

"Do not fear to be eccentric in opinion,
for every opinion now accepted was
once eccentric."

Bertrand Russell



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Editorial Foreword

Dear Readers,

Welcome to a new issue of our scientific journal, ***Review of Applied Socio-Economic Research – Volume 28 / issue 2 / 2024***. This issue continues to bring to your attention challenging socio-economic research topics for the transformative period we live in, marked by the multiple crisis from the recent years.

Review of Applied Socio-Economic Research – Volume 28 / issue 2 / 2024 provides a venue for high-quality research works of academics and researchers worldwide, such as Argentina, the Czech Republic, United Kingdom, Turkey, Indonesia, Malaysia, Saudi Arabia, Republic of Kazakhstan, Morocco, Nigeria and South Africa.

In this issue, new challenging research questions arise in the Review of Applied Socio-Economic Research coverage areas - Economics and Business Research, Marketing & Innovation Management Dynamics, New economy models, Social Innovation, Global Challenges, and Interdisciplinary Research in Social Sciences. The authors approached various actual and interest subjects such as organizational culture in healthcare organizations and examining prescribing behaviour; carbon footprints and income inequality; AI in e-commerce brand recognition and the challenge simultaneous use of social networks; various dimensions of inequality, poverty and issues concerning the quality of life of women and women's empowerment in some countries; the challenge of employing people with disabilities as a tool for labor market stabilization; or the imperative of redefining business norms by the social responsibility.

We want to thank our authors who found in our review an appropriate forum of academic and research debate on the above topics, our reviewers for their hard and quality work, and all those who contributed to the Review of Applied Socio-Economic Research – Volume 28 / issue 2 / 2024!

Enjoy your reading!

Dr. Cristina Barna

Editor in Chief
Review of Applied Socio-Economic Research

Transforming Organizational Culture in Healthcare Organizations in the Post-Pandemic Era: Challenges, Strategies, and Outcomes

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Abstract. *This study explores the challenges and strategies of transforming organizational culture within healthcare settings in the post-pandemic era, recognizing it as one of the most complex leadership tasks. By focusing on how organizational capabilities and core competencies can drive successful change management, the research provides critical insights into cultural transformation. A mixed-methods approach was employed, combining qualitative and quantitative methodologies. Qualitative data were collected through semi-structured interviews with ten purposively selected healthcare professionals, analyzed using NVivo software. Quantitative data were gathered through a survey of 300 respondents, utilizing random clustered probability sampling, and analysis with SPSS. The findings highlight the importance of leadership in navigating sustainable cultural change, emphasizing that a well-aligned organizational culture is essential for successful change initiatives. This study offers valuable implications for academic researchers and healthcare practitioners seeking to implement enduring cultural transformations in an evolving healthcare landscape.*

Keywords: Change Management, Culture Change, Organisation, Post Pandemic Workplace, Resistance.

JEL Codes: D23, I11, I19, M12

1. Introduction:

Organizational culture is increasingly recognized as a critical determinant of the success or failure of change management initiatives, particularly in complex sectors like healthcare. As healthcare organizations face continual shifts in regulatory environments, technological advancements, and patient needs, the importance of cultivating an adaptive and cohesive culture has become paramount. However, despite its prominence in discussions of organizational effectiveness, the precise definition of organizational culture remains elusive. Scholars and practitioners often grapple with the concept, presenting varying interpretations of its meaning and scope.

Schein (2021) offers one of the most comprehensive frameworks, defining culture as a pattern of shared basic assumptions developed by a group as it navigates external adaptation and internal integration. These assumptions, which have been deemed effective over time, become ingrained and are passed on to new members as the accepted way to perceive, think, and solve problems within the organization. Trompenaars (2020) further expands this view by emphasizing the role of culture in shaping employees' beliefs, values, and attitudes—factors that directly influence how individuals approach their work, address challenges, and collaborate within the organization.

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Other scholars, such as Deal and Kennedy (2021), describe culture as a set of informal, unwritten rules that guide how individuals interact with one another, while Smircich and Morgan (2020) metaphorically refer to culture as a "superglue" that binds individuals together, creating a shared identity and fostering unity within the organization. These interpretations highlight the multifaceted nature of culture, which operates at both the individual and collective levels, influencing not only behaviour but also perceptions and attitudes.

Despite these insightful contributions, defining organizational culture in precise terms remains challenging. As Schein (2021) notes, the concept is often used inconsistently and described in ambiguous terms, leading to divergent applications across contexts. Nevertheless, there is broad consensus among scholars that culture plays a pivotal role in shaping how individuals align with and contribute to their organizational environments (O'Reilly, Chatman, & Caldwell, 2021). It is widely regarded as a system of shared meanings that distinguishes one organization from another, shaping both internal dynamics and external perceptions (Robbins & Judge, 2020). Understanding these cultural dimensions is essential for effectively managing organizational change, particularly in industries like healthcare, where the stakes are high, and adaptive capacity is critical to success.

1.1 Organizational Culture and Its Role in Organizational Change Management:

Organizational culture is a critical factor influencing the success or failure of organizational change management. This importance is particularly prominent in healthcare settings, where complexity, regulatory pressures, and the need for coordinated responses to change present unique challenges (Tharp, 2020). Despite its prominence, organizational culture is a multifaceted and often ambiguous concept. Researchers and practitioners alike struggle to define it with precision, as its interpretations can vary depending on the context (Tharp, 2020).

At its core, organizational culture refers to the shared beliefs, values, and norms that shape the behavior of individuals within an organization. Hofstede (2021) describes culture as a collective mindset that differentiates one group of individuals from another, influencing interactions within the organization and with external stakeholders. Robbins (2019) characterizes it as the "social glue" that holds organizations together, providing implicit guidelines for behavior and shaping how employees align their actions with the organization's goals. These perspectives collectively underscore the role of culture in guiding both individual and collective behavior within an organization.

1.1.1 Perspectives on Organizational Culture

Various scholars have approached organizational culture from different angles, contributing to a richer understanding of its role in change management. Deal and Kennedy (2021) view culture as an informal system of governance, comprising unwritten rules that dictate how individuals are expected to behave. This perspective suggests that culture influences not only social interactions but also decision-making processes, ultimately shaping the operational efficiency of an organization.

Similarly, Smircich and Morgan (2020) liken culture to a "superglue" that fosters a collective identity among employees. During times of organizational change, this shared identity becomes crucial, helping employees navigate uncertainties and rally around common goals. Schein (2021) offers a more granular view, defining culture as a set of basic assumptions learned through collective problem-solving. These assumptions, which become ingrained within an organization, guide members' perceptions, thoughts, and actions, especially when addressing external challenges and internal integration.

1.1.2 Organizational Culture in Healthcare Settings

In healthcare, where the environment is dynamic, and change is constant, organizational culture has a particularly profound impact on change management. Healthcare organizations often struggle with

professional territorialism and resistance to change, as highlighted by Arrow (2019) and Ouchi (2021). Organizational inertia, the tendency to resist change, can significantly disrupt efforts to implement new models of care or operational improvements (Ahgren, 2021; Scott et al., 2019). Traditional change management practices in healthcare often fail because they do not account for the entrenched cultural norms that influence professionals' responses to change.

Holmberg (2019) and Benders and Van Hootegeem (2019) argue that resistance to change is frequently rooted in the organizational culture itself. When change is perceived as a threat, it can trigger a cultural response that disrupts the balance within the organization, further complicating the change process (Appelbaum & Wohl, 2020). In healthcare, where professionals often share similar values and goals, culture becomes a powerful force that can either facilitate or obstruct change (Edmondson, 2019).

1.1.3 Approaches to Culture and Change: Integration, Differentiation, and Fragmentation

Martin (2020) presents three key perspectives on how organizational culture can influence change: integration, differentiation, and fragmentation. The integration perspective sees culture as promoting consensus and continuity within the organization, often creating a conservative mindset that resists disruptive change. This perspective is particularly relevant in healthcare organizations, where maintaining stability can be both a benefit and a barrier.

The differentiation perspective, on the other hand, highlights the existence of subcultures within an organization. These subcultures can sometimes conflict with one another, especially during periods of organizational change. In healthcare, differentiation is evident when various professional groups—such as doctors, nurses, and administrators—hold conflicting views on how change should be implemented (Sinclair, 2021). These conflicts can hinder the change process, as each subculture may resist any attempt to alter established practices.

The fragmentation perspective, as described by Martin (2020), acknowledges the existence of ambiguity and contradiction within organizational culture. Rather than being a unified entity, culture is seen as a collection of fragmented beliefs and values that coexist uneasily within the organization. In healthcare, this fragmentation can manifest as conflicting priorities between patient care, cost containment, and regulatory compliance (Hatch, 2019).

1.1.4 The Role of Culture in Supporting Change

Despite its potential to hinder change, organizational culture can also play a supportive role in change management. Berlin and Carlstrom (2020) argue that cultural diversity within healthcare organizations can enhance communication, collaboration, and coordination, all of which are critical to successful change initiatives. Moreover, cultural artifacts—such as shared rituals, language, and symbols—can promote safety and facilitate change by reinforcing desired behaviors among employees (Xiao et al., 2011, 2021).

As noted by Xiao et al. (2021), a supportive workplace culture is a powerful asset in overcoming resistance to change. In healthcare settings, where the stakes are often high and decisions must be made quickly, a strong, adaptive culture can help professionals navigate the uncertainties of change. By fostering a sense of shared purpose and mutual support, culture can serve as a stabilizing force that allows organizations to adapt to new circumstances without losing sight of their core mission.

1.1.5 Cultural Resistance and Change Dynamics in Healthcare

Healthcare organizations, by their nature, tend to develop cultures that are resistant to change due to the high levels of risk and regulation inherent in the industry. Culture in healthcare is often formed in response to professional norms and standards that prioritize patient safety and clinical excellence. However, these same cultural norms can lead to resistance when new models of care or operational structures are introduced (Edmondson, 2019).

Schein (2021) highlights that cultural resistance is often a defined mechanism against perceived threats to the status quo. In healthcare, where the consequences of failure can be dire, this resistance is particularly pronounced. Sinclair (2021) contends that while no single model of managing organizational change is universally applicable, culture plays a central role in determining the success of change initiatives.

Organizational culture is a complex and multifaceted concept that significantly impacts change management in healthcare organizations. While it can act as a barrier to change, creating inertia and resistance, it also has the potential to support change by fostering collaboration, shared values, and a collective identity. Understanding the various dimensions of culture—whether through integration, differentiation, or fragmentation—can help healthcare leaders navigate the complexities of change more effectively.

The challenge, as Schein (2021) notes, lies in cultivating a culture that is both adaptive and supportive of change, particularly in high-stakes environments like healthcare. By acknowledging the role of culture in shaping employee behavior and organizational dynamics, leaders can better align their change management strategies with the underlying values and beliefs that drive their organizations forward.

Ultimately, while organizational culture is difficult to define and often applied inconsistently, its influence on the success or failure of organizational change cannot be underestimated. Particularly in healthcare, where continuous adaptation is required, fostering a culture that embraces change is essential for long-term success.

1.2 Resistance to Change in the healthcare organization:

Resistance to change is a major factor contributing to the failure of change initiatives. Research consistently underscores that employees often resist change, which complicates the implementation process (Osakamp, 2021; Morrison, 2022; Kotter, 2020; Hiatt and Creasey, 2022). Kotter (2020) emphasizes that resistance is a prevalent issue during change management processes. According to Harvard Business School Press (2023), resistance is expected when employees perceive that they stand to lose from the change initiative. Such resistance often manifests passively, through a lack of commitment to the change goals and an absence of proactive steps towards achieving them. Kotter (2020) further argues that the primary challenge lies in overcoming employees' internal resistance and demonstrating that perceived barriers are not as significant.

Hiatt and Creasey (2022) identify two types of resistance to change: personal and organizational. Personal resistance is influenced by individual knowledge, experience, and skills, which affect how an individual responds to change. In contrast, organizational resistance relates to how change impacts the existing status quo, career aspirations, and personal interests within the workplace. This type of resistance can be driven by concerns about the potential negative effects of change on future career prospects.

Harvard Business School Press (2023) also notes that employees dissatisfied with their long-held status quo may exhibit discretionary efforts to preserve their current situation. Similarly, Bridges (2023) observes that while many individuals eventually adapt to change, they are more likely to do so effectively if they receive adequate support. Bridges (2023) emphasizes that support systems are crucial for helping employees navigate challenging transitions and integrate changes successfully.

1.3 Communication in Healthcare Change Management:

The relationship between communication and change management has garnered substantial attention in recent management scholarship (Kitchen and Daly, 2022; Proctor and Doukakis, 2021). Elving (2022) differentiates between communication activities and mere information provision, critiquing the latter as a myopic approach to change management. Instead, Elving advocates for a communication approach that incorporates organizational narratives and discourse, which can provide deeper insights into managing change (Johnsson and Heide, 2021).

Communication is increasingly recognized as a fundamental element for organizational success and is crucial in fostering change readiness, reducing uncertainty, and securing commitment to change (Armenakis et al.,

2022; Klein, 2021). Caldwell (2021) posits that communication in change management serves to inform, involve, and inspire stakeholders, thereby facilitating their engagement in the change process. This perspective highlights communication as an indispensable tool for achieving successful change outcomes.

Further, communication plays a pivotal role in the effective implementation of change by announcing, explaining, and preparing individuals for the transition (Spike and Lesser, 2021). Lippitt (2023) emphasizes that effective communication enhances understanding of the change process and diminishes confusion and resistance. Grunig (2022) asserts that communication acts as a catalyst for organizational excellence and effectiveness, while Harshman and Harshman (2021) identify it as a key factor influencing organizational performance. Hall (2022) adds that communication is a critical component in assessing corporate health.

Effective change efforts often hinge on an organization's ability to alter individual employee behaviors. When organizational change involves modifying employee tasks, communication becomes essential for conveying relevant information (Robertson et al., 2022). Therefore, communication should be a central element of change strategies and efforts (Robertson et al., 2022).

While the literature widely acknowledges the significance of change communication, many scholars agree that the specific approaches and impacts remain inadequately explored (Lewis, 2022). Armenakis and Harris (2022) argue for a focus on developing targeted messages and distinguishing between different message domains within change communication. Clampitt et al. (2021) and Lewis (2022) emphasize the importance of selecting appropriate communication mediums for change initiatives. Recent findings by Daly et al. (2021) support the critical role of effective communication processes in successful change implementation. Additionally, research into the phases of change highlights the importance of communication in fostering mutual understanding of organizational issues (Bennebroek Gravenhorst et al., 2021).

Francis (2022) identifies two primary goals of organizational communication: informing employees about tasks, policies, and relevant issues, and fostering a sense of community within the organization (De Ridder, 2022). These goals underscore the distinction between simply providing information about change and creating a supportive community before and after the change.

Communication aligned with the change process can more effectively reduce resistance by continuously reinforcing and adapting the change narrative within employees' cognitive frameworks. The connection between communication and organizational change has increasingly attracted scholarly and practical interest (Johansson and Heide, 2021). Scholars such as Ford and Ford (2023), Kotter (2022), Lewis and Seibold (2023), Daly et al. (2021), and Elving (2022) have emphasized the integral role of communication in managing change. Some perspectives view change as fundamentally a communicative challenge (Allen et al., 2021) or as primarily a communication problem (Lewis and Seibold, 2023). Bordia et al. (2022) affirm that communication is inherently embedded in change implementation activities.

2. Research Elaboration:

The primary aim of this study is to facilitate organizational culture change within healthcare organizations in Bangladesh in the post-COVID-19 era. Recognizing the profound impact of the pandemic on healthcare systems globally, this research seeks to provide systematic, evidence-based frameworks that address the multifaceted challenges associated with effective cultural transformation in this critical sector. Organizational culture change is inherently complex, often met with resistance from various stakeholders, making it imperative to understand and manage these dynamics to ensure successful implementation. By focusing on the Bangladeshi healthcare context, this study contributes to the broader discourse on organizational change management, offering insights that are both contextually relevant and broadly applicable.

