on a broader time window, like semester goals or avoiding procrastination. Only one question had a significant difference: "regular note taker." This difference was only with CIS students, who reported decreased practice. The decrease was sufficient to cause a decrease in LRP for CIS students but not for all students. Therefore, we reject hypotheses H1(c), H2(c), H3(c), but fail to reject H4(c).

As with the SRP findings, the LRP results leave us questioning why CIS students were more significantly affected than others. The findings highlight specific needs and challenges that CIS students may face while maintaining LRP practices, particularly in note-taking, when disruptions and stressful situations arise. The significant decrease in regular note-taking among CIS students points to a need for targeted educational interventions to enhance LRP strategies and note-taking habits, ultimately leading to improved academic and professional outcomes for these students. By addressing the decline in note-taking, CIS students could benefit from improved academic and professional outcomes for these students.

**Overall Time Management**

Five of the 19 questions generated significant differences when comparing pre-COVID and COVID data. Still, those were in the specific majors, which only resulted in a significant difference in LRP for the CIS students. The differences in all the data generated a significant difference in TMQ for CIS but not the other majors. Considering all factors, we reject hypotheses H1, H2, and H3; however, we partially fail to reject H4 in the case of CIS students.

The findings suggest that the pandemic had a differential impact on time management practices among business students, with CIS majors experiencing more significant changes than the other areas. It indicates that major-specific strategies may be needed to address different student groups' unique time management challenges.

## Limitations

The study predominantly utilizes Britton and Tesser's (1991) questionnaire, a tool employed in various other studies but initially developed in 1991. An additional question about social media was included, although it was not independently validated. This question mirrors the language of the original questions and does not significantly alter the analysis results or hypotheses. Moreover, the study applied the same univariate statistical methods—t-tests and ANOVA—as those used by Britton and Tesser (1991), Trueman and Hartley (1996), Hardy et al. (2020), Powell et al. (2020), and Pharris et al. (2021).

This study operates under the assumption that students accurately represent their time-management behaviors. Relying on students' self-reported time management attitudes and behaviors may introduce bias if students attempt to present themselves more positively than their actual behaviors reflect (Bauhoff, 2014; Paulhus, 2017). Despite this potential bias, several average responses were below 3.0, indicating that students acknowledge deficiencies in their time management practices. While the study aims to investigate business majors, it is limited by convenience sampling from a single school of business. Consequently, the findings cannot be generalized to a broader population (Wild et al., 2022).

## Directions For Future Research

Based on the study findings, opportunities exist to investigate the underlying causes behind why CIS students experienced significant decreases in note-taking and LRP practices.

Examining the reasons for the significant differences in BUAD over groomer behavior and increased social media usage among ACCT majors is also encouraged. Understanding these root causes can help with the design of effective interventions. Likewise, higher education and business fields would benefit from studies that involve interventions aimed at (1) improving note-taking and LRP skills specifically for CIS students and (2) reducing social media use and promoting constructive time use among accounting students.

Future research should also build on the results of this study by exploring time management behaviors and attitudes across a broader range of disciplines beyond business majors to identify common challenges and unique issues. Investigating the specific behavioral adaptations students adopted to manage their time more effectively during the pandemic would help identify successful strategies to enhance time management practices in future educational settings (Biwer et al., 2021).

## Concluding Remarks

This study contributes valuable insights into how a major global event like COVID-19 affects students' time management practices, a critical skill for academic and professional success. It highlights the differential impact of the pandemic on time management among business students, particularly in majors such as Accounting, Business Administration, and Computer Information Systems. Key findings, such as the significant decrease in note-taking among CIS majors and the significant increase in social media use by Accounting majors, underscore the unique challenges different student groups face. Identifying specific changes in time management behaviors, attitudes, and practices reveals critical areas where students struggled during the pandemic. This awareness enables educators to design targeted approaches and interventions to support students in adapting to unexpected challenges (Turner & Hodis, 2023), ultimately helping them improve their productivity despite these obstacles.

The study offers relevant information for educators and those responsible for improving the education of business students through curriculum design and academic support services. Incorporating structured time management training into the curriculum can help students strengthen essential skills for academic and professional success. Workshops focused on effective note-taking, reducing social media overuse, and enhancing long-range planning can directly address the deficiencies identified in the study. By adapting educational strategies to meet the specific needs of different majors, institutions can provide a more accommodating learning environment that enhances student performance and engagement.

The results also have implications for businesses that hire these graduates. For instance, understanding that CIS students faced significant challenges in time management during their education allows employers to provide targeted support and training in these areas. While the study centers on business majors, the findings offer insights and implications for other disciplines, contributing to a broader understanding of how students manage their time under stressful circumstances. This understanding can help institutions provide better mental health and academic support, enhancing student well-being (Patias, 2021; Babicka-Wirkus, 2020). Empowered by these insights, educators and employers alike have the opportunity to equip students better to navigate future disruptions, turning challenges into opportunities for growth and paving the way for resilient and adaptable future leaders.

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# Certifications in MIS/CIS Programs and Test Prep Options:
# An Honest Review from an Educator

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## Abstract

Certifications are crucial in the Information Technology (IT) industry, often required by companies and giving those who posses them an edge in the job market. Traditionally offered by trainers, certifications are now part of many university and college Computer Information Systems programs. This paper explores the journey in implementation of certifications at one university, and highlights the successes and challenges faced. It ends with a review of the current certification training software in use and how students perceive the software.

Certifications are a very integral part of the information technology (IT) world with many companies requiring them and others putting job applicants who have them at the top of the interview pile. Some people prefer to study for certifications on their own, and others like the structured approach of in-class instruction. Traditionally these certification classes have been offered by industry trainers, but now more and more two- and four-year university programs are incorporating them into formal Computer Information Systems/Management Information Systems (CIS/MIS) degree programs. Northwestern State University (NSU) is one such example with an emphasis on CompTIA certification exams in the Networking and Cybersecurity/CIS program. In this paper the researcher will discuss the journey of certification implementation at NSU, and the things that did and did not work along that journey. The paper will end with a brief review on the certification training materials currently in use, and some lessons learned along the way.

## A Brief History of Certifications

Before discussing certifications in detail, it is important to explain what a certification is, and what it not. The word "certification" comes from the French word *certificat* or the Latin *certificatum* (Axline, 2021). These were documents issues by respected organizations that "attested to someone's authorization to practice or do certain things," and were granted by the trade guilds of the Middle Ages. In the more modern world, certification takes on two forms: one of an authorization to practice a trade (such as a medical or law license), and one to show that you have the knowledge needed to do a job (like in IT). Today there are thousands of different certifications in almost every professional field.

Certification exams in the IT world are not new. Some were available as far back as the 1970's, but the first mainstream certification was the Certified Novell Administrator (CNA) by a company known as Novell Netware (Johnson, 1986). Netware was a very popular server software before Windows NT in the mid 1980's. This was one of the first certification exams to gain industry recognition outside of IT circles in that it would show a potential employer the certificate holder had a basic knowledge of how to run a network. Today there are thousands of different IT certifications by hundreds of companies. Some of those, like the Cisco Certified Network Associate (CCNA) are vendor specific while some, like the CompTIA certifications, are more vendor neutral.

The Computing Technology Industry Association (CompTIA) was established in 1982 and was originally known as the Association of Better Computer Dealers (ABCD). Initially, it was a group of hardware and software vendors aiming to foster collaboration among themselves and with their customers (Karl, 2023). Shortly after its creation, ABCD partnered with Compaq to create a hardware certification program. Technicians could become certified in Compaq equipment, allowing them to service Compaq machines under warranty. This certification eventually became CompTIA's first offering, the A+ certification (Gregory and Hughes, 2015). Today, CompTIA is a major industry standard for providing certifications to IT professionals. CompTIA offers a variety of certification exams, ranging from beginner levels requiring little to no experience to expert levels requiring years of study. See Appendix A for a roadmap of the certification exams. In this appendix, CompTIA exams are in bold, and other equivalent industry-level certifications are listed. For example, the CompTIA Advanced Security Practitioner (CASP+) is listed as equivalent to the Cisco Certified Internetworking Expert (CCIE) or the Certified Information Systems Security Professional (CISSP), both offered by other companies.

**Certification Options at the University/College Level**

NSU has gone through several iterations of certification exams. One of the first offered was the Certiport IC3 Digital Literacy series, which includes certifications like the IC3 Digital Literacy cert. A couple of advantages of these certifications are that they can be proctored by the instructor in-class. However, a downside was quickly learned: while this is a good certification for a non-CIS student, it simply does not cover enough material to be useful to a major student.

In the second iteration, certifications from TestOut were used. The TestOut IT Pro series is much more technical than the IC3 series and aligns more closely with the course content and objectives of mid/upper-level IT classes. These certifications include options like IT and Network Systems, and IT Security Systems. As with IC3, these can be administered by the instructor, which is a major plus. The ultimate decision to move to another platform was due to the lack of recognition for these certifications. While they are comparable in difficulty to the CompTIA certs, they are not recognized by entities like the Department of Defense (DoD) for certification (TestOut, ND).

In the third and current iteration, the move was made to official CompTIA certification exams due to their industry recognition, including acceptance by the DoD and other government agencies. This decision was also influenced by the CIS program's advisory board, which noted the importance of certifications for hiring graduates. While this change was positive, it required significant course adjustments. As these are official certification exams, they cannot be administered in class and must be taken online via a specialized proctor or at a testing center like PearsonVUE. Fortunately, there is a PearsonVUE test center on the NSU campus as part of our Testing Center. PearsonVue also administers the GRE so they will be found on many campuses.

Unlike the IC3 and TestOut certifications, there is no faculty reporting for scores, making it the student's responsibility to report their results. A Moodle "exam" was created for students to upload their score reports. If no score is presented, it is assumed the exam was not taken.

## Test Prep Options

There are many options for test preparation software and books, just as there are many certification options. This list is not exhaustive but highlights a few options the University has tried, along with their pros and cons.

Both IC3 and TestOut offer online training, books, test prep software, and labs designed to help prepare for exams. IC3's offerings are specifically catered to the IC3 exams, while TestOut is designed to prepare students not only for their own certification exams but also for the CompTIA equivalent. For example, the TestOut Network Pro should prepare students for the CompTIA Network+ exam. However, in our experience, while this did help with Network+ preparation, it was not a perfect match, and students still lacked skills in some areas.

Another major offering is Ucertify. Ucertify does not offer certifications but provides certification prep software in various areas, including CompTIA, Cisco, Adobe, and Microsoft. The Ucertify platform is user-friendly, and the test-prep software includes labs, an e-book, practice questions, and several practice certification exams. This is an overall great product, and it is still used in some classes, such as Digital Forensics, where it serves as test prep for the Certified Hacking Forensics Investigator (CHFI) exam. One of the standout features of this product from an instructional standpoint is its reporting capabilities. The instructional dashboard allows instructors to see not only each student's scores in each section but also how long they spent there.

## CompTIA Test Prep

Currently, and for the foreseeable future, the decision has been made to use the CompTIA suite of test prep software. While this requires significant setup by the instructor, it has been found to best prepare students for the CompTIA exams. The initial assumption, now proven true, is that the company that creates the exam will ensure their test-prep software effectively prepares students for that exam. Although there is no comprehensive data collection to support this due to COVID-19 and other factors, a brief analysis of the semester change from Ucertify to CompTIA CertMaster shows a 30% increase in pass rates for the Network+ exam in sections with similar numbers of students. CompTIA offers exam prep in four forms: a book or eBook, test prep software, a virtual lab platform, and a combination platform called Learn.

### The Book/Ebook

The book/eBook is like a traditional textbook, containing the knowledge needed to pass the certification exam. These books are tailored to the specific exam in question. They vary in size; for example, the Security+ book for version 701 is 606 pages. Each eBook includes a mapping guide that aligns chapters with the specific domains on the certification exam. From an instructional perspective, the instructor's book comes with PowerPoints and answers to the questions at the end of each chapter. The books are available to read online or can be downloaded in PDF format, watermarked for each student. The instructor's book also includes a spreadsheet that maps each topic to the built-in videos, in-class labs, practice labs, and the PBQs (performance-based questions) for that topic. PBQs are included in almost all CompTIA certification exams and, unlike traditional multiple-choice questions, are mini labs where the test applicant must demonstrate their ability to complete a task. Figure one shows a brief snippet of the map for Security+ 701.

| | E | F | G | H | I | |
|---|---|---|---|---|---|---|
| 1 | TopicTitle | Video | In-Class Lab | Additional Practice Lab | PBQ | Sub |
| 2 | Course Introduction | Job Roles Using Security+ | Assisted Lab: Exploring the Lab Environment | | | |
| 3 | Security Concepts | | | Assisted Lab: Perform System Configuration Gap Analysis | | |
| 4 | Security Controls | | Assisted Lab: Configuring Examples of Security Control Types | | Compare and Contrast Secu | |
| 5 | Threat Actors | Identifying Common Threat Actors and Motivations | | | | |
| 6 | Attack Surface | | Assisted Lab: Finding Open Service Ports | | | |
| 7 | Social Engineering | Use the Social Engineer Toolkit | | Assisted Lab: Using SET to Perform Social | Compare and Contrast Soci | |
| 8 | Cryptographic Algorithms | Identifying Symmetric Cryptographic Alg | APPLIED Lab: Using Storage Encryption | | Identify Cryptographic Mod | |
| 9 | Public Key Infrastructure | | | | Implement Certificates and | |
| 10 | Cryptographic Solutions | | Assisted Lab: Using Hashing and Salting | | | |
| 11 | CLOSE | | | | | |
| 12 | Authentication | Implementing IAM | | Assisted Lab: Managing Password Security | | |
| 13 | Authorization | Examining the Access Token | Assisted Lab: Managing Permissions | | Implement an Access Cont | |
| 14 | Identity Management | | | | | |
| 15 | Enterprise Network Architecture | Configuring EAP and AAA Authentication Technologies | | | | |
| 16 | Network Security Appliances | Load Balancer Configuration | | | | |
| 17 | Secure Communications | Secure Remote Administration Protocol | Assisted Lab: Using IPSec Tunneling | Assisted Lab: Setting up Remote Access | Implement Secure Remote | |
| 18 | Cloud Infrastructure | | Assisted Lab: Using Virtualization | Assisted Lab: Using Containers | Analyze Infrastructure Type | |
| 19 | Embedded Systems and Zero Trust Architecture | | | | | |
| 20 | Asset Management | Applying the Elements of Asset Manage | Assisted Lab: Performing Drive Sanitization | Assisted Lab: Implement Backups | | |
| 21 | Redundancy Strategies | Detect Malicious Network Traffic with a Honeypot | | | Incorporate Redundancy St | |

*Figure 1 - This is the map showing the topics, videos, labs, and pbq's for a section of the Sec+ 701 exam.*

**CertMaster Practice**

The Practice platform is the test-prep itself and provides questions for students to answer after completing the reading and labs. Questions can be given by topic/domain of the exam, by chapter of the ebook, or mixed to simulate the actual exam. Questions can be presented in two modes: practice mode and test mode. In practice mode, the student sees the correct answer immediately after responding, and if incorrect, it indicates where to learn more. In test mode, results are not shown until the end.

A specific practice mode is recommended where students see each question three times. Once they correctly answer it three times, the topic is removed, allowing them to focus on other areas. This method helps cement the knowledge they have just read. The user receives a report showing progress. One downside to this software is the lack of LMS integration, as these certifications are more industry-focused than education-focused. However, this may change soon, as CompTIA acquired TestOut in January 2023, primarily to integrate with more schools (CompTIA, 2023).

Figure two shows an example of a Practice report. Moodle assignments were created for each section, requiring students to upload a screenshot showing progress. Students are expected to continue working on the sections until achieving 80% or higher accuracy. Other features of this report include an estimated time to complete, and the total time spent on the software.

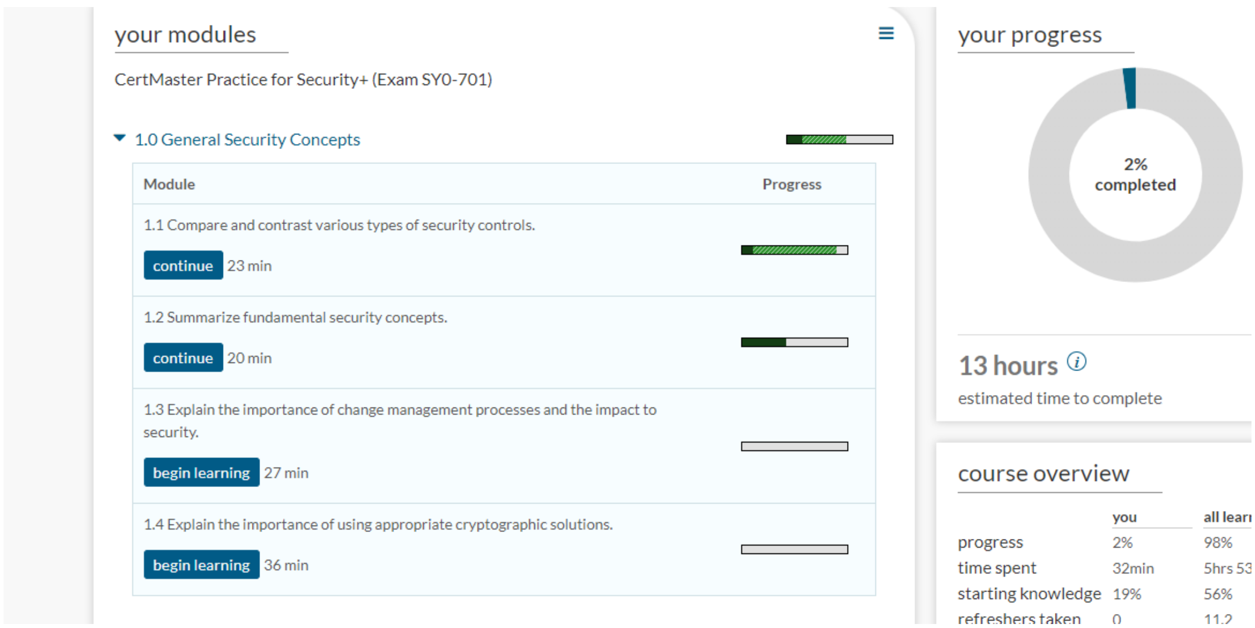


*Figure 2 - This is an example Practice report from a student in module 1 of the Security+ 701 prep.*

CertMaster Labs

Another component of the test-prep software is CertMaster Labs. In the Labs portion, students are presented with a virtual lab platform where they complete tasks, providing them with practical experience related to the topic. Labs come in two types: assisted and applied. In an assisted lab, students receive help and prompts to complete the task, whereas in an applied lab, they do not.

The labs are virtual machines (VMs) running in the cloud, which take some time to start up, typically about two minutes from launch until they are ready to use. These labs include a variety of operating systems. Figure three shows an example of a Security+ lab for performing a simple port scan using Kali Linux. The VM lab environment for most of these labs is "closed," meaning it does not have internet access. This provides students with a sandbox environment where they can experiment safely. If commands are typed incorrectly, the lab can simply be closed and restarted. The instructions include tips to assist students. For example, in the Kali labs, copy and paste functionality is disabled, so the first tooltip advises students to type in the commands, such as the username and password to log in.

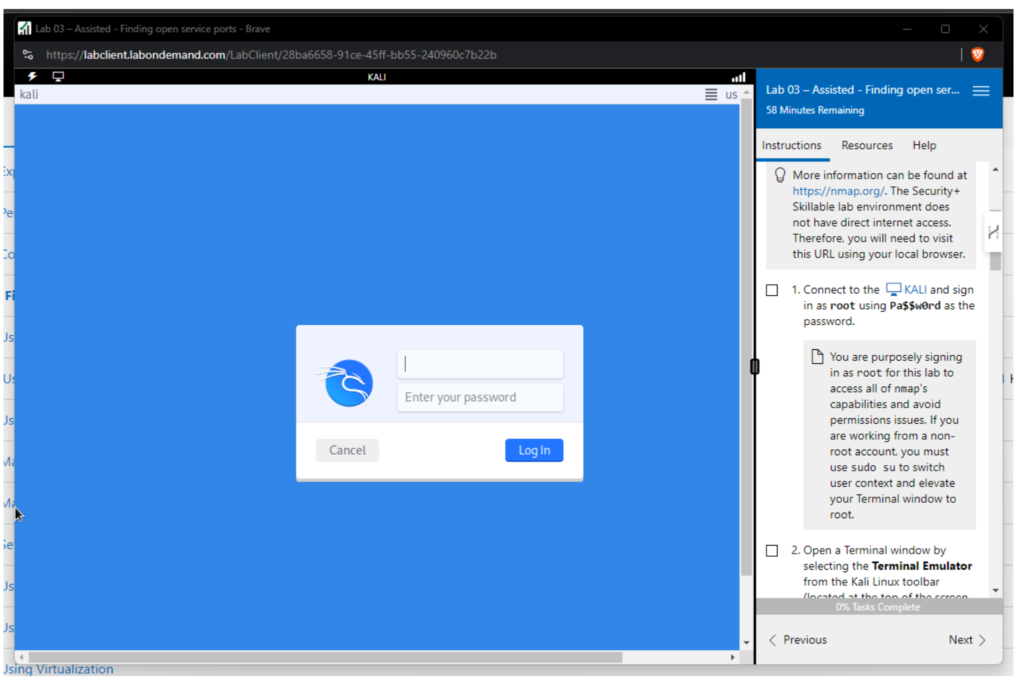


*Figure 3 - This is an exaple of a lab in CertMaster Labs. In this lab the student is to use Kali Linux to peform a simple NMAP scan.*

Because there is no reporting feature yet, it is up to the instructor to verify that students have completed the work. Instructors use various methods, such as having students post screenshots of completed or in-progress labs or submitting a brief paragraph about what they learned in the lab. Some instructors use both methods, requiring screenshots for the assisted labs and short paragraphs for the applied labs.

### CertMaster Learn

The final product in the series is the CertMaster Learn platform. Learn combines features of the eBook and Practice, and is often integrated with the eBook. The Learn platform not only provides the correct answer but also explains why the other options are incorrect. A key feature of Learn is the ability for users to set a confidence level as they answer questions (e.g., “I am sure this is correct,” “I think it is correct,” or “I’m guessing”). This information is used to tailor future questions. Figure four shows an example of a question where a student got it partially right, along with the explanation that appeared below the question after the answer was submitted.

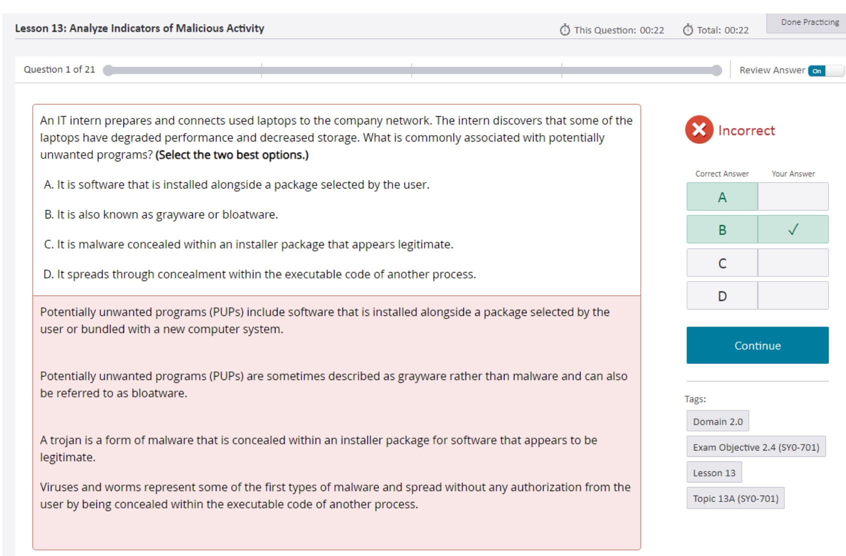


*Figure 4 - An example of a Learn question with a partially right answer.*

## Student and Faculty Perceptions of the Products

Overall, both students and faculty have been satisfied with the CompTIA products, especially compared to other options considered. The major drawback for faculty is the lack of reporting. There is no way for a faculty member to see if a student has even started work if they do not upload screenshots or other evidence, as there is no reporting back-end. This may, however, change with CompTIA's acquisition of TestOut Corporation.

Another issue for faculty, though minor, is that the exam cannot currently be administered in class. Students must either go to an authorized test center or take it online in a very quiet environment. If a student takes it at home and is interrupted, PearsonVUE will invalidate the exam. Two examples the researcher can share from his own classes:

- A student's internet went out. PearsonVUE required the student to obtain a statement from their ISP to show that the internet went out before they would refund and reschedule.
- A student's deaf brother knocked on his door while he was taking an exam. This caused PearsonVue to invalidate the exam.

While this may seem excessive, it is important to note that CompTIA must maintain the credibility of the certification exam, which can only be achieved through strict proctoring. To address this, students are encouraged to take the exam at a test center. Many colleges and universities have test centers, so there is usually one within an hour's drive. Students are advised not to use the online option unless it is the only choice, and they must sign a form acknowledging that any interruption or internet outage will be their responsibility.

Initially, students viewed these certification exams negatively, as passing the certification is required to pass the class, making some classes essentially pass/fail. This initially caused anxiety among students due to the high stakes of the exam.

To address this, the program starts with the CompTIA ITF+ exam, a general knowledge exam that is relatively easy. In this course, students must take the exam, but they can still earn a C in the course if they fail it. This exam is primarily to introduce students to the certification exam process, including setting up an account, scheduling the exam, and experiencing an industry certification. The online option is not offered for this exam, except in rare cases. Since this exam is part of the Intro to CIS course taken by all CIS freshmen, students are better prepared for pass/fail classes like Network+ when they encounter them later. Students in online sections are informed about the test requirement in the first few days of the course and are directed to a website that will assist them in finding a testing center.

Over time, students have become more comfortable with the certifications. As a small school, word has spread among students about how these certifications are helping seniors secure jobs. While students may not be happy about the workload, they are beginning to see the end goal. An informal survey of students in a recent class revealed positive feedback about the Security+ certification:

> "This certification is hard, and it scares the crap out of me that I will pass or fail this course based on how I do on that test. My friend XX passed his last semester and GIDT has already offered him a job, so while I'm not looking forward to it, I see why it is important." (GDIT is a DoD security contractor in a near-by town and Sec+ is required to get clearance on the network.)

Another major concern for students is the cost. Even with the CompTIA Academic Academy discount, purchasing the certification exam and the software/ebook is expensive. As of August 2024, the exam voucher for Security+ is $262, the ebook is $61, and the software is $178, totaling $501 for course materials for a single course.

A significant issue encountered is that CompTIA will not sell to a non-University owned bookstore at this rate. The NSU bookstore, outsourced to Follett and not run by the university, is not considered part of the academic institution by CompTIA. This means book vouchers cannot be purchased for the software or certification at the academic rate (which is less than half the retail price). The solution, which requires more effort from the faculty, is to institute a large lab fee for the course and provide the material to students on day one. By assessing a lab fee, students can pay for everything with financial aid, which is crucial as over 90% of students at NSU are on financial aid (Data USA, 2024). Since vouchers are valid for one year from the purchase date, the count is taken on day one, a few extras are purchased each semester, and those are used in the next semester.

In conclusion, despite many trials and errors in incorporating certification exams into the CIS program, the overall experience has been positive and, more importantly, it is helping students secure jobs. It is well worth the investment. For those considering implementing certification exams into their programs, it is recommended to join the CompTIA Academic Network. It is free and provides access to materials for making decisions based on the curriculum.

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## LinkedIn Learning: Teaching Soft Skills in a Hard Skills World

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### Abstract

Soft skills are essential to career success. This paper presents a professional development activity using LinkedIn Learning to develop the soft skills needed for students. Using a mixed-method study, results show that LinkedIn Learning is a cost-effective learning tool to help students, in both technical and non-technical degree programs, develop the soft skills they need before graduation.

Keywords: soft skills, emotional intelligence, career success

## Introduction

Both technical and soft skills are essential to an individual's career success; however, soft skills often receive less attention in traditional higher education curricula. To increase student employability, it is important that higher education considers how to incorporate soft skills education into their coursework, even in courses designed for technical roles such as Information Technology (IT). This paper explores how incorporating the use of LinkedIn Learning into the classroom can help students obtain the soft skills needed to be successful. Student feedback, implications, and instructor recommendations are also discussed.

## Background

Soft skills are interpersonal and social skills that help people interact, which leads to a more effective workplace. Hard (or technical) skills can be applied directly to a specific task, but soft skills can be adapted to different tasks. Consequently, soft skills are critical in the workforce because these cannot be replaced by technology. Some of the most common soft skills are communication, empathy, emotional intelligence, resilience, creative thinking, and collaboration. Wagner and Sternberg (1985) first identified the concept of soft skills or "practical intelligence" after they observed that academic success did not always translate to career success. Even now with the emergence of artificial intelligence (AI), soft skills remain important because these skills cannot be replicated or replaced by machines. In fact, Lau (2021) cites a 2017 Deloitte report predicting that soft skill-intensive occupations will account for two-thirds of all jobs by 2030. Additionally, hiring employees with these skills could help increase revenue by more than $90,000. As 2030 nears, it is increasingly important to find ways to help students gain these valuable skills. By focusing on these skills, students can make themselves more attractive to employers and be more successful when they enter the workforce.

Instructors play a vital role in helping students develop soft skills, and Nazare de Freitas and Almendra (2022) identify several options for teaching these skills in higher education. One method is active teaching, which includes having students engage in an activity that requires them to reflect on ideas and how they would apply them in real settings. Active teaching includes activities such as class discussions, case studies, and simulation exercises. Group projects can also help students build soft skills such as team work and communication while also learning about a specific topic.

**Soft Skills for Technical Roles**

Technical knowledge has always been required for those working in technical roles; however, soft skills are becoming increasingly important. Munir's (2022) study found that 96% of engineers surveyed agreed that engineers needed soft skills to be successful in the role. However, 70% agreed that engineers lack these skills even though they believed that soft skills had a direct impact on their promotion opportunities. This view is not limited to engineering fields. Idrus (2009) states "Employers are now emphasizing that success as an engineer requires more than simply strong technical capabilities. Also needed are skills in communication and persuasion, the ability to lead and work effectively as a team member, and an understanding of the non-technical forces that affect engineering decisions" (p. 71). These two studies emphasize the importance of soft skills in a technical career, specifically for engineers.

Additionally, Joseph et al. (2010) noted a similar response that IT professionals also need soft skills to be successful. These skills include "the managerial, intrapersonal, and interpersonal skills that are used to resolve IT-related work problems" (p. 149). They noted that practical intelligence, or soft skills, for IT professionals is often developed through real-world experience. Graham & Lu's 2023 study of skills requested in online job listings for cybersecurity positions found employers seek people skilled in "presentation, problem-solving, interpersonal, organizational, and communication" (p. 944). Similarly, Dubey et al.'s (2022) study of IT professionals and students showed that students were deficient in customer orientation, active listening, and time management. These three studies support the idea that soft skills are needed in technical careers in the IT field. Karimikia et al.'s (2022) study of the behavior of information system professionals indicated that the role of IT professionals is shifting to be more customer-focused and providing value beyond just technical skills. More focus on developing soft skills in this area will result in a decreased need for managerial supervision as these professionals become more adept at dealing with others across the organization.

Likewise, maintaining technical skills has become a moving target. According to Smith (2023), technical skills have a "shelf life" of only two years, meaning that continuous learning is necessary to stay current in the field. Add in today's increased focus on the use of artificial intelligence, it is predicted that 60% of workers will need to be retrained by 2027. However, while technical skills are ever changing, soft skills such as creative thinking, collaboration and adaptability remain top required job skills (Smith, 2023).

While some instructors may consider it challenging or counterproductive to focus on soft skills in a technical course, it will be the soft skills, such as resilience, that will help an IT professional adapt their technical skills to the changing times. With some apprehension about how to help students improve their soft skills development before graduation, instructors may look for resources to help in this task. One resource to consider is LinkedIn Learning.

## LinkedIn Learning

LinkedIn Learning (n.d.) provides over 20,000 online videos to teach both hard and soft skills. These courses are taught by business professionals, and completing a course provides a certificate that students can post on their social media pages. It requires a subscription, but the first month is free.

LinkedIn Learning may be an effective way to develop the professional skills needed and share them with a larger audience (Trent-Gurbuz, 2020). Potential recruiters may see the skills posted on a LinkedIn profile and contact a possible applicant about open positions. LinkedIn Learning can be effective for both IT-related and non-technical roles as the platform offers a wide variety of courses for business, creative and technology skills. Leveraging LinkedIn as a job site, students can use LinkedIn Learning to grow specific skills that are included in job postings. Even IT-related roles include a list of soft skills that are required for a given role.

Dubey et al. (2022) called for educators to update their courses to incorporate soft skills development to increase the chances that students are employed as IT professionals. Students can utilize LinkedIn for more than finding a job as it provides a means for life-learning, which is an attribute of high achievers and a requirement in today's fast-changing business environment (Gotian, 2023). This paper presents an idea to incorporate the value provided by LinkedIn Learning into a college course.

## Research Problem

Faced with larger class sizes in a senior-level professional development course required for students who major in General Business, the authors sought ways to provide valuable activities for their students, while ensuring the instructors would still be able to manage the grading load for the course. The course includes three major areas of professional development:

- Career Preparation – creating resumes and application letters, practicing interview techniques, and creating an online professional profile
- Personality Awareness – completing a personality assessment and reflecting on how this impacts their professional lives
- Emotional Intelligence – learning and applying concepts of emotional awareness in their professional careers

In order to complete assignments aligned with the career preparation and emotional intelligence modules, students created both a LinkedIn profile and a LinkedIn Learning account. The LinkedIn Learning courses reinforce specific topics that are addressed in the course. Five modules focused on helping students gain the skill of emotional intelligence, and students also completed a course on creating an effective LinkedIn profile. All selected modules included videos with embedded quizzes, and students earned a certificate that could be added to their LinkedIn profile.