To comprehensively explore the intricacies of organizational culture change, a mixed-methods approach was employed, integrating both qualitative and quantitative research methodologies. This methodological triangulation ensures a robust and nuanced understanding of the research problem, allowing for the corroboration of findings across different data sources.

The quantitative aspect of the study involved the development and administration of a structured survey questionnaire. The survey was designed to capture a wide range of variables related to organizational culture, change management practices, and the perceived barriers and facilitators of cultural transformation. A random clustered probability sampling technique was utilized to select a representative sample of 300 respondents from various healthcare institutions across Bangladesh. This approach ensures that the sample is both diverse and reflective of the broader population, enhancing the generalizability of the findings. The collected quantitative data were analyzed using the Statistical Package for the Social Sciences (SPSS), enabling the identification of significant patterns, correlations, and trends that inform the study's conclusions.

Complementing the quantitative data, the qualitative component comprised semi-structured interviews with ten purposively selected top executives from key healthcare organizations. These executives, chosen for their strategic roles and firsthand experience with organizational change, provided in-depth insights into the challenges and strategies involved in cultural transformation. The interviews were conducted using a flexible yet focused framework, allowing participants to elaborate on their experiences and perspectives. The qualitative data were meticulously transcribed and analyzed using NVivo software, facilitating the identification of recurring themes and sub-themes that elucidate the underlying mechanisms of culture change within the healthcare sector.

This study adheres to stringent ethical standards to ensure the integrity and credibility of the research process. Participant anonymity and confidentiality were rigorously maintained, with all data being anonymized to protect the identities of respondents and interviewees. Informed consent was obtained from all participants, ensuring that they were fully aware of the study's objectives, their voluntary participation, and their right to withdraw at any stage without repercussions. Additionally, the research protocol was reviewed and approved by an appropriate ethical review board, further safeguarding the ethical conduct of the study.

Organizational culture change is widely acknowledged as a pervasive, complex, and often unpredictable process (Hiatt, 2019; Stacey, 2021). Fullan (2019) conceptualizes culture change as an uncertain journey, fraught with challenges that require persistent and adaptive leadership. Bourne and Bourne (2018) further elaborate that culture change is a daily reality impacting both change agents and employees, necessitating continuous engagement and adaptation. Effective management of cultural transformation demands a profound understanding of the organizational context and the nature of the change being pursued (Stacey, 2021; Fullan, 2019; Kotter, 2022; Hiatt & Creasey, 2019; Blake & Bush, 2021).

A significant barrier to organizational culture change is resistance, which is frequently cited as a major obstacle in transformation processes (Erwin & Garman, 2021). Resistance can manifest in various forms—cognitive, behavioral, and affective—posing substantial challenges to change initiatives (Oreg et al., 2020; Haslam et al., 2021). This resistance often arises from perceived or actual threats and losses associated with the change, leading to intellectual, behavioral, and emotional responses that impede successful cultural transformation (Goncalves et al., 2021; Mulki et al., 2019; Smollan, 2019). Understanding the root causes of resistance, whether they stem from fear of the unknown, loss of control, or disruption of established routines, is crucial for developing effective strategies to mitigate its impact.

To address the inherent challenges of organizational culture change, this study emphasizes the importance of leveraging organizational capabilities and core competencies. Effective leadership is identified as a critical factor in navigating the complexities of cultural transformation, as leaders play a pivotal role in shaping and guiding the organizational culture (Kotter, 2022). Additionally, fostering open communication, building trust, and involving employees in the change process are essential strategies for reducing resistance and promoting buy-in (Hiatt & Creasey, 2019).

The study also explores the role of continuous learning and adaptation in sustaining cultural change. By embedding a learning-oriented mindset within the organization, healthcare institutions can enhance their capacity to respond to evolving challenges and sustain long-term cultural transformation (Blake & Bush,

2021). Furthermore, aligning change initiatives with the organization's mission, vision, and values ensures that cultural change is coherent and consistent with the overarching goals of the healthcare institution. This research contributes to the existing body of knowledge by providing a detailed examination of the factors influencing organizational culture change in the specific context of Bangladeshi healthcare organizations. By employing a mixed-methods approach, the study offers a comprehensive understanding of both the quantitative and qualitative aspects of cultural transformation. The evidence-based frameworks developed through this research address the complexities and challenges of effective culture change, providing practical guidelines for healthcare leaders and practitioners. Moreover, the study bridges the gap between theory and practice, offering actionable insights that can be utilized to enhance change management strategies in healthcare settings. The findings underscore the importance of leadership, communication, and employee engagement in fostering a supportive culture that can adapt to post-pandemic realities. These insights are valuable for academic researchers seeking to further explore the dynamics of organizational culture change and for practitioners aiming to implement enduring cultural transformations within their organizations. Overall, this study underscores the critical role of organizational culture in facilitating successful change management within the healthcare sector. By systematically investigating the challenges and strategies associated with cultural transformation in the post-COVID-19 era, the research provides a nuanced understanding of the factors that influence organizational culture change. The mixed-methods approach ensures a comprehensive analysis, while the emphasis on ethical considerations guarantees the integrity of the research process. Ultimately, the study offers valuable contributions to both academic literature and practical applications, aiding healthcare organizations in navigating the complexities of cultural transformation and achieving sustainable success in an evolving landscape.

3. Results and Discussions:

This research employs a mixed-methods approach, beginning with the presentation of quantitative findings followed by qualitative insights. The quantitative analysis utilized the Statistical Package for the Social Sciences (SPSS) to apply the Spearman correlation coefficient, a statistical test chosen for its suitability to the data sets. This test measures the strength and direction of the association between variables, focusing on the linear relationships among them. The Spearman correlation coefficient was specifically used to assess the relationship between various independent and dependent variables in the context of organizational culture change. The analysis revealed a positive correlation between the change implementation process and cultural support, indicating that a supportive culture is associated with more effective organizational change processes. This finding underscores the importance of fostering a positive organizational culture to facilitate successful change implementation.

Fig. 1: Correlation coefficient of two variables.

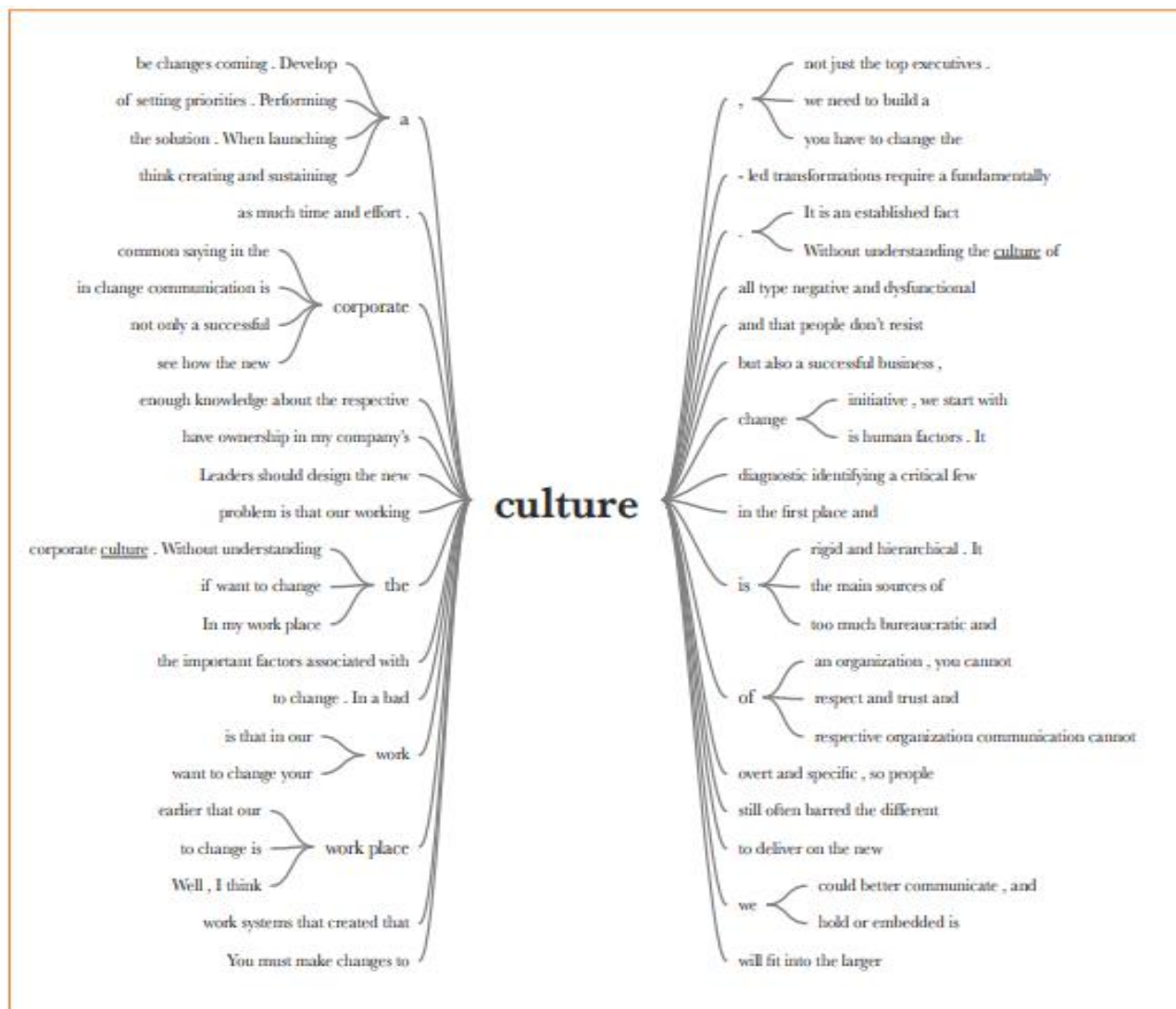
Culture Support		Change Management Process	
Culture Support	Pearson Correlation	1	.496**
	Sig. (2-tailed)		.00
	N	350	350
Change Management Process	Person Correlation	.496**	1
	Sig. (2-tailed)	.00	
	N	350	350

****Correlation is significant at the 0.01 level (2-tailed).**

The Spearman correlation coefficient test statistic was $r=0.496$, with $N=350$. $p<0.001$, indicating a moderately positive relationship between the variables. This result demonstrates that positive cultural support is associated with more effective change management processes. Specifically, when positive cultural support is present, the implementation of organizational change is facilitated, and resistance to change is reduced. The significance level $p<0.001$ confirms that the probability of observing such a correlation by chance is extremely low, suggesting a strong and statistically significant relationship between the variables, well below the standard threshold of $p<0.05$.

The qualitative analysis involved a text search query to explore the integration of key terms and their contextual meanings. This approach not only identified the frequency of specific words but also elucidated the participants' perceptions of these terms. For instance, the term "tree" was used to describe the organizational culture as rigid and hierarchical, indicating that participants perceive their workplace management system as inflexible and top-down. Additionally, the term "bureaucratic" highlighted that many workplaces in Bangladesh remain entrenched in outdated and bureaucratic practices. These qualitative insights complement the quantitative findings by providing a deeper understanding of how cultural elements influence the change management process.

Fig. 2: Understanding the sources by word-tree.



Sources: Nvivo output word tree-understanding the sources.

It defines the present situation about the culture, but it also recommends how to fix the existing culture. The word ‘diagnosis and culture’ means you must update the work systems that created that toxic culture. The sentence, ‘not just top executive means’ here is that a culture change initiative is not just the function of top executive, rather it requires collective effort to make culture change successful and sustainable. However, culture change is difficult as Schein (2019) points out, but in the findings, it found that participants stated culture change is not an easy task, it requires a movement and collective effort. On the other hand, quantitative findings revealed that a positive work culture supports the culture change management process. However, the qualitative results revealed that the workplace of healthcare organizations in Bangladesh is rigid, hierarchical, and often toxic, and does not involve all levels of employees in order to make culture change initiative successful. As Trompenaars (2019) suggests that the employee’s beliefs, values, and attitudes have influence of determining positive workplace culture and dealing with the problem of external adaptation and internal integration. From the qualitative findings, it found that the workplace in Bangladesh is bureaucratic, and strictly structured. Taking everything into consideration (i.e., results of qualitative and quantitative data), healthcare organizations in Bangladesh requires a collective movement for culture change for the post pandemic future. Recommendations for culture change for the post pandemic workplace are as follows:

4. Recommendations for Achieving Sustainable Organizational Culture Change in the Post-Pandemic:

In the post-pandemic era, the COVID-19 pandemic has underscored the need for organizations to develop and sustain cultural transformation capabilities. It has emphasized the importance of adapting to new work modes and fostering a digital culture mindset. To guide academics and practitioners in achieving sustainable organizational culture change, the following recommendations are proposed:

1. **Prioritize Focused and Transparent Communication:** The pandemic has reshaped workplace dynamics, altering protocols and business operations. Effective communication is crucial for addressing challenges brought about by remote work. Organizations must ensure that communication remains transparent and focused, helping employees feel supported and engaged despite physical distance. This will be essential for building a cohesive work environment in the post-pandemic context.
2. **Centre Employee Well-Being:** The pandemic has exacerbated mental health issues such as loneliness, depression, and anxiety, highlighting the need for organizations to prioritize employee well-being, mental health, and work-life balance. Moving forward, maintaining staff well-being should be a top priority, requiring a collective effort across the organization. A strong focus on well-being will help prepare organizations for future challenges.
3. **Encourage Engagement with Technology:** The volatile labour market and significant shifts in employment patterns make technology crucial for business continuity and adaptation. Organizations should integrate technology seamlessly into the workplace, ensuring employees are equipped to use digital tools effectively for communication and remote work. The pandemic has accelerated technological innovation, and aligning this with strategic goals will support employee recognition, engagement, and growth, facilitating the development of a robust virtual culture.
4. **Reimagine and Re-Strategize Diversity, Equity, and Inclusion (DEI):** The pandemic has highlighted the need for renewed focus on DEI. Effective leadership and comprehensive actions to address biases throughout the employee lifecycle are essential. Organizations must recognize that DEI training is just the beginning; meaningful cultural change requires sustained and intentional effort.

5. **Focus on Adaptability:** Organizations that excel in cultural adaptability are better positioned to respond strategically to dynamic environments. Cultivating adaptability fosters innovation, experimentation, and the ability to seize new opportunities. Emphasizing cultural adaptability will help organizations navigate the evolving landscape and turn challenges into opportunities for growth.
6. **Strive for Organizational Integrity:** Integrity should be a fundamental aspect of organizational culture. This includes upholding employee well-being, work-life balance, and health and safety standards. Organizations must adhere to regulations and ethical standards rigorously. Upholding integrity will be crucial for managing the complexities of the post-pandemic environment and ensuring a resilient and trustworthy workplace.

5. Conclusion:

Organizational culture is a fundamental determinant of success in healthcare organizations, especially in the evolving landscape of the post-pandemic era. A robust and adaptable culture can profoundly influence patient outcomes, enhance employee engagement, and drive innovation. A positive culture fosters an environment where employees feel valued and supported, which directly translates to improved patient care and safety. High levels of employee engagement contribute to job satisfaction, reduce turnover, and boost productivity, while a culture that promotes innovation enables organizations to navigate industry changes and address emerging challenges effectively. However, transforming organizational culture in healthcare settings is fraught with challenges. Resistance to change is a significant barrier, often driven by concerns over job security, disruption of established routines, and potential impacts on patient care. Additionally, traditional hierarchical structures and bureaucratic processes can impede cultural change efforts, as can the existence of professional silos that create communication and collaboration barriers.