Another focus of the course is to teach students about the concept of having a growth mindset. People with a growth mindset believe that they can develop and improve their skills over time; whereas a fixed mindset leads to the belief that individuals are born with innate abilities instead of them being developed (Dweck, 2016). If students believe they can grow and learn new skills, they are more likely to advance in their careers. Part of teaching students to have a growth mindset includes having students identify a skill that would benefit them in a future desired role. Students may choose additional modules aligned with the skills they identified. Using this approach allowed the instructors to ensure students received specific instruction on predetermined topics while also allowing them some choice in their learning.

### Research Methodology

To gauge how effectively LinkedIn Learning supports soft skill development, students completed a brief survey on the experience. The survey was designed to gather feedback on their general experience with LinkedIn Learning as well as how they will apply the information they learned from the classes.

The survey was administered online using Microsoft Forms and students completed it at the end of the semester to account for the time they spent on LinkedIn Learning. To encourage participation, students earned points toward the overall course grade for completing the survey. The open-ended questions required a minimum word count of 100 words to ensure students provided more context in their responses.

In total, the survey was given to four sections of the professional development class across two semesters. Two of the sections were online, while the other two sections were face-to-face. The LinkedIn Learning assignments for both modalities were the same.

## Results

In total, 116 students responded to the survey, which resulted in a 95.1% response rate. The survey questions asked students about their overall experience with LinkedIn as well as their recommendations on how to best use the tool. The survey results provide insight into students' overall experiences, the skills they gained, and their recommendations to others.

### *Overall Experience*

When asked if they had previously used LinkedIn Learning, 68.1% of students indicated that they had not used LinkedIn Learning before this class. In regards to registering for the product, 86.2% said it was easy to sign up, and 95.7% said their overall experience was good, very good, or excellent. Assignments were intentionally scheduled so students could complete all required assignments within 30 days to avoid the monthly fee. When asked, 81.0% of students indicated that they were able to finish all their assignments within the trial date, but 11 students (13.3%) stated they were rushed to complete them on time. Students were encouraged to share their certifications on LinkedIn, and 70.7% reported that they sometimes or always shared their certificates on their LinkedIn profile.

Students were also asked how helpful they found the LinkedIn Learning courses to be to their education in the course. Almost 44% indicated that the courses were very helpful, 40.5% said they were helpful and 12.9% said they were somewhat helpful. Only 2.6% indicated they felt the courses they took were a waste of their time. When asked how they determined which optional course to complete, the majority of students (96.7%) reported that they purposely searched for courses that related to their future career (57.8%) or related to the skills that they wanted to learn (37.9%). Only 3.4% of students said they chose courses related to the ones that were required to complete, and only one student (0.9%) said they chose the first lesson that popped up.

Based on these statistics, students indicated the activities in LinkedIn Learning were valuable. Selected student comments about their overall experience with LinkedIn included:

- I loved this platform for two reasons. First, it helped me set up a solid LinkedIn profile. This means that if I were looking for a job, I could network around and find employment I would like. The second attraction of LinkedIn learning is the ability for those who have it to watch an infinite amount of professional development videos. While college is an excellent foundation for business majors entering the business environment, it often does not offer nearly enough experience for us to go into the work world with a complete understanding of how the environment will be. Then, when you factor in coworkers and office politics, things can become overwhelming. LinkedIn learning allows students to understand better what it takes to be successful in the work environment and allows us to gain useful knowledge that will help us be successful in the workplace.
- The skill I believe I will use the most going forward in my career is writing better business email. This is a skill that I will use in every career or job I have going forward. Even in my current job I occasionally have to write email to higher ups in the company and I want them to sound professional and look presentable. In today's age of modern communication being able to write professional and appropriate business email is an essential skill that will continue to grow in importance. The two courses I completed on the subject definitely have improved how I write business emails.

***Gained Skills***

Students were also given the opportunity to provide open-ended feedback about the skills they obtained and how they would apply these skills going forward. Skills that were highlighted by students are included in the table below:

| **Skill** | **Percentage of students indicated skills learned** |
|---|---:|
| Emotional intelligence | 21.7% |

| | |
|---|---|
| Communication | 9.6% |
| Critical thinking | 7.8% |
| Time management | 7.8% |
| Self-awareness | 5.2% |
| Leadership | 3.5% |
| Listening | 1.7% |

Expanding beyond simply learning about a skill, learning how to apply these skills in their future careers is important. When asked about how they will apply their new skills, selected student responses included:

- I will use this skill by boosting my communication with the rest of the loan team and other members of the company. I always struggled to ask for help when it came to contacting an employer or reaching out to a borrower for more information on their loan. I just didn't know how to say I needed help without sounding desperate or pushy. However, these courses helped me learn how to talk with my coworkers and how to ask for help in a way that doesn't sound demanding or desperate. These LinkedIn courses were great and I will continue using them in the future.
- I learned that you have to see things from others point of view and in the future I need to do a better job of just feeling for them and understanding why people make their decision. I learned that anyone at any time can be going through something that you may never know about it and transparency with individuals is the best thing when it comes to empathy. I learned that failure isn't always bad and I'm going to fail but what you do after failure is what matter, you have to be resilient get up and get things done. Resilience is up to you and in the future, I will do my best to always get back up.

- In my future career, I'll put my primary skills into action. Being professional means that I'll bring respect and reliability to the workplace consistently. When presenting myself, I'll communicate my skills clearly and engagingly, whether in interviews or networking. Understanding how businesses operate guides my decision-making, ensuring my actions align with organizational goals. For instance, in project management, I'll make sure my initiatives contribute to the overall business strategy. These skills will be the backbone of my professional conduct, ensuring success in various aspects of my career. Whether it's daily interactions or significant projects, I'll apply these skills to navigate and contribute effectively to the professional world.
- I will use the skills I retained on how to better prioritize my time. I usually complete all of my work in a few days when I feel good, then leave other assignments for a week or more. In the module, I was taught skills on how to effectively use a daily planner to maximize my work progress. I have implemented the use of the daily planner to work on school every other day for a minimum of an hour. I have also been working hard to reach out to my fellow classmates to strengthen our sense of community in the class. I feel like the sense of community will encourage other students to honestly critique my work and ask questions or ask for help with an assignment.

**Student Recommendations**

An open-ended question asked students "If you had to start all over again, would you do anything differently next time?" and "What advice would you give someone else when using LinkedIn Learning?" An analysis of responses produced three common themes between both questions.

- Be an active learner: Students indicated that to make the most of LinkedIn Learning, one should be engaged and take notes when watching the courses. They recommended devoting the proper time to the courses and to set time aside to focus when completing the courses.
- Don't procrastinate: Students said to take advantage of the free trial and take as many courses as you can within that window.
- Focus on your goals: Students suggested to make the most of the assignments by intentionally aligning the courses you take with your future career.

Finally, 24.1% of students said they would continue to pay for and use LinkedIn Learning, and 56.9% said they would continue to use the platform if it was paid for by their employer.

## Discussion and Implications

Based on the survey results, four key implications should be discussed. First, LinkedIn Learning is an effective tool to develop soft skills, which are equally important for people in a technical field. Students identified numerous learned skills outside of the ones that were directly taught in the course. Student comments regarding the effectiveness of these courses were positive, indicating that they understood a clear application for what they learned. Additionally, by leveraging online video courses in conjunction with reading-based learning, the instructors added a different approach to learning the skills. Providing this variety is especially helpful for students who prefer a visual and/or auditory learning style.

The second implication is that LinkedIn Learning can be a cost-effective way for students to learn soft skills. As the cost of higher education increases, educators should consider ways to reduce costs for their students. By utilizing LinkedIn Learning's 30-day free trial, the majority of students were able to complete all of their assignments within the trial. The cost for an additional month is $39, which is less than the average textbook.

Third, LinkedIn Learning can help develop a growth mindset by teaching students how to build these skills. Through the growth mindset assignment, students identified skills they needed to succeed in their desired careers and completed courses to build those skills. Providing this choice also taught students how to not only identify the skills they need to be successful, but also identify how they can gain those skills. This provided hands-on experience with practicing a growth mindset and critical thinking, something that is critical to their professional career development.

Finally, LinkedIn Learning gives students control over their learning. Several students commented that they enjoyed choosing courses that they felt were the most applicable to them. By giving students the opportunity to choose their own courses, students take ownership and responsibility of what they learn, and in turn, will take advantage of the learning tool.

**Instructor Recommendations**

Overall, the instructors' experiences with LinkedIn Learning were positive. The platform helped manage the grading burden by adding meaningful assignments that were easy to grade since the system assessed completion.

From an instructor's perspective, only a few issues with using LinkedIn Learning were apparent. The instructors provided direct links within the learning management system to the required courses, but the links did not always direct students to the exact course. As an alternative, instructors directed students to search for the courses using the course name on LinkedIn.

A small majority of students previously used a free trial; therefore, they had to pay for the subscription. This small fee was not cost-prohibitive as the only other required resource for the course was an inexpensive book (about $15). While these minor issues occurred, they did not significantly detract from the overall benefits of the program.

## Conclusion

Professional skills are often considered currency in the workplace. For IT and other technical roles, it is becoming increasingly important that students are taught the soft skills they need to succeed. In response to industry needs, Dubey et al. (2022) call for academia and industry to address the shortage of soft skills in the IT industry by including soft-skills courses and providing internships to students to help develop these skills. While challenges may exist, incorporating soft skills into technical courses is achievable by leveraging resources such as LinkedIn Learning. By using such resources, instructors can help students develop critical soft skills along with the needed technical skills, thus, increasing their employability. Additionally, these resources can be used as an effective way to encourage students to embrace a growth mindset, which will benefit them regardless of their future career path. Adding resources like LinkedIn Learning develops both hard and soft skills in students, preparing them to become successful professionals in their field.

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# The Not So Itsy-Bitsy Spider: A Review of Cyberattacks on Two Resorts and Lessons Learned

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## Abstract

Cyberattacks on Caesars Entertainment and MGM Resorts in September 2023 caused disruptions in business operations and threatened guest data (Brown & Brown, 2023). Guests' personal information in the Caesars loyalty program and MGM Resorts guests' confidential information was exposed. Additional resort-wide systems were breached, causing turmoil in hotels and casinos. Daily loss of revenue at MGM reached an estimated $8.4 million. Scattered Spider, an established criminal group, took advantage of social engineering that allowed the group to bypass multi-factor authentication, and attain credentials, among other techniques. The research will discuss overall damage, reactions to the attack and chaos, accelerate the responsibilities from legislation, and examine claims and the insurance coverage related to the attack. The subsequent article will serve as a guideline and suggestion for proposing mitigation efforts by initiatives in the hospitality sector to improve the health of cybersecurity policy.

**Key Words**: Cybersecurity, Hospitality, Cyberattacks, Scattered Spider, Resorts

## Introduction

Hotels and resorts collect confidential and financial information from their guests through cloud servers. Financial resources are dedicated to safeguarding against cyber threats. From a security perspective, hotels must employ more cybersecurity (Brooks, 2024). The cyber-attacks on Caesars Entertainment and MGM Resorts in September 2023 illustrate a symmetry of vulnerability to the hotel sector and the far-reaching consequences of hotel cybersecurity breaches. Analyzing those impacts could inform conversations about the future of cybersecurity policies in the hospitality industry.

## Overview of the Cyberattacks

In 2023, cybersecurity breaches at U.S. casino and hospitality firms Caesars Entertainment and MGM Resorts exposed thousands of guests' information to unauthorized third parties—all performed by a mysterious group of hackers known as Scattered Spider, presumably a Generation Z venture (Braithwaite, 2023; Dareen, 2023). They exploited a series of vulnerabilities in Microsoft Windows software (Cabe, 2023). Data disruptions caused by Scattered Spider halted the electronic operations and finances of both companies (Paganini, 2023).

Scattered Spider, with likely assistance of another hacker group, ALPHV, utilized voice phishing tactics to gain access to MGM Resorts servers (Cabe, 2023; Dareen, 2023). They gathered information on MGM Resorts employees from LinkedIn. Then, they contacted the MGM Helpdesk via phone to request a password reset for an MGM Resorts staff member (Morrison, 2023). Subsequently, the group gained illegal access to a DMZ Server using the stolen login information (Braithwaite, 2023). Scattered Spider anticipated that the MGM Helpdesk would detect that they were impersonating an MGM employee to get the credentials, and they would subsequently be blocked. They built an Identity Provider (IDP) application and managed to ensure access rights remained. The fake IDP implemented outside MGM Resorts could send verified requests to Okta MGM's approved IDP (Thompson, 2024). David Bradbury, MGM's Chief Security Officer, noted the breach was successful because the bad actors introduced their IDP and were very competent. Furthermore, Mr. Bradbury confirmed signs of similar hacking attempts starting in mid-August originating from the same group (Dahan et al., 2024).

## Impact on MGM Resorts

The attack on MGM Resorts caused delays in services, including computer and reservation systems shut down for 10 days; shutdown of casino games; the company’s HR system; email; 31 MGM Resorts websites; and the app it provides for its guests, MGM Rewards. It also resulted in a loss of more than $8.4 million in daily revenue and many unhappy, stranded guests who had non-functioning room key cards and slot machines. Guests suffered due to long lines at buffets, a shortage of amenities, and the inconvenience of being disconnected by the shutdown. The shutdown exposed weaknesses in MGM’s IT infrastructure and the ripple effects on its operations (Siddiqui, 2023).

The breakdown of the company's computer and reservation system meant there was an inability of MGM Resorts to continue with any of its critical functions such as honoring guest reservations, check-ins and check-outs, payments, and digital room key systems. The widespread systematic failure demonstrated MGM had to pivot to manual processes across the company’s properties, which severely delayed guests and caused frustration. Catastrophic failures of multiple systems and networks led to disruption, operational, and reputational damage. Damages were further exacerbated by the loss of guest trust, presenting long-term damage-control issues for the company as it tried to regain guest confidence (Morrison, 2023).

Guest services were not the only MGM operation affected. The attack affected the company's Human Resources (HR) systems, and payroll processing and employee scheduling were halted. Some employees reported having trouble receiving their wages on time, which was particularly troublesome for hourly associates who depend on prompt payments. Others could not access scheduling systems in shift management, which added another layer of complications as the company was trying to respond to the chaos in its operations. Employees were not updated, and many questions remained unanswered. The entire process challenged MGM to work with employees during the crisis period. MGM workers also worried about the company's ability to safeguard their data. Personal identification details and payroll information were at risk of being hacked, thus the company also had to respond to concerns about identity theft and possible lawsuits. This attack proved reliable HR systems are of utmost importance for hospitality firms. They need to be in place to operate and function smoothly, to ensure employee welfare and confidence. To address the issues and put their employees at ease, MGM launched recovery actions such as system audits and enhanced cybersecurity and communication plans (Braithwaite, 2023).

## Impact on Caesars Entertainment

Scattered Spider's cyberattacks against Caesars Entertainment occurred in September 2023 impacted data security and the trust of customers in various areas affected by the attacks; many guests' personal information, such as social security number and driver's license number, and records from the loyalty program, were stolen during the breach, which brought privacy and legal issues into focus (Morrison, 2023). To prevent the spread of the stolen data after the breach, Caesars paid a ransom shortly after the breach (Schappert, 2023). However, considering the consequences of the action by Caesars, it is evident large hotel companies are susceptible to cyber blackmail (Newman, 2023). Guests' insecurity about personal data and unsure of privacy protections are concerning (Jones, 2023). These concerns may result in decreasing loyalty and visits in the future.

The data breach resulting from the cyberattack on Caesars Entertainment exposed significant vulnerabilities. Specifically, the breach leaked the personal information of many individuals, including social security numbers, information from driver's licenses, and records from the Caesars loyalty program (Morrison, 2023). This left many people's private information exposed to potential hackers – information that could be easily abused (for identity theft, fraud, or other types of misuse). The incident also brought attention from regulators and led to calls for compliance with data protection laws such as the General Data Protection Regulation (GDPR) and California Consumer Privacy Act (CCPA), and pressure from regulators. Consequently, Caesars enhanced its cybersecurity by developing data architecture, improved access, and monitoring systems to provide customers' data with better protection against future breaches.

## Short-Term Financial Impact

MGM Resorts was hit with multiple cyberattacks that cost millions in losses across the company. About $8 million per day was lost as computers and reservations systems were down for more than a week. While the hotels were still operational with manual bookings and physical keys, along with portions of the casino floors still running and in operation, the nonfunctioning computer network led to losses in earnings. Occupancy dropped as guests struggled to book or amend their reservations. In turn, revenue losses resulted from room revenue, dining services, and ticket sales for entertainment events. The casino business, which composed the bulk of the company's profits, declined as slot machines and table games suffered slumps, with losses in gaming income of an estimated $100 million (Braithwaite, 2023; Milutinovic et al., 2023).

The effect of losses associated with the attacks is likely to have increased the cost of managing the company's conventional operational functions (Newman, 2023). MGM had to incorporate tasks to help with basic customer services such as check-ins and payment methods. The human capital implications of the losses were revealed post-attack. Analysts expect a total economic loss of more than $100 million, which could even increase as additional losses, such as costs of recovery and their impact on revenue forecasts, are tallied. The impact of cyber risk may be easily compounded and devastating in the gaming and hospitality sectors (Forrest, 2023).