To address these challenges, healthcare organizations must implement effective strategies for cultural transformation. Strong leadership commitment is crucial; leaders must actively model the desired behaviours and demonstrate unwavering support for the change process. Engaging employees at all levels is also essential to build buy-in and address concerns, fostering a sense of ownership and commitment to the cultural shift. Clear and transparent communication helps ensure that all staff members understand the rationale behind the changes and the benefits they are expected to bring. Training and development play a critical role in equipping employees with the skills and knowledge necessary to adapt to new practices and ways of working. Additionally, recognizing and rewarding contributions to the cultural transformation process can reinforce positive behaviours and motivate staff.

In the post-pandemic context, there are specific considerations that healthcare organizations must address. Supporting employee mental health and well-being has become increasingly important, as the pandemic has highlighted the need for robust mental health support systems. Embracing remote work, which many organizations adopted during the pandemic, requires creating a culture that supports remote collaboration and maintains effective communication. Leveraging technology can facilitate these efforts, enhancing communication, collaboration, and knowledge sharing across the organization. By proactively addressing these challenges and implementing the strategies outlined, healthcare organizations can successfully transform their culture, creating a more supportive, innovative, and patient-centred environment that is better equipped to meet the demands of the contemporary healthcare landscape.

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Examining Prescribing Behavior: Sociodemographic Profiles, Drug Efficacy, and Marketing Dynamics

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Abstract. *This study examines prescribing behaviour by focusing on sociodemographic profiles, drug efficacy, and marketing dynamics within the healthcare sector. We surveyed 267 healthcare professionals in Rabat, Morocco, using a 33-item questionnaire. Statistical analyses, including Cronbach's Alpha for reliability and ANOVA, chi-square, Cramer's V, and Pearson correlation for significance, revealed notable findings related to profession, experience, speciality, and interactions with medical representatives. Sociodemographic profiles illustrate how factors such as age, gender, education, and socioeconomic status impact prescribing decisions. Drug efficacy evaluation highlights the comprehensive assessment professionals undertake, considering clinical effectiveness, potential side effects, and adherence to guidelines. The study also underscores the significant influence of pharmaceutical promotional strategies, especially interactions with medical representatives, on prescribing behavior. The reliability and statistical tests validate the robustness of our findings. Significant variations in prescribing behaviour were observed based on profession, experience, speciality, and contact frequency with representatives. This research deepens our understanding of prescribing behaviour by illuminating the interplay between sociodemographic factors, drug efficacy, and marketing dynamics, with implications for optimizing healthcare policy, medical education, and pharmaceutical marketing strategies.*

Keywords: Prescribing Behavior, Sociodemographic Profile, Marketing Dynamics.

JEL Codes: M31, M37

1. Introduction

In the realm of healthcare, medication prescription by healthcare professionals holds paramount importance, relying on a myriad of factors influencing prescription decisions. Among these factors lie patients' sociodemographic characteristics, the evaluation of clinical efficacy and drug safety, as well as interactions with medical delegates and other representatives of the pharmaceutical industry. Understanding these elements is crucial for apprehending prescription patterns and clinical decisions made by physicians, pharmacists, and other healthcare providers.

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Certain sociodemographic factors, such as age, gender, education level, and socioeconomic status of patients, may influence treatment and prescription choices due to differences in the perception of medication risks and benefits, as well as personal health preferences. Regarding the clinical efficacy and safety of medications, healthcare professionals meticulously assess available clinical evidence and potential risks for each patient, considering factors such as effectiveness compared to therapeutic alternatives, expected side effects, drug interactions, and compliance with clinical practice guidelines.

In the current context, pharmaceutical marketing mix strategies play a predominant role in physicians' prescription decisions. Studies have highlighted the significant influence of promotional tools on prescription behaviours (Ahmed, 2014). Similarly, the importance of pricing strategy in these decisions has been underscored (Al Thabbah et al., 2022).

The marketing activities of pharmaceutical companies also influence physicians' prescription processes, with a demonstrated role in prescription decisions (Al-Areefi & Hassali, 2013). Physicians' attitudes toward medical promotional tools and their impact on prescription decisions have been examined (Ali et al., 2022).

The interaction between healthcare professionals and pharmaceutical representatives is crucial, with research evaluating the influence of pharmaceutical promotion on prescribers (Altawalbeh et al., 2020). Furthermore, the importance of pharmaceutical representatives in disseminating information about new drugs has been highlighted (Altowayan & Alshubaili, 2022). Understanding the impact of ethical guidelines and directives on healthcare professionals' prescription decisions is essential (Balhara, Mathur & Anand, 2012). Similarly, the predominant role of direct promotion by pharmaceutical representatives in this process has been emphasized (Campo et al., 2005).

Furthermore, studies such as the one conducted by Tuncay et al. (2020), which analyzed the prescription of generic drugs by general practitioners in Italy over a period of 15 years, revealed a general trend towards increasing prescriptions of generic drugs over time, with differences in prescription behaviour based on physicians' age, gender, and experience. This longitudinal retrospective analysis sheds light on the evolution of prescription practices and underscores the importance of understanding trends in medical practice.

Reviews of factors influencing physicians' prescription decisions also provide valuable insights into pharmaceutical market dynamics (Davari, Khorasani & Tigabu, 2018). Likewise, differences in behaviour among physicians in different practice contexts have been analyzed (Anderson et al., 2009). The evaluation of the clinical efficacy and safety of medications remains crucial, with studies highlighting the impact of activities by medical representatives and medication samples on prescription decisions (Kasliwal, 2013). Similarly, the importance of product cost and the reputation of pharmaceutical companies in this process has been emphasized (Khajuria & Khajuria, 2013).

Gender differences in physicians' decisions regarding the adoption of new medications are also an increasingly significant area of interest (Méndez, Scott, & Zhang, 2021). Similarly, the impact of health policies and directives on physicians' prescription decisions has been studied (Howard et al., 2018).

Moreover, the study by Vancelik et al. (2007) examines the self-reported impact of pharmaceutical promotion on the decision-making process of general practitioners in Turkey. The results indicate that, for the majority of general practitioners, the primary reference source regarding prescription was the commercial information provided by pharmaceutical company representatives, which had a significant impact on their decision-making process. This research highlights the significant influence of

pharmaceutical promotion activities on physicians' prescription decisions, thus emphasizing the importance of considering these external influences in the analysis of prescription practices.

Finally, the influence of medical representatives on physicians' prescription practices remains an important subject. Studies have assessed the impact of medical representatives on physicians' prescription practices, showing that nearly half of the physicians report that their prescription decisions have been influenced by medical representatives (Workneh et al., 2016). Research has also examined factors influencing general practitioners' decisions to adopt new prescription medications, highlighting the importance of gender, prescription volume, and physician employment status (Zhang et al., 2019). In Saudi Arabia, researchers have examined the factors influencing physicians' medication selection decisions, highlighting the significant role of pharmaceutical representatives in providing information about new medications (Ibrahim & Bélanger, 2015).

Subsequently, studies have explored the effect of pharmaceutical companies' promotional strategies on physicians' prescription patterns, noting that marketing strategies influence physicians' prescriptions (Ijoma & Onwuekwe, 2009; Albarq & Suleiman, 2021). Research has identified significant differences between practitioners in the public and private sectors regarding factors such as sources of prescription information (Kamuhabwa & Kisoma, 2015). One study examined the influence of pharmaceutical promotions targeting healthcare professionals on prescription decisions, showing that exposure and attention to pharmaceutical promotions were associated with an increased influence of the pharmaceutical industry on prescription decisions (Price et al., 2021). Lastly, a study examined the relationship between exposure to information provided by pharmaceutical companies and the quality, quantity, and cost of physicians' prescriptions, revealing an association between exposure to information provided by pharmaceutical companies and an increase in prescription frequency, higher costs, or lower quality of prescriptions (Spurling et al., 2010).

2. Literature Review

Medical prescription is an act by which healthcare professionals provide medical treatment for the conditions faced by their patients. At first glance, the prescription process is similar among most healthcare professionals, but the difference lies in the nature of the prescribed medications. Indeed, some healthcare professionals prioritize molecules from large pharmaceutical companies, while others prefer the use of generics. Therefore, scientific research has focused on the prescription behaviours of healthcare professionals, attempting to analyze and understand the act of medical prescription.

2.1. Sociodemographic Factors

The first aspect studied by researchers relates to sociodemographic factors influencing prescription practices. Klau et al. (2023) investigate antipsychotic prescribing patterns in children and adolescents within Australian general practices, with a focus on sociodemographic factors such as age, gender, and geographic location. Their study reveals that antipsychotic prescriptions increased from 2.0% in 2011 to 2.9% in 2017. Significant sociodemographic influences include a higher rate of off-label prescribing among older adolescents, females, and patients from outer regional or remote areas. The study also highlights that a substantial proportion of antipsychotic prescriptions were off-label (69.8% in 2011 and 79.7% in 2017) and often accompanied by other psychotropic medications. These findings underscore the

importance of sociodemographic characteristics in shaping prescribing patterns and managing mental health conditions in young patients.

The research conducted by Islam and Awal (2020) examines the sociodemographic factors influencing physicians' clinical decision-making at Upazila Health Complexes (UHCs) in Bangladesh. Their cross-sectional descriptive study, involving 85 physicians from the Rajshahi Division, identifies several sociodemographic factors that affect clinical decisions. The study highlights how factors such as physicians' level of education and the distance between their homes and workplaces impact their decision-making. Additionally, sociodemographic factors of patients, such as their purchasing capacity, influence prescription practices. The research provides valuable insights into how these sociodemographic elements shape clinical practices in this setting and may be of interest to public health researchers and policymakers.

The study by Lam et al. (2003) examines the non-biomedical reasons that lead family physicians to overprescribe antibiotics for upper respiratory tract infections (URTI) in a mixed private/public Asian context. The survey, conducted among members of the Hong Kong College of Family Physicians between August and December 2001, received responses from 801 family physicians, yielding an overall response rate of 65.0%. The results reveal that a significant number of respondents (21.8%) believe they may prescribe antibiotics too often for URIs, but the majority feel they use antibiotics just slightly too often. Older, more experienced physicians or those in private practice are more likely to feel they may prescribe antibiotics too often. Over 50% of respondents believe that satisfying the patient or caregiver, as well as the fear of medical and legal issues in case of patient deterioration, could prompt them to overprescribe antibiotics for URIs. Physicians in the public sector may overprescribe to save time, while those in the private sector may do so to retain patients in their practice. In conclusion, the study highlights that certain physicians are more prone to overprescribing antibiotics, and non-biomedical factors may play a significant role in antibiotic prescription for URIs.

The survey by Sharifnia et al. (2018) examines the key factors influencing physicians' prescription decisions in Iran. Through exploratory research, 460 physicians were surveyed using a questionnaire as a quantitative research instrument, with a response rate of 84%. The results revealed that Iranian physicians primarily paid attention to payment type, individual patient factors, and product characteristics when prescribing medication. Additionally, it was found that marketing expenditures did not have a significant influence on physicians' demand for pharmaceutical products in Iran. These findings could be valuable to marketing strategy planners of Iranian pharmaceutical companies as well as patients, the ultimate consumers of prescribed medications.

In a recent study conducted by Price et al. (2021), researchers delved into the factors influencing prescription decisions of healthcare providers (HCPs) in the United States. Unlike previous surveys by the U.S. Food and Drug Administration (FDA) that focused on attitudes towards direct-to-consumer advertising, this study specifically examines professionally targeted prescription drug promotion. The results reveal that exposure to pharmaceutical product promotion and interactions with the industry was significantly associated with a reported increase in the influence of the pharmaceutical industry on prescription drug decisions. Additionally, specialists were significantly more likely to prescribe off-label and to serve as opinion leaders for the pharmaceutical industry compared to other provider groups. These findings highlight the ubiquity of pharmaceutical promotions aimed at HCPs and underscore their impact

on prescription decisions. These results could inform the FDA about HCPs' responses to prescription drug promotion and its impacts.

In the same vein, Carter et al. (2021) examine the key determinants of general practice prescribing in the UK, as well as the potential role of pharmacist practitioners in general practice (PBPs) in promoting evidence-based prescribing. Through semi-structured telephone interviews and focus groups, participants, including general practitioners, PBPs, nurses, and key informants from the NHS, discussed current influences on prescribing and perspectives on PBPs' involvement in promoting evidence-based prescribing. The results highlighted determinants operating at different levels (individual, practice, societal) influencing prescribing and guideline utilization. Participants expressed divergent opinions on the potential of PBPs to promote evidence-based prescribing. This study thus underscores the importance of targeting modifiable influences at different levels to promote evidence-based prescribing in general practice.

The findings of the study conducted by Kamuhabwa and Kisoma (2015) revealed significant differences in prescription practices between practitioners working in public and private healthcare facilities in Dar es Salaam, Tanzania. The main sources of prescription information were manuals (64%) and the Internet (63%) for practitioners, while proven drug efficacy was a major concern for those working in private healthcare facilities (97%) compared to those in public facilities (74.2%, p -value = 0.001). The cost of medications for patients was also a more significant factor for practitioners in public healthcare facilities (48.4%) than for those in private facilities (24.3%, p -value = 0.010). Additionally, medication accessibility within the healthcare facility had a greater influence on prescription decisions for practitioners in public healthcare facilities (53.5%) than for those in private facilities (18.9%, p -value = 0.000). These results highlight the importance of considering these differences in formulating health policies and allocating resources to promote rational drug use.

2.2. Clinical Effectiveness and Drug Safety

The second aspect highlighted in the literature is the assessment of clinical effectiveness and the absence of negative effects. In addition to the factors influencing the prescription of biological treatments, Wallace et al. (2020) investigated glucocorticoid prescribing patterns among newly diagnosed rheumatoid arthritis patients in the United States. This retrospective cohort study utilized the national Optum administrative database and revealed that glucocorticoids are frequently prescribed to new patients, often at high doses and for extended durations. The study found considerable variability in prescribing practices among rheumatologists, with many patients continuing glucocorticoid therapy for up to a year post-diagnosis. The variability in prescribing was linked to provider-related factors, emphasizing the influence of individual physician decisions on treatment patterns. These results highlight not only the ongoing use of glucocorticoids despite their associated risks but also the need to examine the factors driving prescribing practices to enhance clinical guidelines and patient care.

Murshid, Mohaidin, and Zayed (2019) addressed a gap by presenting a new self-administered tool for measuring factors influencing physicians' prescription decisions, whose validation was previously insufficient. Their study aimed to develop and validate this instrument through a rigorous process, including a literature review, expert assessment, and pilot testing with 705 physicians. Using partial least squares structural equation modelling (PLS-SEM) analyses, they confirmed the content validity and convergent validity of the instrument, which consisted of 44 items grouped into categories such as

marketing efforts, patient characteristics, pharmacist variables, and contextual factors with 13 reflective constructs. The results indicate a relationship between independent variables and medical prescription.

The studies conducted by Molina et al. (2022) and Hogan et al. (2023) provide complementary insights into the impact of pharmaceutical industry interactions on medical students' and residents' knowledge and attitudes. Molina et al. (2022) conducted a national survey in France, revealing that 96.3% of medical students had been exposed to pharmaceutical product promotion, with 78.1% exposed in the past six months. This exposure raised concerns about industry incentives influencing prescriptions, as 53.6% of students believed that receiving gifts could affect their colleagues' prescribing habits. These findings underscore the need to improve education on promotional strategies and institutional policies to ensure more ethical and evidence-based medical practices. On the other hand, Hogan et al. (2023) examined industry payments received by residents, finding that 12% of residents had received payments totalling \$6.4 million. Residents affiliated with for-profit institutions were 3.5 times more likely to accept payments compared to those in federal institutions. Specialities such as orthopaedics and urology also showed higher rates of payment acceptance. These results highlight the significant influence of industry payments on residents' practices and call for greater transparency and stringent policies to minimize conflicts of interest and promote evidence-based prescribing.

Rahbi et al. (2023) conducted a study to evaluate physicians' attitudes, knowledge, and practices regarding antibiotic prescriptions at a teaching hospital in Oman. Their research identified several key contributors to antimicrobial resistance (AMR), including inadequate hand hygiene (51.6%), the widespread use of antibiotics (49%), and the frequent prescription of broad-spectrum antibiotics (47.3%). The study also highlighted additional issues, such as the lack of effective narrow-spectrum antibiotics (47.3%), inappropriate duration of antibiotic therapy (46.2%), and inappropriate empirical choice of antibiotics (45.1%). Furthermore, poor access to local antibiotic resistance information (40.8%) and inadequate restrictions on antibiotic prescribing (34.4%) were noted as significant factors. The study also revealed that 33.3% of physicians considered the absence of local hospital guidelines on antibiotic use as a contributing factor, while 26.8% cited random mutations in microbes and 22.5% pointed to patient demands and pharmaceutical advertising. Rahbi et al. (2023) concluded that addressing these gaps through targeted antimicrobial stewardship programs and improved guidelines is crucial to promoting more rational use of antibiotics and mitigating the spread of resistant pathogens. This study underscores the global health threat posed by AMR and emphasizes the need for comprehensive interventions to combat antibiotic misuse and resistance.

2.3. Marketing Practices of the Pharmaceutical Industry: Contact With Medical Representatives

Aside from the influence of sociodemographic factors and medical efficacy, the parameters related to the indispensable participants in the medical prescription process are studied, particularly the relationship between healthcare professionals and pharmaceutical companies. In this context, the study conducted by Al Thabbah et al. (2022) explores the effect of pharmaceutical companies' marketing mix strategies on physicians' prescribing practices in Jordan. This research utilized a quantitative survey to assess how different elements of the marketing mix—product, price, place, and promotion—affect physicians' prescribing decisions. The study found that physicians' prescribing practices are notably influenced by these marketing strategies, with price strategies exerting the most significant impact. The analysis

revealed that price had the highest median score of 83.3%, indicating a strong effect on prescribing decisions. In contrast, promotional tools had the lowest median score at 69.3%, suggesting a comparatively lesser impact. Additionally, the study highlighted that physicians working in the private sector were more likely to be influenced by these marketing elements. These findings emphasize the crucial role of marketing mix strategies in shaping prescribing behaviours. The study underscores the need for a balanced approach in pharmaceutical marketing practices. Policymakers are encouraged to ensure that marketing practices do not negatively affect patient health and to consider measures such as reducing medication taxes to make treatments more affordable for patients. This balanced approach will help in promoting fair and ethical marketing practices while ensuring the well-being of patients.

This observation is reinforced by Khazzaka (2019), who examines the influence of pharmaceutical marketing strategies on physicians' prescription patterns in Lebanon, focusing on ethics, gifts, and samples. Through a cross-sectional online study conducted on WhatsApp, the author analyzes physicians' prescription behaviours in relation to demographic variables. The results indicate a correlation between pharmaceutical marketing strategies and physicians' prescription behavior, showing that most promotional tools tested motivate physicians to prescribe the promoted medications, especially visits from medical representatives and drug samples. Regarding the acceptance of gifts, physicians consider it an unethical practice. Complementing this, Ali et al. (2022) further elucidate the influence of medical promotional tools on prescribing practices in Jordan and Iraq. Their study, which surveyed 801 physicians, highlights that face-to-face visits by medical representatives and drug samples are commonly accepted promotional methods, with 48% of physicians accepting these tools and 69.9% reporting changes in their practices after participating in conferences. The study underscores the need for clear, country-specific ethical guidelines to regulate medical promotions effectively.

A similar analysis conducted by Albarq and Suleiman (2021) explores the impact of pharmaceutical marketing practices on physicians' medication recommendations in Jordan. Using convenience sampling, the study was conducted from August 2019 to February 2020, with a survey response rate of 80.9%. Results, assessed on a seven-point Likert scale, indicate that pharmaceutical marketing practices have a considerable influence on physicians' prescription behavior. The analysis highlights the effectiveness of various promotional tools, emphasizing that the "public relations" strategy is the most effective, while advertisements in print media attract less attention. These findings offer valuable insights for pharmaceutical marketing managers to design more effective strategies to influence Jordanian physicians and improve their prescription practices.

Similarly to the aforementioned studies, Atia et al. (2022) explored the influence of medical representatives on prescribing practices in Tripoli, Libya. This cross-sectional study, conducted from January to April 2021, surveyed 122 physicians across various public hospitals and private clinics. The study found that medical representatives were a significant source of drug information, with 60.6% of physicians acknowledging their influence. Product samples were identified as the most effective promotional tool, and 73.8% of physicians indicated that their prescribing practices were affected by these interactions. These findings align with those of Workneh et al. (2016), who examined the impact of medical representatives on prescribing practices in healthcare facilities in Mekelle, northern Ethiopia. Their cross-sectional study included all physicians working in public and private healthcare facilities and revealed that 48.2% of the surveyed physicians felt their prescription decisions were influenced by visits from medical representatives. Accepting gifts from these representatives, including stationery supplies and drug samples, significantly increased the likelihood of prescribing the promoted products. The study

also found that face-to-face interactions were the most common promotional method and that working in a private healthcare facility was a predictive factor for influencing prescription decisions. However, most medical representatives did not provide adequate and accurate information about their products and had a negative attitude towards competing products. Both studies highlight the substantial impact of medical representatives on physicians' prescribing practices and underscore the need for more effective regulation of these interactions within pharmaceutical practices.

The study by Al-Areefi and Hassali (2013) explores the factors influencing physicians' prescription decisions and the role of pharmaceutical companies' marketing activities in this decision-making process, focusing on the Yemeni experience. Using semi-structured interviews based on the critical incident technique method, researchers collected information from doctors on specific situations of prescribing newly marketed drugs. The results revealed that several factors influence the prescription of the studied drugs, including drug characteristics, pharmaceutical company activities, indications, patient context, environmental factors such as available information and evidence, and the personal characteristics of the physician. These conclusions underline the complexity of the prescription process and the diversity of factors considered by physicians, including their own experiences, information sources provided by pharmaceutical companies, and their marketing activities.

3. Research Methodology

Based on the literature review and the conceptualization of the survey's framework, the adopted methodology naturally relies on a positivist epistemological stance, emphasizing a quantitative approach. The study takes place in the context of Moroccan healthcare professionals, particularly those based in Rabat, the capital of the Kingdom. A questionnaire survey was conducted to collect data, and this data was subsequently subjected to statistical analysis using SPSS Statistics 25 software.

3.1. Conceptual Model

Referring to the literature data, it is evident that medical prescription is a complex process influenced by a multitude of factors. Among these factors are the characteristics specific to healthcare professionals, such as gender, workplace setting, professional experience, and medical speciality. Additionally, the effectiveness and safety of medications play a crucial role in this process, as do interactions with medical representatives.

Figure 1: Sources of impact on prescribing behaviour (Source: Authors)

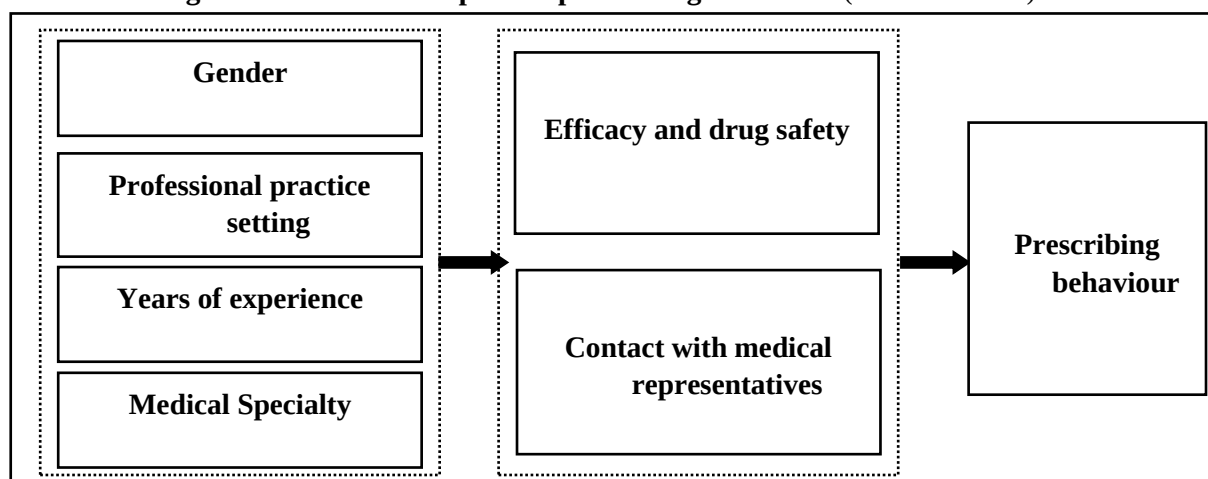


Figure 1 illustrates the conceptual framework of the conducted survey, wherein sociodemographic criteria (gender, professional workplace, years of experience, and medical specialty), medication effectiveness and safety, as well as contact with medical representatives, represent the independent variables influencing the medical prescription of healthcare professionals.

Drawing on the literature review and the conceptualization of the survey's framework, the adopted methodology naturally relies on a positivist epistemological stance, emphasizing a quantitative approach. The study takes place within the context of Moroccan healthcare professionals, particularly those based in Rabat, the capital of the Kingdom. A questionnaire survey was conducted to gather data, and these data were subsequently subjected to statistical analysis using SPSS Statistics 25 software.

3.2. Survey and Data Collection

The objective of this survey is to identify the sources of influence on the behaviour of healthcare professionals regarding medical prescriptions. This research takes place within the hospital network of the Moroccan capital, Rabat. We compiled a list of healthcare professionals practicing in the city and sent them a questionnaire via email. The survey was conducted from November 16, 2023, to February 26, 2024. In total, 953 healthcare professionals (both public and private sector) were contacted during this period, representing those for whom information was available. The response rate was 30% (288 out of 953 respondents); however, 21 questionnaires were incomplete, thus reducing the response rate to 28%. The questionnaire consists of four main sections: sociodemographic data comprising five items (gender, position, place of practice, seniority, and speciality); five items focusing on prescription behavior with an emphasis on choosing between the molecule and the generic; ten items concerning the efficacy and safety of medications; and ten items related to contact with medical representatives.

Table 1: Questionnaire's items configuration

Variable	Number of items	Description
Sociodemographic	5	-Gender (GEN) -Profession (PRO) -Service (SER) -Experience (EXP) -Specialty (SPE)
Prescribing behaviour (PRE)	5	1. Frequency of prioritizing brand-name (molecule) medications over generics in prescribing. 2. Perception of superior efficacy of brand-name (molecule) medications compared to generics. 3. Consideration of patient preference in prescribing brand-name (molecule) medications over generics. 4. Encounter frequency of challenges in convincing patients of equivalence between brand-name and generic medications.

		5. Consideration of cost-effectiveness when prescribing brand-name (molecule) medications over generics.
Clinical effectiveness and drug safety (EFF)	10	<ol style="list-style-type: none"> 1. Frequency of side effect variations with brand-name to generic switches. 2. Perception of higher side effect risk with generic medications. 3. Incidence of new or intensified side effects with generic medication use. 4. Confidence in attributing side effects to specific generic medications. 5. Patient concerns about potential side effect variations with generics. 6. Cases of side effects with generics but not brand-name counterparts. 7. Consideration of side effect variations when prescribing generics. 8. Confidence in the safety profile of generics compared to brand names. 9. Reliance on patient feedback for monitoring generic medication side effects. 10. Encounter frequency of varying side effect intensities with different generic versions.
Contact with medical representatives (CON)	10	<ol style="list-style-type: none"> 1. Frequency of discussing efficacy and safety profiles of specific molecules with medical representatives. 2. The extent of detailed information provided by medical representatives about newly introduced molecules. 3. Frequency of inquiring about clinical studies or trials supporting the efficacy of specific molecules during interactions with medical representatives. 4. Frequency of requesting comparative data between different molecules within the same therapeutic class from medical representatives. 5. Influence of discussions about new molecules with medical representatives on prescribing decisions. 6. Frequency of following up with medical representatives for additional information or updates on specific molecules. 7. The extent to which medical representatives understand the practice's needs and preferences regarding specific molecules. 8. Satisfaction with the level of information provided by medical representatives regarding specific molecules.

		<p>9. Likelihood of considering prescribing a newly introduced molecule based on recommendations or information provided by medical representatives.</p> <p>10. Value found in discussions with medical representatives regarding the benefits and considerations of prescribing specific molecules.</p>
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(Source: Authors)

The elements related to prescription (PRE), efficacy (EFF), and contact (CON), as indicated in Table 1, are assessed using a 5-point Likert scale, where 1 represents the minimum level and 5 represents the maximum level. However, sociodemographic characteristics such as gender (GEN), position (PRO), department (SERV), experience (EXP), and speciality (SPE) are nominal variables.

3.3. Statistical Tests Used

The collected data underwent a series of statistical tests to assess various aspects. Cronbach's alpha was calculated to evaluate the internal consistency of the questionnaire, while analysis of variance (ANOVA) was used to explore the relationships between sociodemographic variables and medical prescription by assessing mean differences. The chi-square test was then employed to examine the presence of significant associations between variables, with Cramer's V coefficient used to quantify the strength of these relationships. Additionally, for the 20 items concerning clinical efficacy (EFF) and contact with medical representatives (CON), an arithmetic mean was computed, and their impact was analyzed using Pearson's correlation coefficient. All these statistical analyses were conducted using SPSS Statistics 25 software.

4. Results

Table 2 shows the descriptive statistics of the healthcare professionals studied in this survey. We observe a predominance of women (n = 187, 70%) compared to men (n = 80, 30%). Table 2 also indicates that the respondents include physicians (n = 127, 47.57%), dentists (n = 82, 30.71%), and 58 pharmacists (21.72%). Among the 267 healthcare professionals, 118 work in a regional hospital (44.19%), and 59 work in a health center (22.10%). Furthermore, the majority of respondents (n = 122, 45.69%) have 10 to 19 years of experience, 62 professionals have more than 20 years of experience, and 83 have less than 10 years of experience (31.09%). Regarding speciality, the number of specialists (n = 104, 38.95%) is lower than the number of non-specialists (n = 163, 61.05%).

Table 2: Descriptive statistics of HCPs

Variable	Indicator	Frequency	Percentage (%)
Gender	Male	80	30.0
	Female	187	70.0
Function	Dentist	82	30.71
	Doctor	127	47.57
	Pharmacist	58	21.72
	Hemodialysis center	5	1.87
Location			

	Diagnostic center	8	3.00
	Health center	59	22.10
	Dental center	16	5.99
	Regional hospital center	118	44.19
	Day clinic	37	13.86
	Local medical center	24	8.99
Experience	1 - 9 years	83	31.09
	10 - 19 years	122	45.69
	More than 20 years	62	23.22
	General practitioner	163	61.05
Specialty	Specialist	104	38.95

(Source: Authors, by SPSS)

The reliability of the questionnaire as a whole and its specific components is remarkably high, as illustrated in Table 3. The overall Cronbach's alpha of the questionnaire is 0.842, indicating high internal reliability. Regarding the items related to clinical efficacy and drug safety, the alpha reaches 0.916, demonstrating high internal reliability as well. Similarly, the internal reliability of items related to the CON variable is estimated at 0.954, well exceeding the acceptable threshold. As for the dependent variable its alpha shows very high reliability of 0.913.