Although the attack was more than a year ago, potential threats to the fiscal health of the companies still linger. Both MGM Resorts and Caesars Entertainment incurred costs from the exposure of customer data and the related ransom payments (Braithwaite, 2023). Caesars acted against the threat by allocating around $15 million in ransom for data-protection measures to stop credit card and driver's license numbers from being accessed by third parties. Though the response helped soothe concerns about the data breach incident, it hemorrhaged resources in a loss that still follows Caesars. The data breach put the company back in the spotlight where it continues to grapple with questions regarding its commitment to privacy responsibilities (Forrest, 2023).

Caesars also incurred costs related to hiring analysts to examine the breach, updating and upgrading security protocols with enhanced encryption and other security procedures for securing data, and various other investments related to its security and data protection, although the exact costs are confidential. Additionally, the company anticipated significant costs related to the adverse publicity. Moreover, the additional concern about the security of company information (data), which resulted from the breach, is likely to reduce future booking levels and engagement in the guest loyalty program, which historically has represented a major percentage of revenue to the company. The financial impact of the cyber-attack was deemed excessive when considering not only the ransom amount but also the additional expenses for security measures and the various fines and other costs which may be more than $50 million (Forrest, 2023). All this is made worse by the fact that the whole industry is particularly exposed to financial cyber threats, and the efforts to improve risk management for securing information and data appear to remain severely hampered.

## Long-Term Financial Implications

For Caesars Entertainment and MGM Resorts, the consequences of the data breach may lead stakeholders to conclude damage suffered extends beyond the initial ransom payment and losses. There could also be implications for regulatory fines, decreased market or consumer confidence, loyalty, and other factors that may affect long-term profits (Blair-Frasier, 2023).

One of the largest threats to the sustainable future of MGM Resorts lies in its expected total losses of more than $100 million dollars (Blair-Frasier, 2023). When operations were disrupted and expected to last for at least seventy-two hours, most special events in MGM, including bookings for slots, were canceled, and all operations at the casino were shut down (Morrison, 2023). The major interruptions may also affect guest reservations, as psychological factors can be an important part of the decision-making process. Moreover, due to the seriousness of the COVID pandemic, consumers' mindset change is a gradual process, and it might be difficult to normalize the business image of MGM, thus affecting their market position in the intense economic competition (Forrest, 2023).

Additional capital may be required as more cybersecurity investment and protocols arise, leading to the shutdown of other key projects. The loss of brand equity due to consumers' mistrust can also force improvements in internal processes and harsh marketing directed at restoring consumers' confidence to increase both cost components of the companies (Forrest, 2023). Public and private entities facing similar occurrences and consumer information exposure can prepare to face legal consequences. These companies could face various fines for violations of federal and state laws (Jones, 2024).

Although the attack on Caesars Entertainment was somewhat preempted by paying the $15 million ransom, the payment was like a band-aid that will cost much more long term, due to additional expenses and regulatory requirements (Forrest, 2023). Because the firm and its entities will likely bear future expenses, they will be exposed to much more costs. The exposure of guests' sensitive data, directly or indirectly, may require changing the information protection practices on the networks. Like MGM Resorts, the company will have to prove that its guests are protected again, a major concern as these individuals will experience mistrust. Thus, guest reservations and gaming revenue might decrease even in the mid and long-term, affecting earnings significantly. The disruptions may always warrant additional training measures which will also require additional financial resources.

Both Caesars and MGM Resorts face significant financial recovery, audit, and brand reparation ahead. With the occurrence of the cyber event on an industry so dependent on the goodwill among its guests, attention to these issues will likely persist and incentivize cyber hygiene in hospitality. In the next few years, these firms may be expected to reallocate capital towards the better management of technology use and risk reduction, especially if they intend to preserve the companies from future cyberattacks, knowing that losses from a cyber-attack are not limited to costs but may impact the way a company operates and plans (Newman, 2023).

## Emotional Impact on Guests

The cyber-attacks that occurred on MGM Resort and Caesars Entertainment have not only affected the corporate image and financial ramifications, but have also affected guests significantly, and this impact might affect future personal interactions with the brands (Forrest, 2023). From the guests' perspective, dissatisfaction caused by the loss of services – be it the inability to manage hotel reservations, digital check-ins, the termination of the advantages brought about by the loyalty program, or both – induced helpless anger and frustration (Morrison, 2023). For these individuals, the experience of feelings including distress, excluded access, or missing functions – as those stricken with psychological difficulty will undergo some form of distress within days of encountering such difficulties (Allen, 2023). Shortly after encountering psychological difficulties, guests experience some form of distress. This includes hardship gained at an additional cost due to inaccessibility to rooms and goods necessitated.

For MGM Resorts, the brand's emotional dissonance with guests will be much more heightened because they have built an expectation with guests that 'hospitality' delivers a higher level of customer satisfaction because of the 'intangible' hospitality components – great service and magical moments through the experience. Guests dissatisfied with operations will experience a sense of betrayal. MGM Resorts will encounter a loss of repeat customers. The second dissonance within the market; the discrepancy between the expectation and the realization would create a 'brand image' problem that may be broadcast through social media in the form of negative information about the company from guest reviews.

At Caesars Entertainment, the threat of sensitive personal information disclosed without authorization caused guests who were potentially hacked to feel even more anxiety. Many of them were extremely concerned about what would happen if their personal information, especially their social security number and driver's license number, ended up in the wrong hands, causing fear. This guest anxiety resulted in the tarnishing of Caesars' brand image and consumer confidence. Additionally, the issue of breach of loyalty and the question of whether Caesars will be recognized as a reliable place to return to by the guests creates a real lack of trust.

**Qualitative Examination of Guest Dissatisfaction**

Following the detection of cyberattacks, both companies need to consider guests' reactions and feelings, which may produce long-term consequences to guest relations. Companies need to take a proactive stance in recognizing the existence of these feelings and take commensurate measures for support and detailed communication about the attack. Thus, if these companies have caused distress to their customers, they will also invariably suffer the consequences. By securing data and preventing future attacks, companies can improve the situation and mitigate existing hostility that may erode trust and cause further harm due to these causes.

Several guests expressed their frustrations with local news outlets. The comments ranged from the following:

- "Nobody could help us," one guest at Mandalay Bay told FOX5. "Computers were down" (Allen, 2023).
- "The slot machines were dark," another guest said. "It was so surreal in a way" (Allen, 2023).

- Brinkenhoff noted it was inconvenient he couldn't use his credit card but planned to take cash out when ATMs started working again. He also expressed worry that a cyber-attack like this affected a company as large as MGM (Allen, 2023).
- "If it can happen to MGM, can it happen more widespread?" he asked. "Because that would be more of an issue, you know?" (Allen, 2023).
- "At this point, what are we paying for?" Brett, who said he was staying at MGM Grand, told 8 News Now (Loftis, 2023).

**Legal Repercussions**

In failing to maintain trust, both companies are predictably facing litigation. Due to the large-scale breaches, repercussions now include claims and litigation that stemmed from these security attacks. Both casino resorts are facing multiple class action lawsuits for failure to provide proper security for collected data. Currently, MGM is facing lawsuits from guests, now turned plaintiffs, that range from seeking reimbursement of losses derived from identity theft, recouping costs from paying for services to protect, monitor, or freeze their credit, and demanding compensation for time expended addressing the breach and requesting free credit monitoring and identity theft insurance for many years beyond the initial breach (MGM Resorts Data Breach Class Action Lawsuit, 2024). If the Scattered Spider, with likely assistance from ALPHV, is proven, MGM could likely lose up to $100 million dollars due to failure to protect customers' data (MGM Data Breach Lawsuit*,* 2024).

Caesars Entertainment is also facing litigation regarding the alleged Scattered Spider breach. These suits include:

- *Katz v. Caesars Entertainment Inc.*, Case No. 1:23-cv-21125, in the U.S. District Court for the District of New Jersey (Mehorter, 2023).

- *Thomas McNicholas and Laura McNicholas, individually and on behalf of all others similarly situated v. Caesars Entertainment Inc.*, Case No. 3:23-cv-00470-MMD-CSD, in the U.S. District Court for the District Court of Nevada (*Rodriguez v. Caesars Entertainment,* 2023).
- *Paul Garcia,* i*ndividually and on behalf of all others similarly situated v. Caesars Entertainment Inc.,* Case No. 2:23-cv-01482-CDS-EJY, in the U.S. District Court for the District Court of Nevada (*Paul Garcia v. Caesars Entertainment,* 2023).

The plaintiffs claim membership in Caesars' loyalty program and seek restitution for the damages they incurred (Mehorter, 2023). Plaintiffs similarly alleged that their personally identifiable information (PII) had been compromised and left them vulnerable to potential long-term repercussions, including fraud and identity theft. As such, this exposure could potentially enable malicious actors to open financial accounts in their names, submit false tax filings, or obtain fraudulent identification (MGM Resorts Data Breach Class Action Lawsuit, 2024). As such, litigation of this magnitude reinforces and underscores the necessity for continuously seeking to strengthen safeguards and data management practices to prevent future incidents (Stoyanovich, 2019).

**Insurance Considerations**

An assessment of the cybersecurity insurance protocols that were in place at the time of the various cybersecurity attacks and whether both companies had the proper coverages to shield their assets would be helpful for the conversation and may have helped prevent the above-mentioned litigation. A post-mortem of the results of the litigation pending against the two resorts has not been completed. However, determining insurance products for hospitality organizations of this magnitude and reviewing the necessary steps required to ascertain and maintain coverage for companies that possess multiple pathways to financial and personal data by other enterprises in the space are not needed to work continuously to protect their guest and their experiences (Cyber Insurance Guide, 2024; *Cybersecurity Breaches & Hotel Insurance: Are You Protected?*, 2024). Why? Invariably and inevitably, the next set of hackers have already spun, or are spinning, their "webs."

Data breaches pose significant risks to organizations across various industries, leading to financial losses, reputational damage, and legal repercussions (Cavello, 2024). As cyber threats continue to evolve, the need for comprehensive insurance products that specifically address the aftermath of data breaches has become increasingly critical. Organizations can benefit from tailored coverage options that mitigate the fiscal impact of these incidents, allowing them to recover more effectively and maintain operational continuity (Sbit, 2023).

To enhance protection against cybersecurity risks, hospitality businesses should consider obtaining comprehensive insurance coverage. Insurance products can provide critical support during a breach, covering costs related to incident response, business interruption, and legal expenses (Cyber Insurance Guide, 2024). This coverage should include several key components designed to mitigate the financial impact of cyber incidents.

First, incident response costs should be covered to manage and mitigate data breaches effectively. This includes expenses related to immediate response efforts, forensic investigations, and remediation measures. In addition to incident response costs, organizations should also seek coverage for business interruption losses. This type of insurance compensates for revenue lost due to operational disruptions caused by cyberattacks. Additionally, it may cover the extra expenses incurred to restore normal operations, such as hiring outside consultants or implementing new security measures. Such financial protection is crucial, as it allows businesses to maintain stability and continuity during challenging times when they may be unable to operate normally.

Another important aspect of data breach insurance is extortion coverage (Cyber Insurance Guide, 2024). Cybercriminals increasingly use ransomware and other extortion tactics to target businesses, demanding payment to restore access to data or prevent its public disclosure. Extortion coverage provides financial protection against the costs associated with such threats, including ransom payments, legal fees, and the costs of negotiating with attackers (Cyber Insurance Guide, 2024). By having this type of coverage in place, organizations can better manage the financial burden of a cyber extortion event and reduce the likelihood of severe disruption to their operations.

Lastly, a critical component of comprehensive coverage is legal expenses. This includes coverage for legal fees and settlements related to breaches (Cavello, 2024). As cyberattacks can lead to lawsuits and regulatory fines, having legal expense coverage can help organizations manage the financial burden associated with legal proceedings and compliance issues. Thus, legal expense coverage is designed to mitigate these financial burdens, allowing resorts to focus on recovery and restoration rather than the escalating costs of legal defense.

Resorts must comply with various data protection regulations, such as the General Data Protection Regulation (GDPR) and the California Consumer Privacy Act (CCPA) (Stoyanovich, 2019). If a data breach occurs, regulatory bodies may impose hefty fines for non-compliance with said or other regulations, and legal expense coverage can help cover the costs associated with potentially defending and/or paying for these fines. This type of protection is important to maintaining the resort's financial health while navigating the complex legal landscape that follows a cyber incident (Brooks, 2024; Sbit, 2023).

Additionally, legal expense coverage typically includes costs related to hiring legal experts, forensic investigators, and public relations consultants to manage the fallout from a cyberattack. (Sbit, 2023). Resorts can leverage this coverage to engage professionals who can assess the breach, advise on compliance with notification laws, and help communicate effectively with guests and stakeholders. By securing adequate legal expense coverage, resorts can not only protect themselves financially but also ensure that they are better equipped to respond to and recover from cyberattacks, ultimately safeguarding their reputation and customer trust (Sbit, 2023).

## Lessons Learned and Recommendations

The cyberattacks in September 2023 underscore the necessity for robust cybersecurity frameworks within the hospitality industry. To address the evolving threat landscape, organizations should invest in advanced security technologies (Brooks, 2024). Implementing state-of-the-art technologies can significantly enhance the ability to detect and prevent cyber threats before they escalate.

The recent cyberattacks also emphasize the critical role of a competent board in overseeing cybersecurity strategies. A well-informed board ensures that cybersecurity remains a top priority within the organization, creating a culture of security awareness that permeates all levels of the company (Costigan & Searle, 2024). This active engagement is essential for fostering an environment where cybersecurity is integrated into daily operations and decision-making processes. Implementing comprehensive onboarding for new technology and personnel is another crucial lesson. By establishing thorough training and awareness programs, organizations can better prepare their staff to identify and mitigate vulnerabilities early on (Cyber Insurance Guide, 2024). Additionally, continuous monitoring of systems and processes is vital for detecting potential threats before they escalate into serious incidents. Alongside this, robust offboarding procedures must be established to protect against insider threats by promptly revoking access to sensitive information when employees leave.

Regularly reviewing laws and industry standards is essential for organizations to remain compliant and adaptable in the face of changing regulatory landscapes (Brands, 2024). Cybersecurity threats are constantly evolving, making it imperative for organizations to stay informed about new legal requirements (Institute Data, 2023). This vigilance helps mitigate risks associated with non-compliance and fosters a proactive approach to cybersecurity management.

Equally important is the continuous assessment of insurance coverage. Organizations must ensure that their policies remain adequate as new threats emerge. By regularly evaluating both compliance and insurance needs, businesses can enhance their resilience against cyberattacks, thereby minimizing potential financial and reputational damage (Brooks, 2024).

The cyberattacks in September 2023 underscored the necessity for robust cybersecurity frameworks, particularly within the hospitality industry (Institute Data, 2023). To effectively address the evolving threat landscape, organizations should invest in advanced security technologies that enhance their ability to detect and prevent cyber threats. Such investments can significantly reduce the likelihood of successful attacks and help safeguard sensitive information.

Regular security audits play a vital role in identifying and addressing vulnerabilities within an organization. By conducting periodic audits, businesses can stay ahead of potential risks and implement necessary improvements in their cybersecurity posture. This proactive approach helps organizations not only recognize weaknesses but also fortify their defenses against future attacks (Brooks, 2024).

Employee training is another key component of a strong cybersecurity strategy (Ludynia, 2024). Continuous education on best practices and threat awareness enables staff to recognize and respond effectively to potential threats. By fostering a knowledgeable workforce, organizations can significantly reduce the risk of human error, which is often a critical factor in successful cyberattacks.

Finally, transparent communication with guests during and after a breach is essential for rebuilding trust. Organizations should prioritize providing timely updates to keep guests informed about the status of the breach and the steps needed to address it (Cyber Insurance Guide, 2024). Offering support and compensation to affected individuals can help mitigate the impact of the breach and strengthen customer loyalty in the long term.

## Conclusion

These events and similar casinos clearly illustrate the extent of guest disappointment attacks. The cyberattacks at MGM Resorts and Caesars Entertainment resulted in a significant level of disruption for guests – whether it was the inconvenience of service being down, the delay in check-in, or the concern surrounding their data being breached. Poor communication and inadequate compensation seemed only to exacerbate the situation, with significant ramifications for whether guests would choose to return in the future. To avoid or reduce the risks of these deleterious effects, hotels should plan on ***not if, but when*** they are attacked and have the strategies and tools in place to ensure that the business can protect and defend its brand and ultimately, its business operations from virtual spiders and/or any other cyber "pests."

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# User Review in Open-Source Software Development: Do the Developers Care?

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## Abstract

Open-source software projects are routinely reviewed and rated by users. Researchers have looked at various motivations that can lead to participation in open-source software projects. However, the existing research does not include an examination of the relationship between user reviews and continued voluntary participation in open-source software development. Continued voluntary participation is so fundamental to the development of open-source software that any factor that can potentially impact participation must be examined. Using a 2 (volume) × 2 (valence) experimental design, this study examines the potential influence of user review on the intention to continue to participate in open-source software projects.