Table 3: Internal consistency of the items

Variable	Cronbach's Alpha	Number of items
Prescribing behavior	0.913	5
Clinical effectiveness and drug safety	0.916	10
Contact with medical representatives	0.954	10
Questionnaire	0.842	28

(Source: Authors, by SPSS)

Table 4 presents the results of the ANOVA test comparing the means of different variables with respect to prescription behaviour. For the gender variable, the test shows no significant difference, with a Fisher's F score of 1.999 and a p-value of 0.159, indicating that gender has no significant effect on prescription behaviour. The same observation applies to clinical efficacy ($F = 0.027$, $p\text{-value} = 0.869$). However, for the profession ($F = 28.789$, $p\text{-value} < 1\%$), workplace ($F = 6.909$, $p\text{-value} < 1\%$), professional experience ($F = 10.428$, $p\text{-value} < 1\%$), speciality ($F = 24.402$, $p\text{-value} < 1\%$), and contact with medical representatives ($F = 9.678$, $p\text{-value} < 1\%$), the ANOVA tests reveal significant differences with p-values less than 0.05. This suggests that these variables have a significant impact on the prescription behaviour of healthcare professionals. Specifically, workplace, professional experience, speciality, and contact with medical representatives appear to be important factors influencing prescription behaviour.

Table 4: Mean comparison – ANOVA's test

Variable	Prescribing behavior	
	Fisher's F	p-value
Gender	1.999	0.159
Profession	28.789	<1%
Place	6.909	<1%
Years of experience	10.428	<1%
Specialty	24.402	<1%
Clinical effectiveness and drug safety	0.027	0.869
Contact with medical representatives	9.678	<1%

(Source: Authors, by SPSS)

The Fisher's F score of 1.999 and a p-value of 0.159 indicate that gender has no significant effect on prescription behavior. The same observation applies to clinical efficacy (F = 0.027, p-value = 0.869). However, for the profession (F = 28.789, p-value < 1%), workplace (F = 6.909, p-value < 1%), and professional experience. These results are similar to studies conducted on the influence of demographic factors (Lam et al., 2003; Price et al., 2021; Sharifnia et al., 2018) and support from medical representatives (Albarq & Suleiman, 2021; Khazzaka, 2019; Workneh et al., 2016).

Table 5: Degree of association between sociodemographic factors and prescribing behaviour

Variable	Prescribing behavior		
	Chi-square	Cramer's V	p-value
Gender	15.553	0.241	0.485
Profession	84.950	0.399	<1%
Place	112.582	0.265	0.119
Years of experience	64.700	0.348	<1%
Specialty	37.564	0.375	<1%

(Source: Authors, by SPSS)

Table 5 indicates that the gender variable does not seem to have a significant impact on prescription behaviour (Chi-square = 15.553, Cramer's V = 0.241, p-value = 0.485), indicating that this sociodemographic element of healthcare professionals does not appear to be a determining factor in their prescription choices. In contrast, the profession variable shows a significant association with prescription behaviour (Chi-square = 84.950, Cramer's V = 0.399, p-value <1%). This suggests that individuals' professions, whether they are dentists, physicians, or pharmacists, can influence their decisions regarding medical prescriptions. The workplace variable has no significant impact on prescription behaviour (Chi-square = 112.582, Cramer's V = 0.265, p-value = 0.119), indicating that the establishment where healthcare professionals practice does not seem to play a major role in their prescription choices. This result contradicts the conclusions raised by Kamuhabwa and Kisoma (2015). Regarding years of experience, there is a significant association with prescription behaviour (Chi-square = 64.700, Cramer's V = 0.348, p-value <1%), suggesting that professional experience can influence individuals' prescription decisions. Similarly, the speciality variable shows a significant association with prescription behaviour

(Chi-square = 37.564, Cramer's V = 0.375, p-value <1%), suggesting that the speciality of healthcare professionals can also influence their choices regarding medical prescription. These results highlight the importance of considering various sociodemographic and professional factors when analyzing the prescription behaviour of healthcare professionals.

Table 6: Pearson's correlation with prescribing behavior

Variable	Pearson's coefficient	p-value
Clinical effectiveness and drug safety	0.010	0.869
Contact with medical representatives	-.190	<1%

(Source: Authors, by SPSS)

Furthermore, the analysis of the EFF and CON variables, corresponding to the average of the 20 items in the questionnaire regarding the aspects, demonstrates that clinical efficacy and drug safety do not have a significant influence on prescription behaviour ($r = 0.010$, p-value = 0.869), as illustrated in Table 6. However, contact with medical representatives leads to a significant relationship ($r = -0.190$, p-value < 1%), which corresponds to the conclusions drawn by Al-Areefi and Hassali (2013), Albarq and Suleiman (2021), Khazzaka (2019), and Workneh et al. (2016). However, the negative sign of the coefficient informs us about the nature of the relationship. This negative correlation suggests that the more frequent the contact with medical representatives is, the less favourable the prescription behaviour is towards prescribing certain medications.

5. Conclusion

Medical prescription, a crucial act of healthcare professionals, varies according to individual drug preferences. Research has thus focused on prescription behaviours to better understand this process. Sociodemographic factors, such as age, gender, scope of practice, and speciality, have been scrutinized (Lublóy, 2014; Lam et al., 2003; Klau et al., 2023; Horwood et al., 2016). For example, physicians may overprescribe antibiotics for various reasons, including patient satisfaction and medicolegal concerns (Lam et al., 2003). Clinical efficacy and drug safety are also determining factors (Rezal et al., 2015; Murshid et al., 2019; Wallace et al., 2020; Molina et al., 2022; Hogan et al., 2023).

The marketing practices of the pharmaceutical industry, particularly interactions with medical representatives, also influence prescription decisions (Wazana, 2000; Al-Areefi & Hassali, 2013; Khazzaka, 2019; Albarq & Suleiman, 2021; Workneh et al., 2016). This dynamic between healthcare professionals and pharmaceutical companies raises questions of ethics and professional independence (Solomon et al., 2012; Carter et al., 2021; Sharifnia et al., 2018; Price et al., 2021). By analyzing these various aspects, researchers have shed light on the multiple determinants underlying medical prescription practices, thereby offering valuable insights to improve rational drug use and guide health policies (Atia et al., 2022; Al Thabbah et al., 2022; Kamuhabwa & Kisoma, 2015; Meenakshi et al., 2022; Sharma et al., 2023; Mohanty et al., 2010).

Our study, while contributory, also has limitations. We did not integrate all relevant variables in our analysis, such as the influence of drug costs or the availability of therapeutic alternatives. For instance, financial accessibility may play a major role in prescription decisions, especially in contexts where patients have limited resources. Additionally, we did not deeply explore patients' perceptions of prescribed medications, which could have provided additional insights into prescription practices. Finally,

the geographical scope of our study is limited to Rabat, which restricts the generalization of our results to other medical contexts.

Despite these limitations, our research paves the way for future investigations aimed at deepening our understanding of the determinants of medical prescription practices. By integrating more variables and expanding the geographical scope of the study, we could better grasp the complexities of this process and propose more targeted interventions to promote more informed and rational prescriptions. Furthermore, by considering patients' perspectives, we could develop more effective communication strategies between healthcare professionals and their patients, thereby fostering more collaborative and patient-centred prescription decisions. In summary, our research represents an important step in understanding medical prescription behaviours, but it calls for continuous and thorough exploration to address the complex challenges of modern clinical practice.

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Carbon Footprints and Income Inequality: A Panel Data Analysis of the 66 Largest Carbon-Emitting Nations

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Abstract. *In this study, we delved into the complex interaction between carbon emissions and critical economic and environmental factors using Two-step Sys-GMM Dynamic Panel Data Estimation. Our comprehensive dataset encompassed 66 major carbon-emitting nations spanning 1990-2020, providing a robust analytical foundation. Our key findings revealed a noteworthy positive relationship between income inequality, as measured by the Gini index, and carbon emissions across all models. This implies that higher income inequality is linked to increased carbon emissions, possibly due to consumption disparities and resource utilization. Furthermore, the relationship between income and emissions displayed intriguing dynamics. While income per capita exhibited a positive association with emissions, suggesting that growing economies tend to emit more, the squared income per capita variable showcased an inverted U-shaped pattern. This suggests that emissions increase at a diminishing rate as income levels reach a certain threshold, aligning with the Environmental Kuznets Curve hypothesis. Surprisingly, we observed that rising income inequality contributed to long-term carbon reduction, hinting at potential shifts in consumption behavior driven by environmental policies as nations develop. Our analysis also highlighted the roles of energy consumption and urbanization in elevating emissions, emphasizing the need for energy efficiency and sustainable urban planning. Conversely, a higher share of renewable energy was linked to reduced emissions, underscoring the urgency of transitioning to cleaner energy sources. Furthermore, net foreign direct investment and international trade exhibited positive associations with carbon emissions, emphasizing the environmental consequences of globalization. Our research underscores the potential of targeted policies addressing income inequality to promote social equity while reducing emissions. Striking a balance between economic growth and environmental sustainability remains crucial, given the intricate dynamics between income and emissions.*

Keywords: Carbon footprint, CO2 emission, income inequality, Sys-GMM .

JEL Codes: C33, Q56, Q52, O15.

1. Introduction

The first industrial revolution, which started in England in the 18th century and soon had its effects all over the world, pushed countries into economic growth models that included more production and consumption. By the end of the 19th century, mass production became widespread, and with the developments in technology, production became mechanized in many countries and production levels increased greatly. Although economic models based on production and consumption have increased welfare in many countries, these welfare levels have created environmental side effects that the world cannot overcome. Carbon emissions, the most basic indicator of environmental damage, reached around 20 billion cubic meters in the late 1980s, from 4.85 billion cubic meters in 1940 (Statista, 2023). These side effects, which could no longer be tolerated after many years of unconscious production around the world, finally attracted the attention of policy makers in 1987, and it was emphasized in Our Common Future that the resources to be left to future

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generations were at great risk. With the Rio Conference held in 1992, the concept of "sustainable development" began to be accepted by all countries and international organizations as a common language. After this period, the concept of sustainable development went far beyond environmental factors and drew a new development model that included economic, social and institutional issues.

Although the dimensions of sustainable development mentioned above may seem like separate issues at first glance, it is very difficult to say that a sustainable world model that does not achieve success in all its dimensions can be successful. Based on this understanding, the United Nations put forward 17 Sustainable Development Goals in 2015. These targets, signed by 191 member countries, are aimed to be achieved by 2030. One of these goals, which includes the three dimensions of sustainable development, economic, social and corporate sustainability, is to reduce carbon emissions to zero all over the world. Aligned with this objective, the United Nations has extended invitations not only to government officials but also to companies and individuals, urging collective action toward this shared goal. A global consensus is evident as stakeholders universally acknowledge the imperative of reducing carbon emissions. The imposition of additional taxes on carbon emissions and government support for sustainable energy resources are instrumental in motivating companies to curtail their carbon footprint. The European Green Deal, a recent commitment by the European Union, stands as a significant initiative geared towards achieving zero carbon emissions by 2050. Noteworthy global companies, including Disney, General Motors, Delta Airlines, Alphabet, Cemex, and Microsoft, have made substantial investments in recent years to mitigate their carbon footprint (Hope, 2022). Despite a seemingly shared awareness and concerted efforts towards sustainable development and carbon reduction, it remains challenging to observe a corresponding decline in emission rates. Notably, global carbon emissions were 35.56 billion metric tons in 2015, when the United Nations set the zero-emission target, and this figure climbed to 37.49 billion metric tons in 2022 (Statista, 2023). The most significant declines in carbon emissions occurred in 2009 and 2020. Consequently, there is a hesitancy to assert a transformative shift towards more sustainable global production models. Emission rates tend to rise during periods of increased economic activity and decrease during economic contractions.

In economic literature, the correlation between economic growth and environmental degradation was initially introduced through the Environmental Kuznet Curve hypothesis. This hypothesis posits that during the initial phases of economic development, economic growth has an adverse impact on the environment; however, as income levels rise, this effect is reversed. The empirical evidence supporting this hypothesis, tested across numerous countries over many years, exhibits significant variations. For instance, Narayan et al.'s (2016) analysis of 181 countries confirmed the hypothesis in only 21 nations. Significantly, the inclusion of high-income nations such as the USA, Japan, and Germany among those with the highest carbon emissions questions the assumption that a rise in income necessarily leads to a reduction in carbon emissions (Worldometers, 2023). Contradictory findings in empirical studies have prompted skepticism about the validity of the inverted U-shaped curve. According to some researchers, the hypothesis has recently lost its relevance, with environmental impacts now being influenced more by variations in income distribution than by the overall income levels of countries. In other words, as income inequality increases, the reducing effect of economic growth on carbon emissions has begun to disappear (Wang et al., 2023).

Considering the elimination of both domestic and intercountry income inequalities, which is among the sustainable development goals of the United Nations, understanding the complex relationship between carbon emissions and income inequality, which is among the environmental goals, will be an element that will reshape social and environmental policies that will ensure income equality. Although there is a consensus in the literature that economic growth will cause environmental degradation by increasing carbon emissions, there is no consensus yet on how income distribution affects carbon emissions. Ravallion et al. (2000) were among the first to empirically analyze the relationship between carbon emissions and income inequality and showed that

income inequalities both within and between countries will lead to significant differences in carbon emissions. However, Borghesi (2006) and Jorgenson et al. (2017) obtained different results. The main motivation of this study, which attempts to reveal the intricate relationship between income inequality and carbon emissions for 66 countries, stems from the lack of consensus on the relationship between the two variables in the literature. The fact that the world's natural resources are not distributed fairly to all countries is a fact that economists and policy makers cannot find a solution to. However, consuming these resources fairly can reduce environmental damage and also has the potential to distribute income fairly. In this context, the study aims to provide important clues to policy makers for both designing environmental policies and creating a more just society.

2. Review of Literature

The idea put forth by Simon Kuznet in 1955 forms the basis of the theoretical relationship between environmental deterioration and income inequality. Based on the relationship between economic growth and income inequality, Kuznet argued that there will be deteriorations in income inequality in the early stages of economic growth, but as the later stages of economic growth progress, income inequality will be positively affected by this situation. In the early 1990s, when economic growth accelerated in all countries due to globalization, Grossman and Krueger (1993) brought a new perspective to this hypothesis. Researchers who observed that rapid increases in economic growth rates lead to environmental degradation have associated Kuznet's hypothesis with the environmental dimension. According to this model, which entered the literature as the Environmental Kuznets Curve (EKC), there is a U-shaped relationship between environmental degradation and income inequality. In other words, according to this hypothesis, carbon emissions will increase in the early stages of economic growth, deteriorating environmental quality, but this situation will reverse as per capita income increases. Therefore, continued economic growth at high-income levels will have an improving effect on environmental factors. Selden and Song (1994) delineated this process as one in which environmental pollution initially surges but subsequently declines. The adoption of more advanced techniques in agriculture and industrial growth is initially linked to an uptick in environmental pollution. However, factors such as positive income elasticities related to environmental quality, shifts in production and consumption patterns, heightened education levels, and increased environmental awareness are expected to contribute to a reduction in environmental pollution over time. Empirical studies in the literature primarily focus on testing the EKC hypothesis to explore the relationship between environmental factors and income inequality.

Carrying out one of the pioneering empirical studies in the literature, Ravallion et al. (2000) analyzed data from 42 countries for the period 1975-1992 with the pooled OLS method and revealed that there is a static balance between reducing carbon emissions and reducing income inequality. The results of Borghesi (2006), who analyzed the period 1988-1995 for 37 countries, gave different results depending on the methods. While the analysis results did not reveal a significant result between income inequality and carbon emissions according to the fixed effects estimator, the pooled OLS estimator revealed a statistically significant and negative relationship between income inequality and carbon emissions.