**Keywords:** Open-source software, continued voluntary participation, user review.

## Introduction

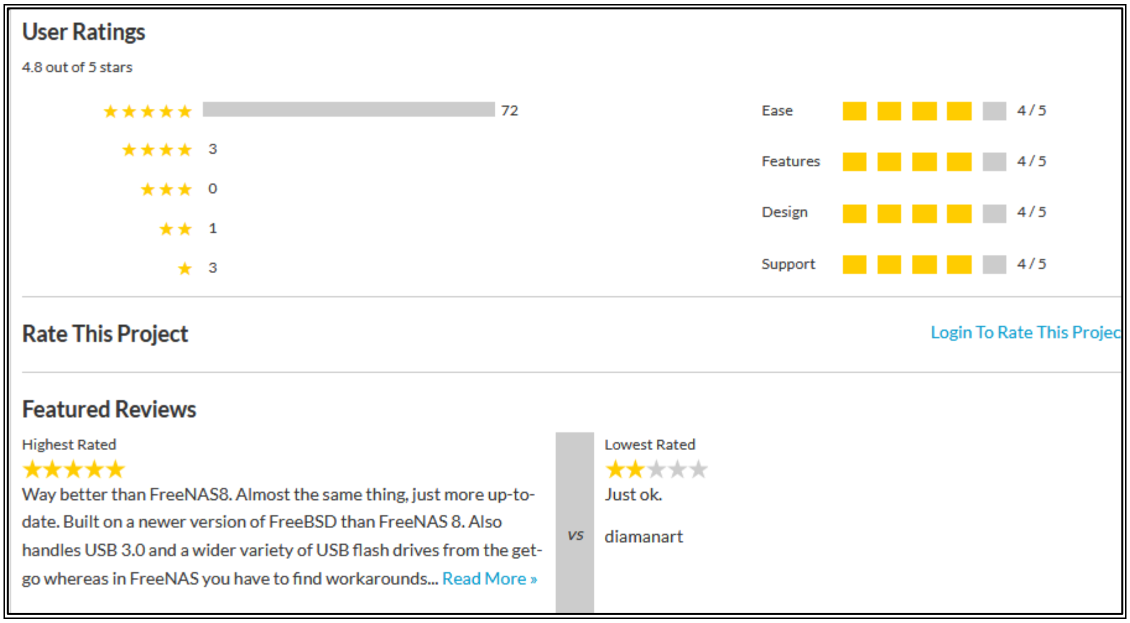
Open-source development of information systems is a social and technical movement that has undeniably changed how information systems (IS) are developed. Indeed, the open-source software (OSS) movement has contributed significantly to society and continues to attract IST professionals to volunteer their time, effort, and expertise to develop new IS products that can help themselves and the IST community of users (Lerner & Tirole 2002; Hann et al., 2004; Blanchard & Markus 2004; Roberts et al., 2006; Carillo & Okoli 2008; Nambisan & Baron 2010; Maruping et al., 2019; Shi & Sun 2022; Taylor & Dantu 2022). The dynamics of OSS development are different from our understanding of software development in the proprietary environment. In proprietary software development (PSD) professionals with IST knowledge are directly paid under some form of contractual obligation to contribute. On the other hand, the world of OSS development is largely dependent on a vast number of volunteers, a significant portion of those volunteers are contributing for free.

However, the availability of free volunteer IST professionals is not the only reason large and small organizations are interested in OSS development. The quality of OSS is also another big reason that is influencing businesses' decision to prefer OSS development to proprietary software development (August et al., 2018). No software product is perfect. Like any product, the progress of the quality of a software does not end with the first implementation or iteration. It is not only common but also essential to make continuous improvements to software to address various technical and non-technical issues. The continuous improvement of popular software such as Microsoft Word, Excel, and PowerPoint made by Microsoft is a testament to this idea of continuous improvement of software products. Software developed in the open-source environment is not any different. IST professionals are at the core of this phenomenon of OSS development. Continuous contribution to updating the code is credited for the high quality of open-source software (August et al., 2018). Hence, various aspects that can influence the continuous participation of IST professionals in the OSS development environment remain a topic of great interest to researchers and practitioners alike (Ho  & Rai 2017). This research dives deeper into the examination of factors that can lead to the continued participation of IST professionals in OSS projects.

User reviews have been tremendously helpful in the world of e-commerce. Online reviews are the most prevalent form of user reviews that are available in today's world of the online market. "Online product reviews help consumers infer product quality, and the mean (average) rating is often used as a proxy for product quality" (Hu et al., 2017, p. 449). Online reviews are becoming increasingly popular to the point that online reviews influence more than two-thirds of online shopping and therefore, organizations are putting more and more emphasis on building or maintaining good online review systems (Shen et al., 2015). While open-source software is not quite comparable to online consumer goods, the OSS development platforms are allowing users to rate and leave feedback on OSS projects. Figure 1 shows results from sourceforge.net that OSS projects not only keep a history of reviews provided by the users but also create a cumulative user rating of many OSS projects based on the feedback they received from users and even highlight some reviews as featured reviews. Because the existing IST literature on OSS development has not examined the role of user reviews in the development of OSS, even though many OSS project users are actively providing feedback, we do not know how this feedback contributes to the development of such OSS projects.

**Figure 1**

*Sample cumulative user-generated ratings of an OSS project in Sourceforge*




This study explores the role of user feedback in the form of online user reviews in OSS development by answering the primary research question: *How do user reviews influence continued voluntary participation in the development of open-source software projects?* The study uses the signaling theory to guide the examination of the influence of user reviews on continued voluntary participation. The signaling theory involves two parties, the signaler and the receiver, in which the signaler shares information that is not known to the receiver to bring symmetry of information between both parties (Boulding & Kirmani 1993; Connelly et al., 2011; Ho & Rai 2017). Signaling theory provides a framework that can help us understand how user reviews provided by users may influence IST professionals' intention to continue to participate in further development of OSS projects.

The study used an experimental study design to ask IST professionals working on various types of OSS projects about how certain user reviews will influence their continued participation in the OSS projects on which they are currently contributing. The OSS projects included in this study served educational, gaming, communication, and several other industries. The host platforms for the projects included well-known OSS development platforms such as GitHub, Sourceforge, and Linux. A total of 164 IST professionals' responses were included in the final analysis. The respondents' roles ranged from peripheral developers to core members. The results are supportive of the central assertion that user reviews play an important role in driving the continued participation intention of IST professionals in OSS development. This study enhances the IST literature, especially the research stream focused on open-source software development, by highlighting the importance of user reviews as a factor that influences continued participation in OSS projects. Continued participation in OSS projects has been a focus of IST researchers and this study shows that user review can play a significant role in influencing continued participation intention even when considered along with other well-studied factors such as motivation, a host of project attributes, and personal attributes such as education and experience.

## Literature Review

Earlier IST research found that participation in OSS development is influenced by a combination of intrinsic and extrinsic motivations (Hars & Ou 2002; Hertel et al., 2003; Taylor & Dantu 2022). Therefore, subsequent research on continued voluntary participation followed the same paradigm. Extrinsic motivations such as peer cognition and status have been found to influence continued voluntary participation in OSS projects (von Hippel & von Krogh 2003). OSS projects that are geared toward the general population tend to look for financial assistance more than projects that are geared toward tech-savvy people (Choi & Chengalur-Smith 2015). A literature review of studies in OSS led von Krogh et al., (2012) to conclude that social practice mediates the relationship between motivations and continued voluntary participation. Fruitful interaction among developers can also positively influence continued voluntary participation (Xu et al., 2009; Qureshi & Fang 2011). For instance, trust can lead to continued participation among OSS communities (Shi & Sun 2022) whereas distrust among developers can reduce continued participation (Ho & Richardson 2013). IST professionals sometimes tend to gain economically from their employment in the proprietary environment for their role in OSS projects when the roles are aligned in both environments (Hann et al., 2013). Other studies have found that license choice, enforcement of intellectual rights, and team configurations tend to impact the continued participation of volunteers in OSS projects (Ho & Rai 2017). Some studies examined the quality of coding of OSS projects and how that potentially drives continued participation (e.g., Herter et al., 2003; Baldwin & Clark 2006; Ho & Rai 2017). Similarly, some have noted that the complexity of software can discourage contribution to OSS development (Midha et al., 2010). Table 1 lists a few notable studies that have looked at the continued voluntary participation of IST professionals in OSS projects.

**Table 1**

*Research on voluntary participation in open-source software development*

| Sources | Factors that Influence Participation in OSS Projects |
|---|---|
| Baird & Maruping 2021 | Human attributes and IS artifact attributes |
| Carillo & Okoli 2008 | Unique learning environment |
| Colazo & Fang 2010 | Project team configuration |
| Daniel et al., 2018 | Ideology, commitment to company, commitment to OSS community |
| Fang & Neufeld 2009 | Situated learning, identity construction |
| Hahn et al., 2008 | Cohesion cues and status cues based on the developer's past collaboration |
| Hann et al., 2004 | Social-psychological functions (normative, values, understanding, career concerns, and ego enhancement) |
| Hars & Ou 2002 | Self-determination, altruism, community identification, future rewards, personal need |
| Hertel et al., 2003 | Valence, instrumentality, self-efficacy, and trust |
| Ho & Rai 2017 | Quality control, type of project, tenure in the project |
| Lerner & Tirole 2002 | Career concern incentive, ego gratification incentive |
| Midha et al., 2010 | Cognitive complexity of OSS |
| Maruping et al., 2019 | Developer open-source values, centrality in a communication network, commitment to the open-source community |
| Nambisan & Baron 2010 | The sense of responsibility to the community and company, expectations of self-image and expertise enhancement, |

| | |
|---|---|
| | identification with community and company |
| Qureshi & Fang 2011 | Social interactions between core and peripheral volunteers |
| Ho & Richardson 2013 | Trust among developers in the team |
| Stewart et al., 2006 | Open-source software licensing choices |
| Shi & Sun 2022 | Trust in OSS project communities |
| Taylor & Danto 2022 | Financial incentive and future growth potentials |
| von Hippel & von Krogh 2003 | Private-collective model of innovation (Private rewards) |
| von Krogh et al., 2012 | Motivations and social practice |
| Xu et al., 2009 | Developer-to-developer interaction |

Among the studies on intrinsic and extrinsic motivations, some have highlighted the importance of feedback on participation. For instance, Hars and Ou (2002) noted that feedback is a very useful way for developers to see "how others are using their contributions." They argue that "the feedback mechanism is self-reinforcing, for it encourages the author to expend additional effort to perfect his code, which in turn attracts more favorable feedback" (Hars & Ou 2002, p. 30). A similar argument was made by von Krogh et al., (2012) that "OSS developers often receive immediate user feedback on installing, systems compatibility, bugs … when developers see how the software product performs on their own and other users' computers, or compares in efficiency with competing products, they may choose to maintain or adjust the standards of excellence in the social practice, as part of learning to practice better" (p.667). While the literature alluded to the importance of feedback or user reviews, we are yet to see a nuanced understanding of how user reviews play a role in motivating IST professionals to continue to participate in OSS projects. We address this gap in the open-source literature.

**Theory**

The theory section is divided into three subsections: construct definitions, research model guided by the signaling theory, and hypotheses development.

### *Construct Definitions*

*Continued voluntary participation intention* or CVPI refers to the intention of developers to participate in an ongoing OSS project for further enhancements. CVPI is adapted from Ho and Rai (2017) who examined various project attributes (e.g., quality control) as antecedents of intention to continue participating in ongoing OSS projects. CVPI should be distinguished from an IST professional's intention to participate in an OSS project for the first time. Even though there are potential overlaps of factors that can lead to initial participation and continued participation, this study is focused on IST professionals' intention to continue participating voluntarily after they have already made some contribution to an OSS development project.

The study refers to user reviews as the feedback that is received from users of open-source software. The user may or may not be a contributor to the development of the software project. This study examines user reviews that are provided from the user's perspective which are provided by users via a system dedicated to providing user feedback (e.g., online review systems) on the respective development platform. The study does not examine reviews that are provided through the channel of communication that contributors (e.g., developers, and initiators) would usually use for collaborative purposes. The study examines two characteristics of user reviews: volume and valence. Volume and valence are the most prevalent characteristics of online reviews in the existing literature (e.g., Chen et al., 2019; Sahoo et al., 2018; Archak et al., 2011). The study refers to the *volume of user review* as the amount of text written (e.g., number of words) by the user in a review. While many researchers of online reviews defined volume as the total number of feedbacks received by a product (e.g., Archak et al., 2011; Sahoo et al., 2018), because this study focuses on understanding how volume would impact CVPI, the definition of volume of user review in this study is connected to the volume of a specific review that is used in the study, and not to the total number of feedbacks received by an OS project. This study refers to the *valence of user review* as the positive or negative feedback provided by the user. In other words, when the feedback describes an OSS project negatively, then we can say that the feedback has negative valence.

***Research Model***

The key components of the signaling theory include the signaler, the signal, the receiver, and the feedback sent to the signaler (Connelly et al., 2011). This study takes guidance from the signaling theory to examine the impact of user reviews in the context of OSS projects in which it argues that the user is the signaler, the user review is the signal, the IST professional contributing to the project is the receiver, and continued voluntary participation in the OSS project is a form of feedback sent back to the signaler(s). The signaling theory suggests that when an asymmetry of information arises when the signaler compels to send a signal to the receiver, the receiver then interprets the merit of the signal and provides feedback to the signaler.

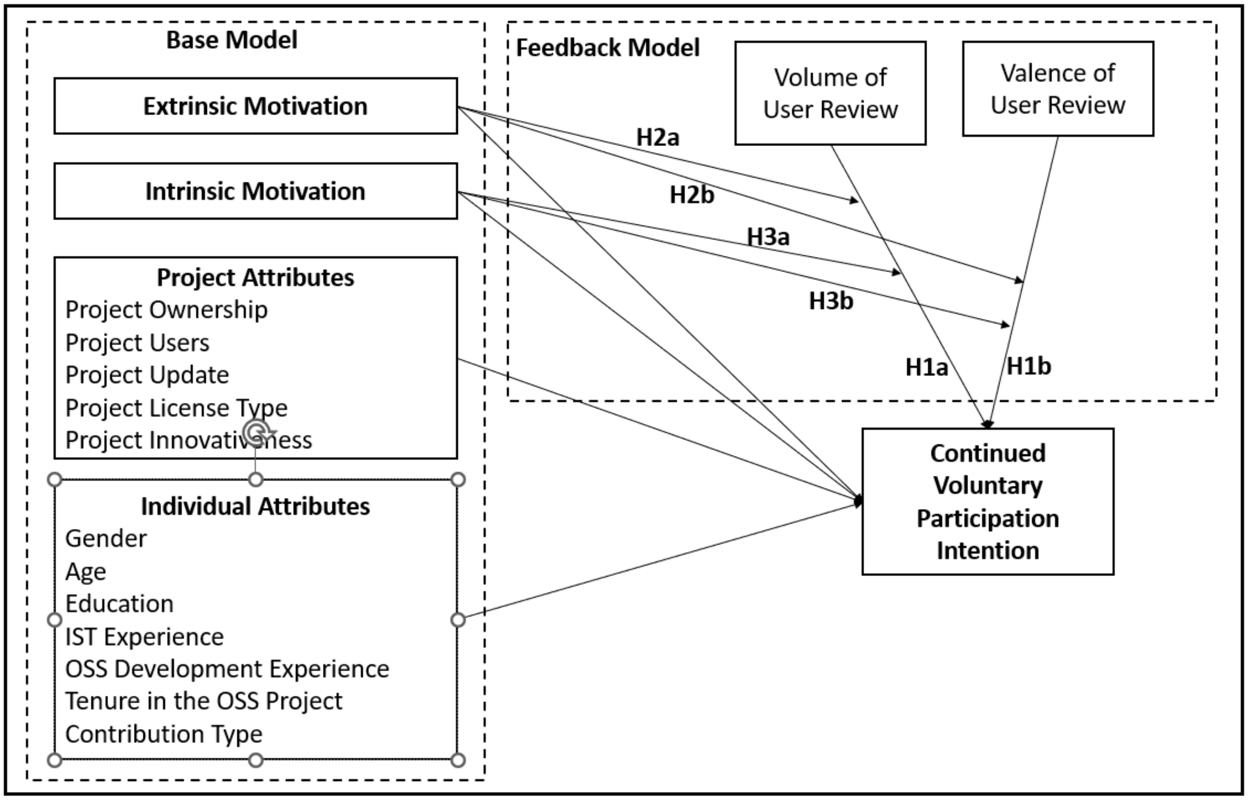
Signaling theory researchers suggest that there are two types of signals: implicit and explicit signals. Most signals are explicit in which the signaler is intentionally trying to reach the receiver’s attention about a product that should be of mutual interest (Ho & Rai 2017). This study argues that a user review is a form of an explicit signal where the user is trying to reach the developers/project leaders to inform them about the potential shortcomings of the OSS project. On the other hand, the project’s quality control is assumed to be implicit signals. As Ho and Rai (2017) note quality control is usually set for producing high-quality projects but is not necessarily meant for signaling volunteers. Hence, it is arguable that the user review is the stronger type of signal for volunteers since it is explicit and meant for the developers.

Based on the logical flow of signaling theory, this study proposes that user reviews and characteristics of user reviews (e.g., volume and valence) will generate a response from an OSS developer in the form of continued voluntary participation. The proposed research model has two segments: a base model and a feedback model. The base model includes the effects of various OSS project attributes (e.g., owners, users, innovativeness), personal attributes (e.g., education, IST experience, OSS development experience, tenure in the OSS project, contribution type) of the IST professional, and intrinsic and extrinsic motivations.

The feedback model includes the effects of the characteristics (volume and valance) of user review on CVPI. Signaling researchers have emphasized the quality of the signal as an important factor for the receiver to act on the signal. While naming it in several different ways such as observability, intensity, strength, clarity, and visibility (Lampel & Shamsie 2000; Warner et al., 2006; Ramaswami et al., 2010; Connelly et al., 2011), all signaling researchers have acknowledged that a high-quality signal will have a better chance of reaching and receiving feedback from the receiver. This study looks at the impact of two qualities of user review on CVPI: volume and valance. Figure 2 depicts the proposed research model.

**Figure 2**

*Proposed Research Model*




***Hypotheses development***

*Characteristics of User Review and CVPI*

IST professionals are busy folks who are already contributing a lot of time and effort in developing OSS projects. So, it is natural that they would appreciate a precise and clear message from the user about the shortcomings of the OSS project in question. On the other hand, a voluminous user review will fail to draw the attention of the IST professional and therefore will not be able to influence his or her CVPI. Even though a long and detailed user review may provide a lot of important details, the sheer volume of the text in the user review can discourage the IST professionals from taking the time to read and find what is suggested by the user. Hence, it is hypothesized that

*H1a: Higher volume of user reviews will negatively impact an IST professional's intention to continue participating voluntarily in the further development of an OSS project.*

When an external user uses an OSS project, the user can potentially run into at least two scenarios. First, the user finds the OSS project helpful but lacking in some areas. Second, the user finds the OSS project not up to serving the purpose of the project. In each of these scenarios, an information asymmetry arises. In the first scenario, even though the primary goals were achieved, the user finds more areas of improvement that may not have been known by the developer(s). In the second scenario, there is even more asymmetry. In this scenario, the developer(s) thought the product was ready to function as intended and made it available to users. However, the user finds it either not performing the intended function or is critically confounded by other problems that are stopping the project from performing its function. This asymmetry leads the OSS project user to send a signal to the project developer(s) in the form of reviews and ratings. Following the signaling logic, the OSS project developers will interpret the signal (reviews) and send feedback by participating in improving the project. However, IST professionals are humans and therefore it is natural for an IST professional to react positively when they see a positive review (positive valence) even though the feedback may point out to a potential problem (e.g., a bug fix request) or request for an additional feature. On the other hand, if the user review has a negative undertone (e.g., criticizes the OSS project outright), the IST professional will be discouraged by the feedback and consequentially not participate in the OSS project's further development. Hence, it is hypothesized that

***H1b:*** *Positive valence of user review will positively influence the continued voluntary participation intention of IST professionals in OSS projects.*

*Interaction between extrinsic motivation and the characters of user review*

Intrinsic and extrinsic motivations are very different from each other. "The most basic distinction is between intrinsic motivation, which refers to doing something because it is inherently interesting or enjoyable, and extrinsic motivation, which refers to doing something because it leads to a separable outcome" (Ryan & Deci 2000, p. 55). "Extrinsic motivation stems from the environment external to the task and is usually applied by someone other than the person being motivated" (Roberts et al., 2000, p. 985), and since user review is indeed provided by someone other than the IST professional in question, it is arguable that the importance given to user review by an IST professional is influenced by that person's extrinsic motivation. In other words, if an IST professional is driven by extrinsic motivation, the need to receive something from others in return for his or her contribution to the OSS project, s/he will give higher importance to user review. Therefore, the higher level of extrinsic motivation will increase the impact of the characteristics of user reviews on an IST professional's continued participation intention. Based on this argument it is hypothesized that

***H2a:*** *IST professionals with higher levels of extrinsic motivation will view user reviews with higher volume positively which will positively impact his or her continued voluntary participation intention.*

***H2b:*** *The effect of valence of user review on continued participation intention will be positively moderated by the level of extrinsic motivation as such that a higher level of extrinsic motivation will increase the impact of valence.*

*Interaction between intrinsic motivation and the characters of user review*

An IST professional, driven by intrinsic motivation, would be interested in contributing voluntarily to an OSS project that is important to the OSS community to fulfill the need for competence, control, and autonomy as suggested by Ryan and Deci (2000). User feedback can help establish the importance of the OSS project to the OSS community. "Satisfaction of seeing the results" indicates the level of intrinsic motivation (Robert et al., 2006). User review from users is a form of result that shows how efficient or effective an OSS project is. Hence, it can be argued that the intrinsic motivation of an IST professional will influence how much importance s/he gives to user reviews of an OSS project. In other words, a higher level of intrinsic motivation will increase the impact of the characteristics of user reviews on an IST professional's continued participation intention. Based on this argument it is hypothesized that

***H3a:*** *The effect of the volume of user reviews on continued participation intention will be positively moderated by the level of intrinsic motivation such that a higher level of intrinsic motivation will increase the impact of volume.*

***H3b:*** *The effect of valence of user review on continued participation intention will be positively moderated by the level of intrinsic motivation such that a higher level of intrinsic motivation will increase the impact of valence.*

## Research Methodology

### Study Design

The study examines the influence of user reviews on IST professionals' intention to continue participating in the subsequent development of OSS projects. To evaluate the hypotheses, the study uses a 2 (high and low volume) × 2 (positive and negative valence) stimulus design. The 2 ×2 stimulus design facilitated testing four scenarios which covered a combination of the two characteristics of user reviews (volume and valance) and allowed the participants to provide a response about their CVPI in the OSS project based on the scenarios. The study also included questions about the participants' extrinsic and intrinsic motivations, their attributes, and specifics about the OSS project they were referring to.

To examine the impact of user reviews on IST professionals' CVPI, the study used real sample user reviews collected from one of the prominent OSS development platforms. Four sample user reviews were collected from sourcforge.net. The four sample user reviews were selected from a pool of 200 feedbacks collected randomly from sourforge.net. User reviews with less than 25 words were identified as low-volume reviews, and reviews containing more than 50 words were identified as high-volume user reviews. The four user reviews were selected in a way so that at least one sample user review represents each quadrant in the 2x2 design of volume and valence of user reviews. The reviews were not modified at all, even to correct spelling or grammatical mistakes, to keep the originality of the reviews.

The sample user reviews used in this study are provided in Table 2.

**Table 2**

*Sample User Reviews used in the study*

| | | **Volume** | |
|---|---|---|---|
| | | High | Low |
| **Valence** | Positive | Sample 3: Our College uses this software from the much-hated flash it campus. The software is great and extensive, but more could be put into easier and flowing designs. Most teachers/lecturers don't have a clue how to use the software sticking work in places they can't find and not knowing how to make an assignment enrolment. But the pros far out way the cons and as seen in my college is vastly used by colleges in the UK at least.” | Sample1: Awesome job, thanks a lot for showing |
| | Negative | Sample 2: “this is one of the most non-intuitive non user-friendly software I have EVER used. IF you have a programmer that can work with the teaching staff, you MIGHT be able to use the features that it has... ex. I want to link to a file on my pc. I must upload the file and then CHOOSE it from a list? Well DUH, I want to use the one I just uploaded! Basic web mail apps are smarter than this!!” | Sample 4: Not allowing asynch. Synchronization is weak. Asynch check box grayed out |

**Data Collection**

The survey was posted on Amazon Mechanical Turk (AMT). Online crowdsourcing markets (e.g., AMT) have recently emerged as a viable alternative source for research participants (Steelman et al., 2014). While the AMT was used as a marketing tool to reach potential respondents, the survey itself was hosted in the Qualtrics server. AMT directed interested IST professionals to an anonymous link hosted by Qualtrics. Several conditions were implemented to achieve quality responses. First, the survey on AMT was designed to be marketed to only IST professionals. To ensure that the survey was marketed to the right people, the study used the AMT category 'Job Function – Information Technology' as a requirement. Second, in addition to AMT's professional category, further screening in the survey was included. The screening included the following questions: "Are you an information system or technology professional? Are you currently participating or recently participated in one or more open-source development of information systems projects?" The questions also included a highlighted note that "A potential participant of this survey must be an information systems or technology professional who is currently contributing or has contributed to one or more open-source software development project(s). Hence, answering NO to this question will terminate the survey." The survey automatically moved to the end for a participant who answered negatively to any of these questions. If a participant indeed answered 'no' to these questions s/he received a note of appreciation and an explanation for the abrupt termination. The note was as follows: "THANK YOU for your time and effort in completing this survey. We sincerely appreciate your contribution to our research. In case you have reached this point only after the first one or two questions, that means you have answered 'no' to any of the first two questions. As we mentioned in our disclosure, a potential participant must be an information systems or information technology professional who is currently participating or has recently participated in one or more open-source software development project(s). Hence, answering NO to these questions has terminated the survey for you. In any event, we appreciate your interest." Third, as suggested by Steelman et al., (2014), the AMT was instructed to only include U.S.-based participants. Respondents were paid $5 for a fully completed survey. Each respondent who reached the end of the survey was provided a random seven-digit code that s/he would provide to AMT to receive the payment from AMT. The respondents had four hours to complete the survey. The clock would start at the time when a respondent chose to respond in the AMT system and the clock would end at the time when a respondent provided the random code s/he received from the Qualtrics survey.

**Participants**

The data was collected in four batches, each batch included a sample user review from one of the quadrants from Table 2. The first batch included the user review with low volume and positive valence from quadrant 1, the following three batches included user reviews from the remaining three quadrants respectively. Overall, 330 responses were collected from all four batches. These 330 respondents reached the end of the survey and provided the code to AMT to collect their payments. However, only 164 responses were included in the final analysis in this paper. Responses were excluded from the final analysis for three reasons: partial answers, lack of useful details, and manipulation check. First, the responses that did not include answers for the focal variables (e.g., intrinsic and extrinsic motivation) were deemed incomplete and excluded from the analysis. Most of the responses that were excluded fell into this first category. The second category was responses which appeared to provide vague or little useful details. For instance, one response mentioned "music player" as the project description. Another example would be a response that mentioned "A front-end JavaScript framework" as the project description. Since these responses failed to provide a good description of the open-source project, these responses were not deemed reliable enough for the study. One respondent did not answer the age group or the gender question and hence was excluded. The final tally included 41 responses for each quadrant.

Approximately twenty-two percent of the respondents were female, and seventy-eight percent of respondents were male. The sample reflects the gender distribution of the national workforce of information systems professionals which, according to DATAUSA, includes 28.2% female and 71.8% male workers. The highest number of respondents were between 31 and 40 years old (approximately 46%) followed by respondents between 21 and 30 years old (approximately 41%). A more detailed demographic data is provided in Table 3. The following table about the demographics indicates that, as per this sample, mostly younger professionals who are early in their career (in their 20s and 30s) are involved more heavily in open-source development than those who are in their 40s and 50s whereas, according to DATAUSA, the IS professionals are mostly in their early 40s. This diversion in OSS workforce from the MIS workforce trend is expected given that younger MIS professionals have more to gain from their contribution to the OSS domain.

**Table 3**

*Participants' Demographics*

| **Age Group** | **Female** | **Male** | **Total** |
|---|---|---|---|
| Below 21 years | 0 | 1 | 1 |
| Between 21 and 30 years | 16 | 52 | 68 |
| Between 31 and 40 years | 18 | 57 | 75 |
| Between 41 and 50 years | 0 | 16 | 16 |
| Above 50 years | 2 | 2 | 4 |
| Total | 36 | 128 | 164 |

The respondents had an average of approximately 8 years of experience in the development of information systems and approximately 6 years of work experience in the open-source development of information systems. 48% of respondents reported that they contribute to open-source projects both for free and for payment. However, 31% reported that they only contribute for free while the remaining 21% contribute only for payment. The projects in our sample included both voluntary projects (106) that did not involve any payments and paid (59) projects. A large majority, approximately 39%, of the projects were initiated by a private individual or a group of individuals. 22% of projects were initiated by the platform organization, 22% by a non-profit other than the platform, and the remaining projects were initiated by a for-profit organization. 39 out of the 165 projects were designed for education, 19 for gaming, 45 for communication, 42 for utilities, and the rest did not fall into the four categories listed above. Even though the respondents mentioned various open-source platforms they prefer to work with, the top 5 favorite platforms included GitHub, Linux, Kaggle, Sourceforge, and Oracle BeehiveOnline. The respondents were involved in a wider variety of open-source projects hosted in various OS platforms that are compatible with operating systems such as Linux and Windows. The purpose for these projects included but was not limited to e-commerce, security enhancement, artificial intelligence, heatmap, internet bot, and cryptocurrency.

**Measures**

The variables of this study are divided into two main groups. As depicted in the research model, the base model included project attributes, individual attributes, and motivations. The project attributes included project license type, project ownership, project users, project innovativeness, and project update. License type was adopted from Lerner and Tirole (2005) which included four choices: Berkeley Software Definition License, General Public License, Lesser General Public License, and Other Licenses. Project ownership was adopted from open-source project type (Ho & Rai 2017) which were categorized into four types: a private individual or a group of individuals, an OSS platform organization (e.g., Linux), a non-profit organization other than the OSS platform organization, a for-profit organization other than the OSS platform organization whose ultimate goal is to produce a commercial software. Project users were adapted from Setia et al., (2012) but categorized the intended project users into three: developers, end-users other than developers, and both. Innovativeness was categorized as innovative (the product uses new technology, a new platform, or a new application of existing technology) and not innovative (the product uses new technology in an existing market). The project update included information about the nature of the update. Ho and Rai (2017) and Setia et al., (2012) alluded to bug fixing as a type of update to an open-source project. Bug fixing was identified as a different type of update than adding a new feature to an OSS project. The study included four choices: bug fixes / new features / both / not applicable because were working on the initial release. Three other project-level variables were also collected: quality control, extent of communication, and cooperative norms from Ho and Rai (2017). However, due to low factor loadings on the desired factors and high cross-loadings across factors, these three variables were excluded from the final analysis.

The study has individual attributes that have been found in many studies in the open-source literature such as gender, age, education, IST work experience, OSS development experience, and tenure in the project. The study also included intrinsic and extrinsic motivations that are antecedents of participation in OSS projects in the literature (e.g., Ho & Rai 2017; Setia et al., 2012; Roberts et al., 2006). Gender was coded as a binary code: female or male. Education was measured in years of formal education. The respondents were divided into five age groups: below 20 years, 21 to 30, 31 to 40, 41 to 50, and above 50 years. IST experience, OSS development experience, and tenure in the project were measured in the number of years in which months were converted into years. The contribution type was coded as a binary variable using free = 1 and paid = 0. The measures for intrinsic motivation and extrinsic motivation were adapted from Roberts et al., (2006). Both types of motivation were measured using four-item scales.

The feedback model included the characteristics of user review. The volume of user reviews was coded as high (1) and low (0). Valence of user review was coded as positive (1) and negative (0). Finally, CVPI was measured with a three-item scale adapted from Ho and Rai (2017) although Ho and Rai used only a two-item scale. Participants provided their responses to measurement items for intrinsic motivation, extrinsic motivation, and CVPI using Likert-type scales with anchors (1) strongly disagree to (7) strongly agree. The measures for intrinsic motivation, extrinsic motivation, and CVPI are listed in Table 4.

**Table 4**

*Measurement Items*

*Intrinsic Motivation*
- It is the satisfaction of seeing the results.
- It gives me the chance to do things I am good at.
- I really enjoy it. It is fun.
- It gives me a sense of personal achievement.

*Extrinsic Motivation*
- It gives me the chance to attain a recognized qualification or skill.
- It gives me status at work.
- It increases my opportunities for a better job.
- It gives me status in the open-source community.

*Continued Participation Intention*
- I predict I would continue this project with my codevelopers.
- I plan to continue this project with my codevelopers.
- I think I will continue to work on further developments of this project.

## Empirical Analysis

Following standard practice, the study first tested the reliability and validity of various scales and then tested the proposed research model using the data collected about the OSS projects. Cronbach's Alpha was used to test the reliability of the measures. The Cronbach Alphas for intrinsic motivation, extrinsic motivation, and continued participation were 0.840, 0.868, and 0.883 respectively. Given that all of the Cronbach Alphas were above 0.7 (the acceptable threshold) it was concluded that all scales were reliable.