The issue of sustainability has become more prevalent in government and company agendas since the late 2000s, which has led to further research on the subject in academia. It is seen that most of the single-country analyzes in the literature focus on the USA and China, which produce the most emissions. Jorgenson et al. (2017), who conducted a state-level analysis for the USA, examined the carbon emission- income inequality nexus, taking into account the 10% group with the largest share of income and the Gini coefficient. In the study using longitudinal analysis for the period 1997-2012, it was observed that while there was a positive relationship between the 10% segment receiving the highest share of income and emissions, this relationship did not appear in the Gini coefficient. The result of the study showed that a more equitable income distribution

resulting from the shift of the poor to the middle class will not trigger the consumption of carbon-intensive products. In another study conducted at the state level in the USA, Liu et al. (2019) used ARDL and quantile regression models to show that high-income inequality initially increases carbon emissions, but this effect is reversed in the long run. Notably, states with higher per capita emissions experienced a more pronounced reduction in carbon emissions with increased income inequality. Sager (2019), who examined the income inequality-emission nexus for US households using input-output analysis and Environmental Engel Curves (EEC), found that income was a significant driver of carbon emissions during the 1996-2009 period. The researcher predicted that emissions could increase by 2.3% in case of a complete redistribution of income distribution and emphasized this situation as the "equal-pollution dilemma". On the other hand, Uzar and Eyüboğlu (2023), who analyzed the period 1965-2017 for the USA using Fourier ARDL and Fourier ADL methods, showed that income inequality improves environmental quality. Yang et al. (2023), who recently conducted research in the USA and France, revealed interesting results utilizing wavelet decomposition and Quantile-on-Quantile techniques. In France, income inequality negatively affected carbon emissions in periods of low-income inequality, while this effect turned positive in periods when income inequality increased. Similarly, in the USA, the emission-increasing effect of deepening income inequality has gradually reversed.

Liu et al (2020), one of the first to investigate the relationship between income inequality and household carbon emissions in China, found a strong positive relationship between the two variables using nationwide micropanel data. According to the findings, household carbon emissions are higher in counties with greater income inequality. Liao et al. (2023), studying 17 provinces in China, showed that carbon emissions per capita decreased with the improvement of income inequality in the period from 2015 to 2017. The study by Liang et al. (2023), in which they investigated the effects of different income groups and consumption categories on per capita carbon footprint in China, concluded that high-income households should reduce their consumption expenditures in order to reduce carbon emissions.

Idress and Majeed (2022), who conducted research on Pakistan, investigated the complex interaction between income distribution, environmental quality and financial development by examining the period 1972-2018. In the study questioning the validity of the Extended Environmental Kuznet Curve (EKC), it was revealed that income inequality and financial development increase environmental pollution. Based on the findings, The EKC hypothesis was not confirmed for Pakistan.

When recent studies in the literature are examined, it is seen that multi-country analyzes are also increasing. Grunewald et al. (2017)'s analysis covering 158 countries aimed to reveal the relationship between income inequality and carbon dioxide emissions per capita. The study, covering the period 1980-2008, concluded that high-income inequality reduces carbon emissions in low- and middle-income countries, while increased income inequality triggers carbon emissions in upper-middle and high-income economies. Mittmann and De Mattos (2020), who conducted research on Latin America, similarly claimed that income levels would be decisive in the impact of income inequality on per capita carbon emissions. Analyzing data from 2006 to 2017 across 18 developing economies in Asia, Khan and Yahong (2021) established a causal connection between income inequality and environmental vulnerability. Belaïd et al. (2022) investigated the driving forces influencing short- and long-term CO₂ emissions patterns in 11 Mediterranean economies from 1990 to 2012. In the analysis employing a dynamic ARDL model, it was observed that while the connection between income inequality and emissions appeared positive in the short term, this association reversed to a negative trend over the long term. Ehigiamusoe et al. (2022) investigated 70 countries with different income levels. The empirical results revealed that both carbon emissions and ecological footprint increased with higher levels of income inequality and poverty across the entire dataset. Considering income groups separately, income inequality alleviated environmental impact in high-income countries but exacerbated it in middle-income countries. Testing the Environmental Kuznets Curve (EKC) hypothesis for 56 countries, Wang et al. (2023) investigated

how income inequality affects economic growth and carbon emissions, especially during the COVID-19 period. Empirical results have shown that the inverted U-shaped Environmental Kuznets Curve has transformed into an N-shaped curve. According to the findings, economic growth in periods of low income inequality worsens carbon emissions, while growth accompanying high income inequality suppresses carbon emissions. It has been determined that this effect is especially evident in countries belonging to high income groups. In a recent study, Hou et al. (2024) employed a Multi-Regional Input-Output model to investigate the dynamic interplay between economic growth, income inequality, and carbon footprint across 43 major economies from 1995 to 2019. The research assessed consumption-based carbon footprints and explored the moderating role of income inequality, measured by the Gini coefficient, on the relationship between GDP per capita and CO₂ per capita. The findings revealed that a more equitable income distribution, reflected in a lower Gini coefficient, significantly facilitated the decoupling of economic growth from carbon footprint.

3. Empirical Analysis

In this section, we describe the empirical framework and methodological approach employed in our study. The objective of this research is to systematically investigate the relationship between carbon emissions and income inequality across a panel of 66 countries that renowned for their substantial carbon emissions. We selected 66 countries based on their significant contribution to global carbon emissions. These countries collectively account for approximately 80% of the world's total emissions. This selection ensures that our analysis captures the majority of global carbon emissions. It provides a comprehensive understanding of the factors influencing these emissions. The chosen countries vary in economic development, industrial activities, and income levels. This makes them representative of different profiles relevant for studying the impact of income inequality on carbon emissions. We included developed nations with high GDP per capita, significant industrial activities, and well-documented environmental policies. Emerging economies experiencing rapid growth and industrialization are also included. Additionally, developing countries with notable contributions to global emissions due to specific sectors or population size are part of the study. This diversity allows us to examine the interaction between income inequality and carbon emissions across different economic contexts.

The analysis spans from 1990 to 2020. This allows us to examine the temporal dynamics of carbon emissions and income inequality. The dataset covers 66 major carbon-emitting nations during this period. Extending the dataset to 2023 is not feasible due to several constraints. Data for these years are not yet fully available or verified. Ensuring their reliability is crucial. Additionally, our balanced panel data structure requires complete data across all years and countries; incomplete data for 2021-2023 would compromise this.

The COVID-19 pandemic significantly impacted these years, causing disruptions in economic activity and emissions patterns, which could introduce anomalies and biases. The period from 1990 to 2020 provides a comprehensive view of long-term trends, including critical phases of economic growth, technological advancements, and policy changes. We acknowledge the limitation of not including the most recent years and suggest that future research extend the analysis as more data becomes available.

Our analysis incorporates a set of key variables, each meticulously chosen to capture critical dimensions of the carbon emissions and income inequality nexus. These variables include CO₂ emissions in kilotons (kt) as a vital indicator of a nation's environmental impact, the Gini index to quantify income inequality within each nation, GDP per capita in constant 2015 US dollars as a proxy for economic growth, energy consumption per GDP (in 1000 Btu/2015\$ GDP PPP) to gauge energy efficiency, renewable energy share as the proportion of modern renewables in total final energy consumption, urban population figures to provide demographic insights, FDI net inflows as a percentage of GDP to illuminate economic globalization, and international trade in goods and services in constant local currency units to emphasize economic dynamics. FDI can lead to

increased industrial activities and economic growth, potentially elevating emissions. However, it can also bring cleaner technologies and practices, reducing emissions. The relevance of FDI is twofold: it promotes technology transfer, improved industrial practices, and economic growth, but it can also lead to increased emissions due to higher production levels.

3.1. Methodology

The study utilizes a methodology based on advanced econometric techniques to examine the relationship between carbon emissions and income inequality. The System Generalized Method of Moments (Sys-GMM) estimation is employed in order to effectively handle endogeneity concerns, incorporate unobservable heterogeneity, and minimize potential biases. This approach ensures the integrity and validity of our empirical results. This enables us to discover enduring patterns and reveal relationships that may not be apparent through traditional cross-sectional or time-series analyses.

Before conducting the Dynamic Panel-Data Two-Step Sys-GMM estimations, a series of preliminary tests were conducted to ensure the robustness and reliability of the empirical model. The analysis commenced with a correlation analysis in order to ascertain the relationships between the key variables. This allowed us to gain an understanding of the basic associations and identify any potential issues related to multicollinearity. Descriptive statistics were calculated to summarize the central tendencies, dispersion, and overall distribution of the data, with the purpose of identifying any anomalies that could potentially impact the analysis.

We also conducted tests for slope homogeneity and cross-sectional independence to assess if the regression slopes were consistent across different cross-sections and to check for cross-sectional dependence in the panel data. Additionally, Pesaran (2003) CADF, Pesaran (2007) CIPS, and Karavias and Tzavalis (2014) unit root tests were performed to verify the stationarity of the variables in order to ensure the suitability of our panel data series.

Identifying the presence of individual and time effects within the models was crucial for selecting an appropriate panel data model. We employed tests to assess the validity of these effects. This informed our choice of model and confirmed the presence of individual effects. These findings guided our decision to use Sys-GMM.

In order to validate the fundamental assumptions of our model, a series of tests were performed to assess heteroskedasticity, autocorrelation, and endogeneity. The test results revealed the existence of heteroskedasticity, autocorrelation, and endogeneity among the variables, which provides a rationale for employing the System Generalized Method of Moments (Sys-GMM) technique.

The preliminary tests were conducted to ensure the robustness and suitability of our dataset and chosen methodology for analyzing the dynamics between carbon emissions and income inequality. By addressing the fundamental econometric concerns, we have established a strong foundation for the subsequent analysis of dynamic panel-data. This approach has significantly improved the reliability and validity of our empirical findings.

3.2. Model Specification

Within the model framework, Table 1 provides a full compilation of the variables used in the model, along with their corresponding abbreviations and representations.

Table 1. Variables

Variable	Notation	Proxy
Carbon Emissions	CO2	CO ₂ emissions (kt)

Income Inequality	GINI	Gini index
Income per Capita	GDP	GDP per capita (constant 2015 US\$)
Energy Consumption	ENC	Energy consumption per GDP (1000 Btu/2015\$ GDP PPP)
Renewable Energy Share	RES	Share of modern renewables in total final energy consumption (%)
Population	POP	Urban population
Foreign Direct Investment	FDI	Foreign direct investment, net inflows (% of GDP)
International Trade	TRD	Trade of goods and services (constant LCU)

Source: World Bank, International Energy Agency

The data set of "renewable energy share" has been extracted from the database of the International Energy Agency, while data pertaining to other series has been compiled from the database of the World Bank. The dataset spans from 1990 to 2020.

Before delving into the empirical findings, it's essential to understand the structural framework of our analysis. The main goal of our study is to investigate the complex links between carbon emissions (CO₂) and a specific group of socio-economic and environmental factors. The basis of this investigation is the understanding that these factors collectively impact carbon emissions. In order to examine this hypothesis, the functional equation is formulated as follows:

$$CO_2 = f(GINI, GDP, ENC, RES, POP, FDI, TRD) \quad (Eq. 1)$$

Equation 1 illustrates the complex relationship between carbon emissions (CO₂), income inequality (GINI), per capita income (GDP), energy consumption per GDP (ENC), renewable energy share (RES), urban population (POP), foreign direct investment (FDI), and international trade (TRD). Our objective is to explore intricate observations on the relationship between income inequality, economic growth, energy consumption, environmental sustainability, and population dynamics in relation to carbon emissions.

The functional expression of the model in Equation 1 may be converted into the empirical model specification, as seen in Equation 2. We will now start the analysis of this equation, which serves as the fundamental basis for our empirical investigation.

$$LnCO_{2it} = \phi LnCO_{2it-1} + \beta_1 lnGDP_{it} + \beta_2 (lnGDP_{it})^2 + \gamma Z'_{it} + \theta X'_{it} + \mu_i + \phi_t + e_{it} \quad (Eq. 2)$$

t (year): 1990...2020; i(country): 1...66

Equation 2 represents a dynamic panel data model that investigates the relationship between carbon emissions and several explanatory variables, including income per capita and its squared term, control variables, and time-varying covariates. It accounts for both country-specific fixed effects and time-specific effects to better capture the underlying dynamics of carbon emissions across countries and over time. The system GMM estimation technique is used to address potential endogeneity and measurement error issues commonly encountered in panel data analysis.

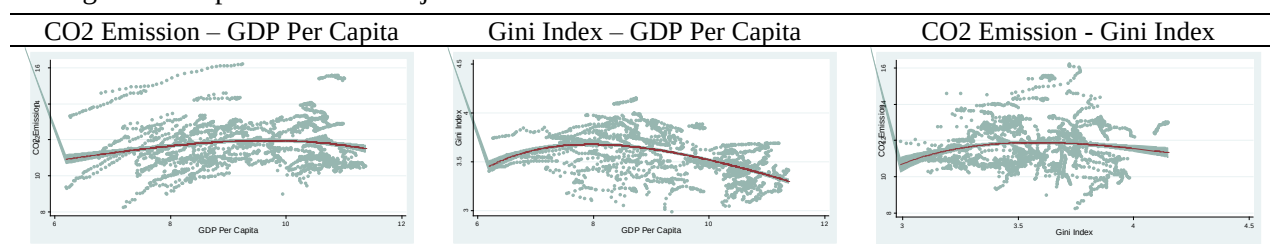
The model considers CO₂ as the dependent variable, whereas s represents the natural logarithm of CO₂ at time 't' for country i. It's a measure of carbon emissions in a given year for a specific country. " $\phi LnCO_{2it-1}$ " is the lagged value of CO₂ in the previous time period (it-1). Lagged variables are often used in dynamic panel models to capture the effect of past values on the current outcome. " $\beta_1 lnGDP_{it}$ " represents the linear effect of the natural logarithm of GDP per capita at time 't' on CO₂. It measures how changes in income per capita influence carbon emissions. " $\beta_2 (lnGDP)^2$ " represents the squared effect of the natural logarithm of GDP per capita at time 't' on CO₂. The inclusion of the squared term allows for a nonlinear relationship between income per capita and carbon emissions, potentially capturing the Environmental Kuznets Curve (EKC) effect. " $\gamma Z'_{it}$ " Are control variables represented by the vector Z'_{it} . These variables can include factors that are expected to influence CO₂ but are not the primary focus of the analysis. The vector " γ " represents the coefficients

associated with these control variables. " $\theta X'_{it}$ " are time-varying covariates represented by the vector X'_{it} . These variables are assumed to vary across time periods and countries. The vector " θ " represents the coefficients associated with these covariates. " μ_i " are individual (country) fixed effects. They capture unobservable country-specific characteristics that are constant over time but may influence carbon emissions.

" ϕ_t " are time effects or time fixed effects. They capture unobservable time-specific factors that affect carbon emissions but are common to all countries. Time effects account for changes in carbon emissions over time that are consistent across all countries. " e_{it} " is the error term or residual. It represents unexplained variation in carbon emissions that is not accounted for by the model's independent variables, fixed effects, or time effects.

Prior to conducting the empirical analysis, it is essential to visually inspect the relationships between the key variables that are the focal point of our research. Figure 1 depicts the potential correlations between CO2 emissions and GDP per capita, Gini Index and GDP per capita, and CO2 emissions and Gini Index. The initial visualizations offer valuable insights into potential relationships, trends, and variations within our dataset.

Figure 1. Graph of selected major variables



Upon a first analysis of the graph illustrating the correlation between CO2 Emission – GDP Per Capita, it becomes apparent that there exists a positive association between income levels and CO2 emissions up to a certain threshold. Nevertheless, once income above this threshold, there is a subsequent decline in CO2 emissions. The observed association between CO2 Emission – GDP Per Capita, which exhibits an inverted U-shaped pattern, aligns with the theoretical framework of the Environmental Kuznets Curve. Upon analysis of the graph depicting the relationship between the Gini Index and GDP Per Capita, it becomes evident that a comparable pattern is discernible. Within a specific threshold, the augmentation of income has a tendency to exacerbate income inequality. However, once income surpasses this threshold, further increases in income have a favourable effect on the fairness of income distribution. The CO2 Emission - Gini Index graph likewise exhibits the same tendency. Although visual interpretations may not provide conclusive solutions, they serve to illuminate our uncertainties and guide our focus towards key components in the following analysis.