**Table 5**

*Factor Analysis with Varimax Rotation and Kaiser Normalization*

| **Items** | **1** | **3** | **2** |
|---|---|---|---|
| Intrinsic Motivation 1 | **0.76** | 0.09 | 0.31 |
| Intrinsic Motivation 2 | **0.79** | 0.1 | 0.32 |
| Intrinsic Motivation 3 | **0.75** | 0.14 | 0.19 |
| Intrinsic Motivation 4 | **0.87** | 0.15 | 0.24 |
| Extrinsic Motivation 2 | 0.14 | **0.85** | 0.16 |
| Extrinsic Motivation 3 | 0.35 | **0.73** | 0.07 |
| Extrinsic Motivation 4 | -0.04 | **0.84** | 0.03 |
| Continued Participation Intention 1 | 0.28 | 0.04 | **0.88** |
| Continued Participation Intention 2 | 0.3 | 0.13 | **0.86** |
| Continued Participation Intention 3 | 0.29 | 0.14 | **0.87** |

To assess the convergent and discriminant validity of the survey items a factor analysis was conducted on the focal variables using principal components to see if items were loading on the desired variables. One item for intrinsic motivation was excluded because of low factor loadings and high cross-loadings. The factor loading of the measurement items for all focal variables is presented in Table 5. Varimax rotation with Kaiser Normalization was used to achieve optimum loading of the items. The rotation converged in six iterations and converged on three factors. The Kaiser-Meyer-Olikin measure of sampling adequacy was 0.832 which can be labeled as "meritorious" indicating that there is no need to examine the anti-image correlation matrix (Kaiser & Rice 1974). Bartlett's test of sphericity indicates that (Chi-Square =1,030.658,

$p < 0.005$) the dataset is appropriate for factor analysis (Bartlett 1950). All of the item's commonality was above 0.5. The factor analysis shows that the average factor loading for all factors was above 0.7 and the average variance extracted was above 0.5, which according to (Fornell & Larcker 1981), indicated good convergent validity of the scale items. All of the cross-loadings were below 0.5 indicating good discriminant validity. For measuring sampling adequacy, we used the Kaiser-Meyer-Olkin (KMO) sampling adequacy test. The KMO test score of 0.83 which is between 0.8 and 1indicated, according to Kaiser (1974), that the sampling was adequate for the factor analysis. Finally, we also checked for any common method bias since survey data are prone to such bias (Podsakoff et al., 2003). The study also included Harmon's one-factor test by running an exploratory factor analysis. Since any single factor did not account for the majority of the variance, according to Iyengar et al., (2015), it was concluded that there was no common method bias.

**Theoretical Model Testing**

The proposed research model includes a base model and a feedback model. The base model includes a set of project attributes, a set of individual attributes, and motivations that may potentially influence an IST professional's intention to continue to voluntarily participate in an OSS project. The feedback model builds on the base model to explore whether user reviews can potentially influence continued voluntary participation intention. Based on the nature of the hypotheses, ordinary least squares (OLS) were used to test the research model. Variance inflation factors (VIF) were used to test for any multicollinearity issues. The VIF values in all the models tested were well below ten, the acceptable threshold (Gruber et al., 2010; Petter et al., 2007), indicating that there was no serious multicollinearity issue. The OLS tests were conducted in three phases; first, the base model and then the feedback model along with the base model and finally the interaction effects. For the interaction effects, a split model analysis was used. However, before conducting regression analysis, t-tests were conducted to ensure that the manipulation by the sample reviews based on their attributes (volume and valance) worked. The t-tests showed that the p-values were $> 0.05$ indicating the manipulations using the sample user reviews worked as intended.

**Table 7**

*Correlations*

| | **Variables** | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Project Ownership | | | | | | | | | | | | | | | | |
| 2 | Project Users | 0.13 | | | | | | | | | | | | | | | |
| 3 | Project Update | 0.12 | .199* | | | | | | | | | | | | | | |
| 4 | Project License | 0.06 | 0.05 | -0.05 | | | | | | | | | | | | | |
| 5 | Project Innovativeness | 0.15 | 0.07 | 0.12 | -0.02 | | | | | | | | | | | | |
| 6 | Gender (1 = Female) | 0.12 | -0.09 | 0.06 | .170* | 0.1 | | | | | | | | | | | |
| 7 | Age Group | 0.1 | 0.01 | -0.07 | .169* | -0.14 | -0.05 | | | | | | | | | | |
| 8 | Education | 0.03 | 0.05 | -0.01 | -0.05 | -0.01 | -0.09 | 0.05 | | | | | | | | | |
| 9 | IS Experience | 0.01 | 0.06 | -0.13 | 0.11 | -0.11 | 0 | .668** | 0.13 | | | | | | | | |
| 10 | OSD Experience | -0.01 | 0.02 | 0.1 | 0.04 | -0.09 | -0.01 | .503** | 0.09 | .652** | | | | | | | |
| 11 | Tenure in Project | 0.06 | 0.04 | .169* | 0.15 | 0.08 | 0.06 | .315** | -.268** | .352** | .434** | | | | | | |
| 12 | Contribution Type | -.221** | -0.08 | -0.14 | 0.04 | -.157* | -0.1 | 0.1 | -0.01 | .196* | .176* | 0.04 | | | | | |
| 13 | Intrinsic Motivation | 0.1 | 0.04 | -0.01 | -0.1 | -0.01 | -0.11 | 0.07 | -0.11 | 0.09 | 0.12 | .164* | 0 | | | | |
| 14 | Extrinsic Motivation | 0.12 | 0.09 | .205** | -0.03 | 0.13 | 0.05 | -0.12 | 0.03 | -0.13 | -0.05 | 0.1 | -0.14 | .517** | | | |
| 15 | Volume of User review | -0.01 | 0.08 | 0.04 | 0.04 | 0.04 | 0.06 | 0.11 | .228** | 0.14 | 0.06 | -0.02 | 0.13 | -0.14 | -0.09 | | |
| 16 | Valence of User review | 0.09 | 0.01 | 0.09 | 0.01 | 0.08 | 0.07 | 0.05 | 0.1 | 0.08 | 0.15 | -0.02 | -0.1 | 0.07 | 0.1 | 0.1 | |
| 17 | Continued Participation Intention | 0.14 | -0.08 | .157* | 0.03 | .244** | 0.07 | 0.02 | -0.15 | 0.02 | 0.04 | .253** | -0.09 | .382** | .389** | -.232** | .166* |

Note: 1. diagonal elements are Cronbach alphas; N/A - Not Applicable
2. *p < 0.05; **p < 0.01

During the first regression run that included the base model variables, two project attributes were found to significantly impact CVPI. The results showed that project users ($B = -0.326$, $p < 0.05$) and innovativeness ($B = 0.60$, $p < 0.01$), have a significant positive influence on an IST professional's intention to continue to participate in an OSS project. This result showed that when an OSS project is intended for multiple users in addition to the developers, the IST professional's intention to continue participating in the project goes down. The result also showed that there is a positive relationship between innovativeness and continued voluntary participation intention. This relationship underlines that IST professionals are more interested in projects that are deemed innovative. Any individual attributes did not have a significant influence on continued participation intention. Finally, both intrinsic and extrinsic motivations significantly influence CVPI. Both intrinsic motivation ($B = 0.352$, $p < 0.01$) and extrinsic motivation ($B = 0.248$, $p < 0.05$) positively impact CVPI. This finding is in line with findings in the existing literature that showed that motivations are important factors for participation in the OSS development environment. The regression results are provided in Table 8. The model explained approximately 33% of the variance in continued participation intention.

In the second phase, the feedback model's main effects, volume and valence, of user reviews were included in the OLS regression along with the base model variables. The model explained approximately 37% of the variance in continued voluntary participation intention in OSS projects. The variance explained by the feedback model main effects and the base model combined was significantly higher (4.2%) than the model that included only the base model variables.

**Table 8**

*Research Model Results*

| | Base Model | Feedback Model | | |
|---|---|---|---|---|
| | | **Main Effects** | **Volume* Motivations** | **Valance* Motivations** |
| $R^2$ | 0.329 | 0.371 | 0.404 | 0.439 |
| $\Delta R^2$ | | .042** | 0.033* | .068*** |
| **Project Attributes** | | | | |
| Project Ownership | 0.085 | 0.073 | 0.108 | 0.074 |
| Project Users | -0.326** | -0.287** | -0.273** | -0.196 |
| Project Update | 0.138 | 0.158 | 0.189 | 0.184 |
| Project License | 0.125 | 0.116 | 0.107 | 0.095 |
| Project Innovativeness | 0.600*** | 0.608*** | 0.546*** | 0.559*** |
| **Individual Attributes** | | | | |
| Gender (1=Female) | 0.012 | 0.044 | 0.068 | 0.111 |
| Age Group | -0.044 | -0.013 | 0.000 | -0.020 |
| Education | -0.012 | -0.005 | 0.004 | -0.003 |
| IST Experience | 0.015 | 0.019 | 0.014 | 0.028 |
| OSS Development Experience | -0.015 | -0.030 | -0.031 | -0.035 |
| Tenure in Project | 0.072 | 0.080 | 0.093** | 0.071 |
| Contribution (1=Free) | -0.135 | -0.020 | 0.028 | 0.000 |
| **Motivations** | | | | |
| Extrinsic Motivation | 0.248** | 0.226** | 0.261*** | 0.293*** |
| Intrinsic Motivation | 0.352*** | 0.319*** | 0.258** | 0.283** |
| **User review Characteristics** | | | | |
| Volume | | -0.540*** | -0.575** | -0.459** |
| Valence | | 0.298 | 0.371* | 0.302 |
| **Interaction Effects** | | | | |
| Volume * Extrinsic Motivation | | | 0.501*** | |
| Valence * Extrinsic Motivation | | | | 0.703*** |
| Volume * Intrinsic Motivation | | | -0.418 | |
| Valence * Intrinsic Motivation | | | | -0.538** |

Note: *p =0.05; **p< 0.05; ***p < 0.01

The results in Table 8 show that the volume of user reviews significantly impacts IST professionals' continued voluntary participation intention supporting H1a. The results also showed that the valence of user review positively impacts continued participation intention, though the relationship was not statistically significant. The four variables that were found to have significant effects in the base model also were found to have a significant impact in the feedback main effects model.

Interaction effects between motivations and characteristics of user reviews were tested in the third phase. In the split model analysis, the interactions between volume and the motivations and the interactions between valence and motivations were tested separately. The first set of interactions added a 3.3% additional variance explanation to the main effects. Volume significantly ($B = -0.575$, $p < 0.05$) and valence marginally significantly ($B = 0.371$, $p = 0.05$) impact CVPI supporting H1a and H1b. The results also show that the interaction effect of volume and extrinsic motivation significantly impacts continued participation intention supporting H2a. The interaction between volume and intrinsic motivation was not significant. The second set of interactions added a 6.8% additional variance explanation to the main effects. In this analysis only volume significantly ($B = -0.459$, $p < 0.05$) impacts CVPI. Interaction effects of valence and extrinsic motivation on CVPI were significant supporting H2b. However, while the interaction of valence and intrinsic motivation significantly impacted CVPI, the interaction resulted in a negative impact contradicting H3b.

**Robustness Analysis**

To test the robustness of the analysis, an OLS regression analysis was conducted using all interaction effects in one regression instead of using a split model. The results are provided in Table 9. The model explained approximately 45% of the variance in continued participation intention in OS projects. The variance explained by the interaction effects was significantly higher (7.8%) than the model that included only the base model and the main effects. The results for volume and valence remained fairly similar to what we found in the main effects though there were slight reductions in the coefficients. The results also showed that the valence of user review and extrinsic motivation interact positively to impact continued participation intention. The results support H1a and H2b in addition to showing that both intrinsic and extrinsic motivation have a significant positive impact on continued participation intention.

**Table 9**

*Robustness Test Results*

| | Base Model | Feedback Model: Main Effects | Feedback Model: Interaction Effects |
|---|---|---|---|
| $R^2$ | 0.329 | 0.371 | 0.449 |
| $\Delta R^2$ | | .042* | .078* |
| **Project Attributes** | | | |
| Project Ownership | 0.085 | 0.073 | 0.09 |
| Project Users | -0.326* | -0.287* | -0.198 |
| Project Update | 0.138 | 0.158 | 0.197 |
| Project License | 0.125 | 0.116 | 0.095 |
| Project Innovativeness | 0.600** | 0.608** | 0.542** |
| **Individual Attributes** | | | |
| Gender (1=Female) | 0.012 | 0.044 | 0.117 |
| Age Group | -0.044 | -0.013 | -0.015 |
| Education | -0.012 | -0.005 | 0.001 |
| IS Experience | 0.015 | 0.019 | 0.024 |
| OSD Experience | -0.015 | -0.030 | -0.033 |
| Tenure in Project | 0.072 | 0.080 | 0.079 |
| Contribution (1=Free) | -0.135 | -0.020 | 0.022 |
| **Motivations** | | | |
| Extrinsic Motivation | 0.248* | 0.226* | 0.302** |
| Intrinsic Motivation | 0.352** | 0.319** | 0.253* |
| **User review Characteristics** | | | |
| Volume | | -0.540** | -0.491** |
| Valence | | 0.298 | 0.343 |
| **Interaction Effects** | | | |
| Volume * Extrinsic Motivation | | | 0.291 |
| Valence * Extrinsic Motivation | | | 0.611** |
| Volume * Intrinsic Motivation | | | -0.187 |
| Valence * Intrinsic Motivation | | | -0.437 |

Note: $^*p< 0.05$; $^{**}p < 0.01$

## Discussion

The development of information systems in the OSS environment is becoming more prevalent (August et al., 2018). The reasons for volunteers to join an OSS project are not necessarily the same as the reasons for them to continue to take part in the project. Since continuous improvement is part and parcel of software development, what influences volunteers' intention to continue to participate in an OSS project remains a research interest to IS scholars (Ho & Rai 2017). The goal of this study was to examine how user review can impact the continued participation intention of IS professionals.

The study attempted to answer the research question by using an experimental method using a 2 x 2 design that included responses from 164 IST professionals working on open-source software development projects. The study started with a base model that included various OSS project attributes and individual attributes. The project attributes included but were not limited to ownership, intended users, and innovativeness. The individual attributes included both demographic controls (e.g., age, gender), IST, and OSS development-related experience. The base model also included intrinsic and extrinsic motivations. The base model showed that both intrinsic and extrinsic motivation play significant roles in influencing an IST professional's intention to continue participating. The results also show that IST professionals tend to put significant weight on the innovativeness of the OSS project when it comes to continuing to participate in an OSS project. The study also found that the intention to continue contributing to an OSS project is negatively impacted when the intended users include people who are not contributors (e.g., users who are not developers). The feedback model shows that volume and valence significantly influence continued voluntary participation intention. Finally, the findings corroborated that volume and valence interact with intrinsic and extrinsic motivation to impact the continued participation intention of IS professionals in OS projects. While the results supported all but one of the hypotheses, they included a counterintuitive interaction effect of valence and intrinsic motivation on CVPI. Opposite to the hypothesis of the study, intrinsic motivation appeared to change the positive effect of valence into a negative one. Perhaps one of the reasons for this directional change could be that IST professionals with higher levels of intrinsic motivation take the positive valance as a sign that the OSS project does not require any further support and feel less inclined to continue working on the OSS project. Future research could look into this effect more closely to understand it better.

**Theoretical Implications**

The study enhances the open-source literature in two ways. The study enhances the open-source literature by examining the impact of user reviews on the intention to continue participating in OSS projects. Fang and Neufeld (2009) demonstrated that a large portion of OSS projects fail because of the discontinuation of volunteer participants. Years later Ho and Rai (2017) argued that continued participation is still an ongoing problem for open-source software development. The existing literature has examined various reasons for the participation of volunteers in OSS projects that include, but are not limited to, motivations (e.g., Roberts et al., 2006), project characteristics (e.g., Ho & Rai 2017), future rewards ( e.g., Hars & Ou 2002), commitment to OS community (e.g., Maruping et al., 2019). Many researchers have also controlled for several attributes such as education, age, gender, and experience. However, the existing literature has not examined whether user reviews from users of OSS projects have any impact on continued voluntary participation. This study contributes to the open-source literature by examining the effect of user reviews on continued participation.

The study builds on the existing literature in two ways. First, it developed a base model that included a range of project and individual or personal attributes using various control variables that are found in the open-source literature. It also included intrinsic and extrinsic motivations in the base model. Second, once the base model is tested, the study included the importance of reviews in the mix of factors. The results support the notion that user review is indeed an important factor that can impact an IST professional's intention to continue participating given that characteristics of user reviews impact continued participation intention. Hence, the findings contribute to the OSS literature by demonstrating that not only intrinsic and extrinsic motivation play important roles in the context of OSS projects as shown by many OSS researchers (e.g., Roberts et al., 2006), but also shows that user review can influence intention to participate in further development of OSS projects.

Second, the study contributes to the OS literature by providing a nuanced understanding of the impact of user reviews on continued participation intention in OSS projects. The study examined how two characteristics of user review, volume, and valence, can impact the continued participation intention of IS professionals. Volume and valence were picked because these two are easily understandable characteristics of user review. In addition, the study examined the interaction between characteristics of user reviews and motivations. The results showed that volume negatively impacts an IST professional's continued participation intention. The results also showed that valence positively impacts continued participation intention though the relationship was not found to be significant. Most importantly, while volume and valence are perhaps not the only characteristics of user review that may have an impact on participation intention, the findings provide a starting point for a more nuanced examination of user reviews in the context of ongoing OSS projects.