Table 2. Correlation Matrix

Variable	CEM	GINI	GDP	GDP2	ENC	POP	RES	FDI	TRD
CO2	1								
GINI	0.035	1							
GDP	0.085	-0.434	1						
GDP2	0.078	-0.449	0.998	1					
ENC	0.295	-0.276	0.186	0.173	1				
POP	0.813	0.298	-0.310	-0.310	-0.118	1			
RES	-0.097	-0.004	0.164	0.162	-0.295	0.011	1		
FDI	-0.102	-0.068	0.157	0.152	0.014	-0.150	0.125	1	

TRD	0.376	0.159	-0.220	-0.217	-0.085	0.478	-0.061	-0.063	1
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Table 2 presents a correlation matrix displaying the pairwise relationships between variables in the empirical model. The numbers in the table represent correlation coefficients. GINI shows a very weak positive correlation (approx. 0.035) with carbon emissions, implying a subtle positive link between income inequality and emissions. GDP exhibits a positive correlation (approx. 0.085) with carbon emissions, signifying a positive but relatively weak connection. ENC demonstrates a moderate positive correlation (approx. 0.295) with carbon emissions, indicating a moderate association between energy consumption and emissions. RES displays a weak negative correlation (approx. -0.097) with carbon emissions, suggesting that higher shares of renewable energy are linked to slightly lower emissions. POP reveals a robust positive correlation (approx. 0.813) with carbon emissions, indicating a strong connection between population and emissions. As population increases, emissions tend to rise significantly. FDI shows a weak negative correlation (approx. -0.102) with carbon emissions, indicating a mild negative link between foreign direct investment and emissions. TRD exhibits a moderate positive correlation (approx. 0.376) with carbon emissions, implying a moderate positive relationship between international trade and emissions. As international trade increases, emissions tend to increase as well.

The presence of correlation between variables does not necessarily indicate a causal relationship, and the magnitude of these associations can differ across various contexts. These correlations offer preliminary insights into the relationship between carbon emissions and the mentioned variables. However, additional analysis is conducted to comprehend the influence of these factors on emissions.

Table 3. Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
CO2	2046	391671.14	1070218.4	3839.2	10944686
GINI	2046	36.048	8.092	19.9	63.4
GDP	2046	19725.377	19546.425	493.095	87123.66
ENC	2046	5.608	3.423	.937	27.837
POP	2046	43166749	88220068	409813	8.668e+08
RES	2046	11.346	11.94	-79.327	62.37
FDI	2046	3.405	6.689	-40.086	106.594
TRD	2046	2.049e+14	9.681e+14	2.207e+09	9.296e+15

Table 3 shows the descriptive statistics. The dataset consists of 2046 observations for various economic and environmental variables. Notably, the mean CO2 amount to approximately 391,671 kilotons, with a considerable standard deviation of 1,070,218.4, indicating substantial variation across countries or regions. Income inequality, measured by the Gini index, exhibits an average value of 36.048, reflecting moderate disparities in income distribution. Income per capita (GDP) shows a mean of 19,725 constant 2015 US dollars, although with notable dispersion (standard deviation of 19,546). Energy consumption per GDP (ENC) has a moderate mean of 5.608, while the urban population (POP) ranges widely from 409,813 to 866,800,000. The share of renewable energy (RES) reveals an average of 11.346%, and foreign direct investment (FDI) averages 3.405% of GDP. International trade (TRD) is substantial, with a mean of 2.049e+14 constant local currency units, yet showing substantial variation (standard deviation of 9.681).

3.3. Findings

Testing slope homogeneity is crucial to choose the proper unit root test and panel data estimator. Assuming that the coefficients are homogeneous while heterogeneous causes biased results. Table 4 presents the results of tests related to slope homogeneity and cross-section independence. These tests are essential in panel data analysis to assess whether the relationships between variables are consistent across different entities (cross-sectional units) and whether there is any dependence between these entities.

Table 4. Slope Homogeneity and Cross-section Independence Tests

CD Tests				Homogeneity	
CD	CDw	CDw+	CD*	Delta	Swamy S (χ^2)
11.22*	-0.14	1861.37*	9.27*	9.725*	4.0e+05*

Note: * $p < .01$, ** $p < .05$

CD Tests

CD: This test statistic, with a value of 11.22, is used to assess cross-sectional dependence in the panel data. It is taken from Pesaran's work in 2015 and 2021. The p-value associated with this test is less than 0.01, indicating strong evidence against the null hypothesis of weak cross-sectional dependence. This suggests that there is a significant degree of cross-sectional dependence among the entities in the panel.

CDw (CD with Weights): This test statistic, at -0.14, is derived from Juodis and Reese's research in 2021. It doesn't indicate a significant departure from the null hypothesis of weak cross-sectional dependence.

CDw+ (CD with Weights and Power Enhancement): This statistic, at 1861.37, is an extended version of CDw with power enhancement, based on Fan et al.'s work in 2015. The extremely high value suggests strong evidence against the null hypothesis of weak cross-sectional dependence, indicating that the panel data exhibits substantial cross-sectional dependence.

CD* (CD with Principal Components): Derived from Pesaran and Xie's research in 2021 with the use of four principal components (PCs), this test statistic is 9.27. The p-value associated with this test is less than 0.01, providing evidence against the null hypothesis of weak cross-sectional dependence.

Homogeneity Tests

Delta Test: This test statistic, at 9.725, is used for testing slope heterogeneity, specifically whether the slope coefficients are homogenous. The null hypothesis is that the slope coefficients are homogenous across cross-sectional units. The extremely low p-value ($p < 0.01$) suggests strong evidence against this null hypothesis, indicating that there is significant variation in the slope coefficients.

Swamy S (χ^2) Test: The Swamy S test statistic, with a value of 4.0, is another test for slope homogeneity. Like the Delta test, it assesses whether the slope coefficients are homogenous. The extremely low p-value ($p < 0.01$) indicates strong evidence against the null hypothesis of homogenous slope coefficients.

These tests collectively indicate significant cross-sectional dependence and heterogeneity in the slope coefficients across the entities in the panel data. This underscores the importance of accounting for these factors in our modeling and interpretation, ensuring accurate and reliable analysis.

It is essential to consider the stationarity properties of our variables because of the presence of cross-sectional dependence and heterogeneity in panel data. In order to thoroughly evaluate stationarity, we utilize unit root tests that are specifically designed to address these concerns. The following section presents the outcomes of three distinct unit root tests, each specifically designed to address the difficulties associated with cross-sectional dependence and heterogeneity.

Pesaran (2003) CADF test addresses unit roots in heterogeneous panels with cross-section dependence. It uses the mean of individual Dickey-Fuller (DF) or Augmented Dickey-Fuller (ADF) t-statistics for each unit within the panel. The null hypothesis assumes that all series are non-stationary. To mitigate cross-dependence, the standard DF (or ADF) regressions are augmented with the cross-section averages of lagged levels and first differences of individual series, resulting in the CADF statistics. Pesaran (2007) CIPS test estimates unit roots in heterogeneous panels while accounting for cross-section dependence. It provides three different deterministic specifications and considers individual dynamics. The CIPS test is particularly well-suited for panels with both cross-sectional heterogeneity and dependence. Karavias and Tzavalis (2014) test focuses on slope heterogeneity in panel data with structural breaks.

The results of these three unit-root tests, considering cross-sectional dependence and heterogeneity, are presented in Table 5.

Table 5. Unit root test

<i>Pesaran (2003)</i>		CO2	GINI	GDP	ENC	POP	RES	FDI	TRD
CADF stat.	Level	-2.22*	-1.68	-1.80	-0.63	-1.23	-1.27	-2.58*	-2.15*
CADF stat.	1 st df.	-	-2.64*	-2.46*	-2.56*	-3.42*	-2.81*	-	-
<i>Pesaran (2007)</i>		CO2	GINI	GDP	ENC	POP	RES	FDI	TRD
CIPS stat.	Level	-2.37*	-1.05	-1.66	-0.72	-1.60	-1.47	-3.39*	-1.62
CIPS stat.	1 st df.	-	-3.32*	-3.09*	-4.05*	-4.41*	-4.02*	-	-3.82*
<i>Karavias and Tzavalis (2014)</i>		CO2	GINI	GDP	ENC	POP	RES	FDI	TRD
minZ-stat.	Level	6.34	0.11	0.96	-7.74*	2.42	1.2493	-31.08*	-19.61*
minZ-stat.	1 st df.	-27.77*	-5.92*	-45.18*	-	-33.33*	-74.44*	-	-

Note: * p<.01, ** p<.05

The CADF Test in Table 5 shows that the CO2 and TRD series are stationary at levels, while the GINI, GDP, ENC, POP, and RES series are stationary after first differencing. The CIPS test results suggest that the CO2 and FDI series exhibit stationarity at levels, whereas the GINI, GDP, ENC, POP, RES, and TRD series demonstrate stationarity after first differencing. The Karavias and Tzavalis Test, which considers the presence of structural breaks, suggests that the ENC, FDI, and TRD series exhibit stationarity at levels. On the other hand, the CO2, GINI, GDP, POP, and RES series demonstrate stationarity only after applying the first differences. In conclusion, it can be inferred that all three forecasting methods exhibit cointegration levels of either I(0) or I(1) for the series.

Empirical Model Selection

Identifying the presence of individual and time effects within the models is a crucial step in selecting an appropriate panel data model. The Likelihood Ratio (LR), F, and Breusch-Pagan Lagrange Multiplier (LM) tests are employed to assess the validity of these effects. The findings are reported in Table 6.

Table 6. Test for Individual and Time Effects

	Individual Effect	Time Effect
LR	4483 (p = 0.000)	2.20 (p = 1.000)
F	421 (p = 0.000)	0.72 (p = 0.869)
LM	20398 (p = 0.000)	

Hausman Test $\chi^2(6) = 18.77$ ($p = 0.0162$)

Since the LR statistic is 4483 with a p-value of 0.000, we can reject the null hypothesis of no individual effect. This result confirms that the model contains individual-specific effects. Similar to the LR test, the F statistic of 421 with a p-value of 0.000 allows us to reject the null hypothesis that there is no individual effect. The F test provides additional evidence for the existence of individual-specific effects.

As the LR statistic is 2.20 with a p-value of 1.000, the null hypothesis of no time effect cannot be rejected. Similarly, since the F statistic is 0.72 with a p-value of 0.869 we cannot reject the null hypothesis. Therefore, no evidence exists to corroborate the existence of time effects. These results corroborate individual-specific effects rather than time effects in the panel model. The Hausman Test is employed to determine the consistent model between fixed effects (FE) and random effects (RE) models. Since the Hausman chi2 is 18.77 and the p-value is 0.0162, which is less than the significance level of 0.05, we can reject the null hypothesis and conclude that the FE model is superior to the RE model.

Table 7 displays the results of diagnostic tests conducted to evaluate the robustness and reliability of the econometric model. The purpose of these evaluations is to ensure that the model's fundamental assumptions are met and that the empirical analysis remains valid. Each test evaluates a unique aspect of the performance of the model, such as heteroskedasticity, autocorrelation, and endogeneity. The outcomes of these tests provide significant insights into the model's suitability and contribute to the comprehension of the empirical findings.

Table 7. Test Results of the Model's Basic Assumptions

Heteroskedasticity test H_0 : no heteroskedasticity	$W0 = 18.38$ $df(63, 1710)$ ($p = 0.000$)
	$W50 = 10.15$ $df(63, 1710)$ ($p = 0.000$)
	$W10 = 16.19$ $df(63, 1710)$ ($p = 0.000$)
IV Heteroskedasticity H_0 : Disturbance is homoskedastic	Pagan-Hall Stat.: 259.007 ; $\chi^2(16)$ ($p = 0.000$)
Autocorrelation Test H_0 : No Autocorrelation	DW = 0.22 < 2
	LB1 = 0.43 < 2
Endogeneity H_0 : variables are exogenous	Durbin (score) $\chi^2(1) = 6.590$ ($p = 0.0103$)
	Wu-Hausman = 6.577 ($p = 0.0104$)

The Levene, Brown, and Forsythe's Test was employed to assess the presence of heteroscedasticity in the fixed effects (FE) model. The test statistics, represented as W0, W50, and W10, were compared to the Snedecor F table using degrees of freedom (df) of (63, 1710). The comparative results led to the rejection of the null hypothesis which suggests that the variances are equal. Therefore, the results provide strong evidence supporting the presence of heteroscedasticity in the model.

The output represents the results of an instrumental variable (IV) heteroskedasticity test, which assesses whether the variance of the errors or disturbances in a regression model is constant across all levels of the independent variables. The null hypothesis assumes that the disturbances have constant variance. In this case, the Pagan-Hall test statistic, distributed as a chi-squared random variable with 16 degrees of freedom, yielded a p-value of effectively zero (0.0000). This extremely low p-value suggests strong evidence against the null hypothesis, indicating a significant departure from homoskedasticity. Thus, it implies that the model's errors do not have constant variance, highlighting the need to consider adjustments or alternative modeling approaches to account for this heteroskedasticity in the data.

The modified Bhargava et al. Durbin-Watson statistic is approximately 0.22, while the Baltagi-Wu LBI statistic is approximately 0.43. These statistics are commonly used to test for the presence of autocorrelation in a regression model's residuals. In general, a Durbin-Watson statistic significantly less than 2 and a low p-value associated with the Baltagi-Wu LBI statistic may indicate the presence of autocorrelation in the model's residuals.

The presented statistics represent tests of endogeneity, where the null hypothesis assumes that the variables in the model are exogenous, meaning they are not correlated with the error term. The results of these tests indicate otherwise. Firstly, the Durbin (score) test yielded a χ^2 statistic of 6.590 with 1 degree of freedom, resulting in a p-value of 0.0103. This low p-value provides evidence to reject the null hypothesis, suggesting that at least one of the variables in the model is likely endogenous, demonstrating a correlation with the error term. Additionally, the Wu-Hausman F-test produced an F-statistic of 6.577, along with a p-value of 0.0104. The F-test yields additional support for the rejection of the null hypothesis, indicating the presence of endogeneity within the model. Both statistical tests indicate that the model contains at least one endogenous variable, highlighting the necessity of considering this association during analysis.

Table 8 presents the key outcomes derived from our empirical analysis using the Two Step System GMM framework for dynamic panel-data estimation. The use of this advanced econometric technique allows us to examine the relationships between our main variables, while also accounting for the potential existence of endogeneity and delayed effects. Table 8 presents the estimated coefficients, t-statistics, and p-values for all variables used in the model. The aforementioned estimates provide insight into the characteristics and importance of the relationships among carbon emissions, income inequality, and the variables under consideration.