## Practical Implications

This study helps practitioners such as open-source software project owners or managers and OSS development platforms in two ways. First, the study reinforces that user reviews are important aspects of open-source software development and therefore should be accommodated. The OSS development platforms have been accommodating user reviews in the form of reviews of OSS projects. This study ties user reviews to the continued participation of IST professionals contributing to OSS projects. This relationship makes the user reviews an important aspect not only to potential users but also to the contributors and therefore sheds a new light on the usefulness of user reviews. Second, by examining the impact of volume and valence on the continued participation of volunteers, this study encourages OSS project owners to take more detailed initiatives regarding user review. Understandably, OSS project owners or platforms cannot enforce strict rules about user reviews, which may discourage users from giving feedback. However, they can establish and market guidelines to users by highlighting the fact that the users' feedback is important, and they should keep the characteristics (e.g., volume, valence) of their feedback in mind when they provide such feedback. After all, it is only logical to assume that the users who provide feedback would want their feedback to be heard and heeded. Hence, if they are aware that giving feedback in a certain way (e.g., writing a less voluminous review) would have more impact on the development of the OSS project, they would be mindful when they provide such reviews.

## Limitations and Suggestions for Future Research

This study is not without limitations. The study included several project attributes such as quality control, extent of communication, and cooperative norms which were noted as important factors by Ho and Rai (2017) in their study of continued participation in OSS projects. However, due to validity issues, these factors were these three important variables were not included in the final analysis. While the study included many of the known factors, the base model would have been more comprehensive if it included these three variables. Given that Ho and Rai (2017) had no validity issues with their measures, future researchers should include these variables in their base model with a different sample.

Even though valence positively influences continued participation intention, the impact was not statistically significant for this sample. However, this finding does not diminish the necessity to include valence in future research. On the contrary, future researchers should examine the impact of valence more closely given the interaction between valance and intrinsic motivation. Future researchers also have the opportunity to cover more characteristics of user reviews now. For instance, the understandability of the review could be a potential characteristic that future researchers can examine.

Interestingly, the results reveal that IST professionals intend to continue working on OSS projects when the intended users are those who are contributing to the project. This is interesting because the existing literature shows that altruism positively (e.g., Hars & Ou 2002) impacts participation. However, the results appear to suggest that the intention to participate goes down when the intended users include people other than those who are contributing. Does this mean that IST professionals are averse to providing services to those who are only consumers or something more complicated? Future research can look into this issue deeper, perhaps by asking an open-ended question. Future researchers can also further look at the question of innovativeness. Open-source software development is a form of open innovation, and therefore it is very logical that IST professionals will care about OSS projects that are more innovative. However, this study only covered innovativeness as a binary option. Future researchers can develop scales that capture a more in-depth understanding of the innovativeness of an OSS project.

**Conclusion**

The goal of this paper was to show that user review does play a role in the participation of volunteers in open-source projects. The findings of the paper do corroborate the prime assumption that user reviews are important to IST professionals for them to continue participating in the further development of an OSS project. The findings also provide us limited understanding of the interplay between review characteristics and continued voluntary participation intention. The author hopes to spark a conversation in the IS literature about user review in OSS projects which will lead to future research on this topic.

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# Using Finance and Law to Build Global Communities

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**Abstract**

Higher education has become increasingly globalized recently, with students, faculty, and institutions interacting across national boundaries to share knowledge, research, and resources (De Wit, 2020). Building global higher education partnerships has become a priority for many institutions as they seek to create partnerships that benefit students, researchers, and society (Mittelmeier, Lomer, Al-Furqani, & Huang, 2024). To facilitate these efforts, enhanced study of finance and law can expand opportunities for greater harmonization between different countries as they seek to better understand the respective principles and applications of each.

Finance universally provides the resources necessary to support research, teaching, and learning. Effective financial networks and partnerships can foster sustainable funding streams to support short- and long-term goals (Organisation for Economic Cooperation and Development [OECD], 2020). For example, institutions can collaborate with private sector partners to secure research project funding or establish scholarships for students from underrepresented backgrounds. In addition, law plays a critical role in building global higher education communities (United Nations Educational Scientific Organization and United Nations, 2019). International laws and regulations have the potential to significantly impact the ability of institutions to collaborate across borders, particularly in areas such as intellectual property rights, data protection, and visas for students and scholars. Thus, by understanding and complying with these laws and the principles of finance, institutions can ensure that they can fully participate in

global higher education communities and contribute to the advancement of knowledge.

**Keywords**: Finance, International Law, and Global Partnership

## INTRODUCTION

University students must learn diverse topics in business in a global environment that continues to seek more integrated partnerships (King & Bailey, 2021). These course subjects should support their national communities and span geographical divides. Educating undergraduates from all levels of society helps them find similarities and challenges students to understand and, hopefully, respect differences in our global community (Wang, et al., 2022). In this article, the researchers will discuss how the foundational areas of finance and law prepare students to collaborate and grow with their colleagues in different countries in the international business arena.

## GLOBAL PARTNERSHIP BUILDING

Educating undergraduates from all levels of society helps them find similarities and challenges students to understand and hopefully respect differences in our global community to lay the foundation for international partnerships (Bosio & Torres, 2019). Students must learn laws that govern business enterprises and their financial transactions with businesses, customers, governments, and other stakeholders (James, 2022). Future business leaders are presented with reasons why laws are enacted and what they are designed to protect or facilitate. Undergraduates can learn how to ensure ethical behavior, transparency in transactions, conflict resolution, and protect civil and human rights (Hansen, 2021). Further, domestic students must interpret laws that regulate their markets, including forming and operating a business, intellectual property, securities, insurance, trade: import and export, fintech, and financial laws.

Adding an international dimension to these topics allows students to learn and critically assess their knowledge, attitudes, and beliefs about the legal system to which they must adhere

(United Nations Educational Scientific Organization and United Nations, 2019). Students should be exposed to an international definition of the rule of law because business spans all areas of life (Reid & Garson, 2017). Globally, the rule of law is recognized as the guiding principle of governance in which all persons, institutions, and entities, public and private must adhere to and abide by laws that are publicly communicated, equally enforced, and independently adjudicated (United Nations, 2004). These laws are consistent with international human rights norms and standards (United Nations, 2004). Ensuring that students understand at the tertiary level that these principles are guiding both in their country and in others can spur discussions to collaborate and develop frameworks to navigate international business legal landscapes (OECD, 2020; Wang et al., 2022).

Learning how to traverse global markets and connect people remains one of the essential focuses of international business law and finance (Lourenço, 2018). Operating in different areas of the world, students need to be aware of the diverse cultures and differences that govern both finance and law and yet still seek to build a global community for business (King & Bailey, 2021). One way to achieve or strengthen a global community is through the disciplines of finance and law, which can help facilitate collaboration and ensure that resources are used effectively and ethically. Building global higher education communities requires a multifaceted approach that involves finance, law, and collaboration. Institutions must work to establish sustainable funding streams, comply with international laws and regulations, and engage in networks and consortia that promote cooperation and knowledge sharing (Lourenço, 2018). By doing so, they can contribute to the advancement of knowledge and help to create a more interconnected and inclusive world.

The number of students studying abroad has steadily increased (National Center for Education Statistics [NCES], 2021). Students seek educational opportunities outside their home countries to gain a global perspective, access quality education, and enhance their employability. Popular study destinations included the United States, the United Kingdom, Canada, Australia, and various European countries (NCES, 2021). Institutions have established partnerships, branch campuses, and collaborative programs in different countries to expand their reach and offer programs in diverse locations. For example, Western universities have established branch campuses in countries like Qatar, China, and the United Arab Emirates.

Globalization has facilitated collaboration among faculty researchers from different countries, leading to the sharing of knowledge and expertise (United Nations Educational Scientific Organization and United Nations, 2019). Researchers now engage in international collaborations, joint projects, and conferences to address global challenges collectively. Further, globalization has intensified the competition among universities worldwide. Institutions strive to enhance their international reputation and attract talented students and faculty members (James, 2022). Various university rankings have emerged to assess and compare institutions globally, influencing institutional strategies and student choices. Students can also take advantage of the fact that globalization of higher education promotes cultural exchange and diversity on campuses. Institutions embrace international perspectives, welcome students from diverse backgrounds, and encourage intercultural understanding among students and staff (James, 2022).

Governments have recognized the importance of higher education as an economic driver and have implemented policies to attract international students and foster collaboration. There have been efforts to harmonize academic standards, credit transfers, and quality assurance mechanisms across countries (Grandorff, et al., 2021). Technological advancements, particularly in information and communication technologies, have played a crucial role in the globalization of higher education. Online learning platforms, virtual classrooms, and digital resources enable students to access educational content remotely and institutions to offer programs globally (Martel & Baer, 2021).

It is essential to recognize that the landscape of globalization in higher education is dynamic, and new developments are constantly emerging (United Nations Educational Scientific Organization and United Nations, 2019). Finance and law can be instrumental in ensuring the efficient and ethical implementation of collaborative initiatives that promote globalization. However, institutions must establish sustainable funding streams to comply with international laws and regulations to engage in networks and consortia that promote this interconnected and inclusive world (United Nations Educational Scientific Organization and United Nations, 2019). Higher education has become increasingly globalized recently, with students, faculty, and institutions interacting across national boundaries to share knowledge, research, and resources (James, 2022). Building global higher education communities has become a priority for institutions as they seek to create partnerships that benefit students, researchers, and society (Whatley, 2017). One way to achieve this goal is through finance and law, which can help facilitate collaboration and ensure that resources are used effectively and ethically. Building global higher education communities requires a multifaceted approach that involves finance, law, and collaboration. Institutions must work to establish sustainable funding streams, comply with international laws and regulations, and engage in networks and consortia that promote cooperation and knowledge sharing. By doing so, they can contribute to the advancement of knowledge and help to create a more interconnected and inclusive world.

Finance is a critical component of any higher education community, as it provides the resources necessary to support research, teaching, and learning (Martel & Baer, 2021; Weenink, 2014; Whatley, 2017). By building financial networks and partnerships, institutions can create sustainable funding streams supporting short- and long-term goals (Martel & Baer, 2021). For example, institutions can collaborate with private sector partners to secure research project funding or establish scholarships for students from underrepresented backgrounds. Such partnerships can also help institutions to diversify their revenue streams and reduce their dependence on government funding.

In addition to finance, the law also plays a critical role in building global higher education communities. International laws and regulations can significantly impact the ability of institutions to collaborate across borders, particularly in areas such as intellectual property rights, data protection, and visas for students and scholars (Wang, et al., 2022). By understanding and complying with these laws, institutions can ensure that they are able to fully participate in global higher education partnerships and contribute to the advancement of knowledge.

## FINANCE: A CRITICAL BUILDING BLOCK

Finance is crucial in building a global partnership in higher education by providing resources, funding, and support for internationalization efforts (Whatley, 2017). Financial assistance, such as scholarships and grants, can enable students from different countries to access higher education opportunities abroad. These funding options help overcome financial barriers and promote campus diversity, fostering a global community of students (Weenink, 2014;

Whatley, 2017). Financial support for research projects and collaborations across borders facilitates knowledge exchange and the advancement of global research initiatives. Funding can be allocated for joint research projects, conferences, workshops, and research networks, encouraging cooperation and cross-cultural learning (Martel & Baer, 2021).

Investment in infrastructure and facilities, such as international student centers, study abroad offices, and multicultural spaces, enhances the experience of international students and promotes a sense of belonging (Weenink, 2014). These resources provide platforms for cultural exchange, collaboration, and community building (Whatley, 2017). Financial support for faculty development programs, such as international conferences, research exchanges, and sabbaticals, encourages faculty members to engage in global academic networks (Luo & Jamieson-Drake, 2015). This fosters knowledge sharing, cross-cultural understanding, and the integration of global perspectives into teaching and research.

Finance is crucial in establishing and sustaining collaborative programs and partnerships between institutions across borders (Luo & Jamieson-Drake, 2015; West, 2019). Funding can support joint degree programs, exchange programs, twinning arrangements, and branch campuses, promoting international cooperation and enabling students to gain global perspectives without leaving their home countries. Investment in technology and digital infrastructure facilitates online learning, virtual classrooms, and digital resources, which are vital for global education (Martel & Baer, 2021). Financial support can help institutions develop and maintain robust online platforms, ensuring access to education and fostering global connectivity (West, 2019).

Financial resources support the development and implementation of comprehensive internationalization strategies within institutions. This includes hiring international staff, creating language support programs, organizing intercultural activities, and supporting international student recruitment efforts (Jonbekova, 2023; West, 2019). These initiatives contribute to the formation of a global community on campus. Finance can aid in advocacy efforts for policies that promote internationalization and the global community in higher education (Jonbekova, 2023; Whatley, 2017).

Funding must be allocated to support organizations and initiatives that create favorable policies, remove barriers, and foster national and international collaboration (West, 2019). Overall, finance provides the means to support initiatives promoting higher education globalization (Jonbekova, 2023). By enabling mobility, cultural exchange, research collaboration, and integrating international perspectives within educational institutions, finance facilitates building a global community.

## ADDING THE LEGAL COMPONENT

Expanding the international dimension to these topics allows the students to learn and critically assess their knowledge, attitudes, and beliefs about the legal system they are mandated to follow for finance or any academic area. Students can be introduced to an international definition of the rule of law because business spans all areas of life. Globally, the rule of law is recognized as a principle of governance requiring all persons, institutions, and entities, public and private, to be accountable to publicly communicated laws, equally enforced and independently adjudicated. These laws are consistent with international human rights norms and standards (United Nations, 2004). Ensuring that students understand at the tertiary level that these principles are guiding their country, and others can spur discussions to collaborate and develop frameworks to navigate international business legal landscapes.

As such, having global legal competency should be imperative for individuals wishing to understand globalization and its impact on everyday life (United Nations Educational Scientific Organization and United Nations, 2019). This is especially true for those who will and/or transact business across borders. Knowledge that various laws may be or are different in the various districts should prepare individuals for global engagement. Reviewing international laws that govern the following topics: education, commerce, environment, and the like can promote international cooperation (United Nations Educational Scientific Organization and United Nations, 2019; UpCounsel, 2022). The existing governing policies, procedures, and protocols can promote more cooperation between the countries, institutions, faculty, and students.

Students are challenged to learn laws that govern business enterprises and their financial transactions with businesses, customers, governments, and other stakeholders. Pupils are presented with reasons why laws are enacted and what they are designed to protect or facilitate. Undergraduates learn that these range from ensuring ethical behavior, transaction transparency, conflict resolution, and protecting civil and human rights (Hansen, 2021). Further, domestic students are provided with laws that regulate their markets, including forming and operating a business, intellectual property, securities, insurance, trade: import and export, fintech, and financial laws. After learning the laws of their own country, students in exchange could benefit from understanding where the host country and the home country have similarities and differences (United Nations Educational Scientific Organization and United Nations, 2019).

In the classroom, students exposed to the components of a sound legal education—including various countries' history, culture, and political landscapes—can develop essential cultural sensitivities (United Nations Educational Scientific Organization and United Nations, 2019). These sensitivities shape their perceptions and foster deeper connections to legal topics. By understanding diverse legal frameworks and cultural contexts, students can cultivate a more nuanced approach to resolving disputes, which is particularly valuable in an increasingly interconnected world.

This perspective becomes even more significant when examining treaties and questions of international law. As students engage with these complex topics, they gain insights into the mechanisms of international cooperation and the roles played by various global organizations. Whether governmental, non-governmental, or private, these entities are often tasked with upholding the rule of law across borders. A deep comprehension of these dynamics enables students to appreciate the challenges and opportunities inherent in international legal practice.

Moreover, teaching laws that align with or diverge from those of students' home and host countries facilitate robust discussions (United Nations Educational Scientific Organization and United Nations, 2019). These conversations allow students to critically assess the similarities and differences in legal systems, encouraging them to explore how laws can be strengthened. By analyzing the intersections and gaps between various legal frameworks, students can better understand the implications of these differences for international relations and dispute resolution.

This comprehensive approach to legal education equips students with the tools necessary to navigate complex legal landscapes. By fostering cultural awareness and encouraging dialogue about the interconnectedness of law and finance, educators can prepare students to become thoughtful and effective practitioners (King & Bailey, 2021). This preparation enhances their ability to resolve disputes and contributes to a more harmonious international legal system.

**CONNECTION ESTABLISHED/MAINTAINED**

Learning how to traverse global markets and connect people remains one of the essential focuses of international business law and finance (United Nations Educational Scientific Organization and United Nations, 2019). Operating in different areas of the world, students need to be aware of the diverse cultures and differences that govern both finance and law and yet still seek to build a global community for business (Lourenço, 2018).

In conclusion, building global higher education partnerships requires a multifaceted approach that involves finance, law, and collaboration (Lourenço, 2018; King & Bailey, 2021). Institutions must work to establish sustainable funding streams, comply with international laws and regulations, and engage in networks and consortia that promote cooperation and knowledge sharing. By doing so, they can contribute to the advancement of knowledge and help to create a more interconnected and inclusive world through finance and law.

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