Table 8. Dynamic panel-data- Two Step Sys-GMM Estimations

LnCO2	M1 CO2	M2 LnCO2	M3 LnCO2	M4 LnCO2	M5 LnCO2
L.LnCO2	0.991* (632.7)	0.969* (402.8)	0.966* (425.5)	1.089* (124.6)	0.675* (49.75)
LnYGINI	0.0766* (47.30)	0.102* (14.07)	0.0946* (10.65)	0.201* (16.43)	0.057** (2.352)
LnYGDP5	-0.0889* (-21.27)	-0.0913* (-8.860)	-0.0733* (-4.874)	-0.280* (-11.69)	0.273* (5.936)
LnYGDP5S	0.00469* (21.22)	0.00496* (8.055)	0.00419* (4.889)	0.013* (10.84)	-0.010* (-3.709)
LnENJ2		0.0262* (16.86)	0.0169* (3.931)	-0.061* (-11.12)	0.242*** (27.10)
LnYRNE1			-0.0121* (-3.822)	-0.00254 (-0.682)	-0.019* (-2.777)
LnPOPU				-0.151* (-16.57)	0.196* (11.85)
LnFDI2					0.016* (13.63)
LnTRD					0.041* (8.876)
Constant	0.254* (13.35)	0.393* (13.74)	0.389* (9.365)	2.332* (15.93)	-2.832* (-11.40)
F	9.860*	1.030*	2.490*	1.310*	3.015*
AR(1)	-3.33*	-3.34*	-5.03*	-5.07*	-4.70*
AR(2)	-0.53	-0.52	0.20	0.18	0.66
Sargan (χ^2)	404.2*	394.5*	576.5*	442.9*	244.5*

Hansen (χ^2)	64.21	64.60	60.57	61.98	60.47
Prob > χ^2	0.365	0.319	0.419	0.336	0.318

t-statistics in parentheses * $p < 0.01$, ** $p < 0.05$,

The gradual building and testing models, as demonstrated in Table 8, is a robust and systematic way to explore the relationships between variables and assess the impact of each variable's inclusion. In this case, we started with Model 1 (M1) and successively added variables to create Models 2 through 5 (M2 to M5). This stepwise approach allows us to understand how each variable contributes to the explanation of carbon emissions (LnEM4) while controlling for various factors. Model 5 (M5) represents the final model and includes all the variables of interest. In all models, it is observed that there is a statistically significant and positive relationship between income inequality (GINI) and CO2 emissions. "When the model is extended with FDI2 and TRD to measure the impact of globalization on emissions, it is observed that the lagged CO2 coefficient decreases slightly, and the relationship between income and emissions exhibits an inverted U-shape trend, parallel to the EKC hypothesis. Model 6 represents the culmination of our investigation, encompassing all the variables mentioned in the previous models. This ultimate model offers a holistic perspective on the multifaceted dynamics governing carbon emissions among the world's largest contributors. Upon examining the estimate results of Model 5, the following conclusions are obtained:

LnEM4 (Carbon Emissions): The coefficient for LnEM4 with lag 1 (L1.) is approximately 0.675. This coefficient represents the effect of past carbon emissions on current emissions. Specifically, it suggests that a one-unit increase in the lagged value of carbon emissions is associated with an increase of approximately 0.68% in current emissions, all else being equal. This implies a strong positive autocorrelation effect, indicating that past emissions have a substantial positive influence on present emissions.

LnYGINI (Income Inequality): The coefficient for LnYGINI is approximately 0.057. This coefficient represents the effect of income inequality on carbon emissions. A one-unit increase in income inequality (measured by the natural logarithm of the Gini index) is associated with an increase of approximately 0.057% units in carbon emissions, holding other factors constant. This suggests that higher income inequality is associated with a slight increase in emissions.

The coefficient for income per capita (LnYGDP) is estimated to be approximately 0.273. The coefficient in question quantifies the impact of per capita income on carbon emissions. An incremental rise of one unit in income per capita corresponds to a roughly 0.273% increase in carbon emissions, under the assumption that all other variables remain unchanged. This indicates that carbon emissions tend to increase substantially as per capita income rises.

The coefficient for LnYGDP5S (Income per Capita Square) is approximately -0.010. This coefficient indicates a quadratic relationship between per capita income and carbon emissions. It indicates that as per capita income increases, the relationship between income and carbon emissions initially increases, but then begins to diminish as income levels rise. This suggests a U-shaped relationship inverted between per capita income and emissions.

The coefficient for LnENJ (Energy Consumption) is approximately 0.242. This coefficient illustrates the relationship between energy consumption and carbon emissions. If all other variables remain constant, a one-unit increase in energy consumption is associated with an increase of approximately 0.242% in carbon emissions. This indicates that there is a strong positive relationship between energy consumption and emissions.

The coefficient for LnPOPU (Urban Population) is approximately 0.196. This coefficient represents the effect of the urban population on carbon emissions. Keeping all other factors constant, a one-unit increase in

urban population is associated with an increase of approximately 0.196% in carbon emissions. This suggests that higher urbanization is associated with higher emissions.

The coefficient for LnYRNE (Renewable Energy Share) is approximately -0.019. This coefficient represents the effect of the proportion of renewable energy on carbon emissions. Assuming all other variables remain constant, a one-unit increase in the proportion of renewable energy is associated with a decrease of approximately 0.019% in carbon emissions. This suggests that a greater proportion of renewable energy is associated with reduced carbon emissions.

The coefficient for LnFDI (Net FDI) is approximately 0.016. This coefficient represents the impact of foreign direct investment (FDI) on carbon emissions. Assuming that all other variables remain constant, a one-unit increase in net FDI is associated with an increase of approximately 0.016% in carbon emissions. This suggests that an increase in net FDI is associated with a marginal increase in emissions.

The coefficient for LnTRD (International Trade) is approximately 0.041. This coefficient represents the effect of international trade on carbon emissions. Keeping all other factors constant, a one-unit increase in international trade is associated with an increase of approximately 0.041% in carbon emissions. This implies a positive relationship between international trade and emissions.

Arellano-Bond Tests for Autoregressive Processes: These tests evaluate the presence of serial correlation in the first differences of the dependent variable. The results indicate that there is evidence of serial correlation at the first lag (AR(1)), but no evidence of serial correlation at the second lag (AR(2)). In order for GMM (Generalized Method of Moments) estimators to be efficient, second-order correlation should not be present. Since the null hypothesis of no autocorrelation at the second-order level is not rejected, our method is deemed appropriate.

Sargan Test of Overidentifying Restrictions: The Sargan test assesses the validity of overidentifying restrictions in the model. In this case, the test statistic is highly significant ($\chi^2(56) = 244.50$), suggesting that the model's instruments are not likely to be correlated with the error terms. This is a good sign, indicating that the instruments used. In other words, it can be seen that the over-identification restrictions are not valid, indicating that the variables are endogenous.

The Hansen test is another test for the validity of instruments in an IV estimation. It assesses whether the instruments are valid under the assumption of heteroscedasticity (unequal variances) in the error term. The null hypothesis for the Hansen test is that the instruments are valid, even under the assumption of heteroscedasticity. The alternative hypothesis posits that, under this assumption, the instruments lack validity. The test statistic (χ^2) in this particular case is calculated to be 60.47, which is associated with a p-value of 0.318. Given that the p-value surpasses the predetermined significance level of 0.05, there is inadequate evidence to dismiss the null hypothesis. Based on the available evidence, it can be concluded that the instruments remain valid, even in the presence of heteroscedasticity in the error term.

4. Conclusions

This study utilized the Two-step Sys-GMM Dynamic Panel Data Estimation technique to examine the relationship between carbon emissions and various economic and environmental factors. These factors include income inequality, income per capita, squared income per capita, energy consumption, urban population, renewable energy share, net FDI, and international trade. The analysis relies on a comprehensive dataset that encompasses 66 countries and covers the years from 1990 to 2020. This extensive dataset enables us to examine the temporal dynamics of carbon emissions.

The results of our study provide valuable insights into the factors that influence carbon emissions. Firstly, it has been observed that income inequality has a statistically significant positive impact on carbon emissions. This suggests that higher levels of income inequality are linked to increased carbon emissions. The statistically significant positive impact of income inequality on carbon emissions underscores the potential efficacy of income redistribution policies in aligning environmental objectives with broader social and economic goals.

Furthermore, it is observed that the income per capita variable demonstrates a positive and statistically significant influence on carbon emissions. This implies that as economies grow and individuals experience an increase in wealth, there is a tendency for carbon emissions to rise. This observation aligns with the "Economic Growth Hypothesis," which posits that economic progress frequently entails greater energy consumption and resource utilization, resulting in elevated emissions. The variable representing squared income per capita exhibits a negative relationship with carbon emissions. This suggests that as income per capita increases and reaches higher levels, the rate of carbon emissions may decelerate or potentially decrease. This finding aligns "Environmental Kuznets Curve" hypothesis, suggesting that as a nation's income increases, there is an initial decline in environmental conditions, followed by subsequent enhancement due to increased awareness and regulatory measures.

Furthermore, our study reveals a strong correlation between energy consumption and urban population, underscoring the need of including energy efficiency and urban planning considerations into environmental policy frameworks. In contrast, the proportion of renewable energy had an adverse effect on carbon emissions, underscoring the need to shift towards more environmentally friendly energy sources and the necessity of increased funding for renewable energy initiatives in order to alleviate emissions.

Moreover, our investigation has shown that net foreign direct investment and international trade exhibit a positive relationship with carbon emissions, indicating that economic globalization might potentially lead to elevated emission levels. These results highlight the need of giving more consideration to the environmental impacts of globalization and emphasize the necessity of adopting a well-rounded strategy that maximizes the advantages of globalization while minimizing its negative effects on the environment.

In order to mitigate income inequality and encourage the adoption of renewable energy sources, a set of precise policy recommendations has been identified. The implementation of progressive taxation and social welfare programs has the potential to decrease income inequality, which in turn can lead to a reduction in carbon emissions by encouraging fairer consumption patterns. The acceleration of the transition to cleaner energy sources can be achieved by promoting the establishment of renewable energy communities and offering subsidies or tax incentives for the adoption of renewable energy. This approach has the potential to significantly reduce carbon emissions.

Developing and promoting energy efficiency standards and technologies in both industrial and residential sectors is crucial for reducing energy consumption and emissions, contributing to environmental sustainability. Investing in sustainable urban infrastructure can mitigate the environmental impact of urban populations, which are major contributors to carbon emissions. Sustainable urban planning, including the development of green spaces, public transportation, and energy-efficient buildings, is essential for reducing urban emissions.

Regulating Foreign Direct Investment (FDI) to ensure it contributes to sustainable industrial practices can balance the benefits of economic globalization with the need for environmental preservation. These regulations can help prevent environmental degradation often associated with increased industrial activities and ensure that FDI supports sustainable development.

The crux of our research resides in the convergence of economic inequality and environmental effects. The implementation of efficient policy measures aimed at addressing economic inequalities might have dual benefits, namely the promotion of social fairness and the reduction of carbon emissions. Nevertheless, it is

crucial to achieve a harmonious equilibrium between economic advancement and the preservation of the environment, recognizing the intricate and diverse nature of the connection between per capita income and emissions.

Our study makes a valuable contribution to the current academic discussion around the intricate interplay between economic variables and carbon emissions. This statement highlights the significance of implementing specific policy measures to tackle the issue of income inequality, encourage the use of renewable energy sources, improve energy efficiency, and effectively manage the environmental consequences associated with globalization. Subsequent investigations should persist in delving into these processes with heightened precision and include an examination of regional disparities and the consequential policy ramifications.

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Impact of Women's Empowerment on Female Account Ownership: A Case Study of Selected Sub-Saharan African Countries (2011 – 2021)

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Abstract. *This study investigated women's empowerment and its impact on female account ownership, using selected sub-Saharan African countries as a case study from 2011 to 2021. The central research question covers whether women's empowerment has any impact on the financial inclusion of women in sub-Saharan Africa, with an emphasis on account ownership by women as a yardstick to measure financial inclusion. The selected women empowerment variables comprised the percentage of the total labour force, namely female labour force (FLF), equality in the rights to ownership of property (EOR), non-discrimination of women in employment (NDW), choice of where to live by women (CWL), mean years of schooling of females (MYS), and women political empowerment (WPE). By means of pooled ordinary least square regression, using the fixed effects estimation model applied to the panel data from 38 sub-Saharan African (SSA) countries with available data for the period 2011 to 2021, as reported on the three-yearly database, this research was able to establish the impact of some of the selected variables of women empowerment on female account ownership in SSA. This study hinges on the undeniable potential of women to lift Africa from multi-dimensional poverty since a greater proportion of household consumption is contributed by the income of women rather than men in Africa. The authors, therefore, recommend, among others, that African governments should invest in policies that will encourage gender equality and women's emancipation to boost women's empowerment, which is the gateway to enhanced financial inclusion of African women and the attendant gain of accelerated poverty reduction in Africa.*

Keywords: Account-Ownership, Financial-Inclusion, Women-Empowerment

JEL Codes: J160, J710

1. Introduction

While most studies centre around the view that financial inclusion enhances women empowerment, this study joins the few researchers who believe that, conversely, the extent of a woman's empowerment determines the magnitude or level of her financial inclusion. The authors believe that women empowerment is the starting point or baseline for the financial inclusion of women. They further believe that the accelerated financial inclusion of women in SSA would contribute significantly to lifting the region from multi-dimensional poverty.

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Saluja et al. (2022) contend that women assume and contribute via various roles and at distinct levels of human life, including commercial processes, family and within society, broadly highlighting gender inequalities. Furthermore, G-20 nations have emphasized that to achieve gender equality and other sustainable development goals, financial inclusion must serve as a facilitator (Bhatia & Singh, 2019). The World Financial Inclusion Index is not gender sensitive currently, while the gender gap in account ownership has remained at 9% since 2011 (CGAP, 2021).

Women's empowerment ensures that women participate in decision-making regarding different societal matters (Rani, 2019). The Consultative Group to Assist the Poor (CGAP) recognizes the potential of gender empowerment and has hence updated its vision statement to capture the gender problem as: "a world where poor people, especially women, are empowered to capture opportunities and build resilience through financial services" (CGAP, 2020). According to Duflo (2012), women's ability to access health care, education, work, and other personal rights is indeed women empowerment. Financial inclusion entails bringing to the household financial services that are affordable for disadvantaged groups in society such as low-income groups and the underprivileged (Wakdok, 2018). Onaolapo (2015) avers that financial inclusion is a means to achieve access to financial services with its attendant poverty alleviation through increases in savings and investments.

According to the United Nations (2020), gender inequality is prevalent in sub-Saharan Africa (SSA). The World Bank's (2021) global poverty update declares that South Africa and Nigeria, the two largest economies in this region, saw output fall sharply in 2020, while agricultural growth slowed down, leading to decreases in per capita income. The report further states that living standards have fallen lower than a decade ago in some countries in the region.

2. Review of Related Literature

Loaba (2023) conducted an analysis of determinants that influence disparity in financial account access between males and females across 25 sub-Saharan African nations, using data from 2021. The outcomes revealed that, typically, 43.73% of males possess a financial account in contrast to a mere 32.7% of females. This demonstrates that the factors' impact on this gap varied based on a country's developmental stage. Nonetheless, it was noted that completion of secondary education emerged as the most crucial factor, with its significance fluctuating depending on the country's level of development. The above research study concluded that tailored financial inclusion strategies for females should align with the specific circumstances of each country. Additionally, to enable women to leverage the benefits of financial inclusion initiatives, it was deemed imperative to promote women's education up to at least secondary level by reducing or eliminating school fees while fostering an enabling environment to retain women in the education system for prolonged periods.

Elouardighi and Oubejja (2023) scrutinized the correlation between digital financial inclusion and the involvement of women in the labour force in Africa, while also shedding light on obstacles that hinder their access to digital financial services, using the 2021 Global Findex database. The research employed the Probit model estimation technique to analyze the empirical outcomes. The results unveiled a positive link between the two. The study also showed that various obstacles hinder women's access to financial services. These barriers include inflated costs of mobile financial services and a lack of mobile phones. A review conducted by Gammage et al. (2017) emphasizes that substantial financial inclusion for women can mitigate gender disparities, enabling women with saving mechanisms to exert greater control over their earnings and decisions, ranging from marital choices to professional endeavours, education, and leisure activities. In a recent investigation that Wandeda et al. (2023) conducted in Kenya, ownership of mobile phones and televisions indicated a higher probability of women engaging in digital finance. Furthermore, the research discovered that women in Kenya who use digital financial services exhibited a higher likelihood of financial well-being. Yeyouomo, Asongu and Agyemang-Mintah's (2022) findings indicate that fintechs lessen gender disparity with respect to access to and utilization of financial services in sub-Saharan Africa. Giron, Kazemikhasragh, Cicchiello and Panetti (2022) mention the exclusion of younger women and individuals from financial inclusion in Africa and Asia, citing education and income as pivotal elements that enhance financial inclusivity.

The study also unveiled that heightened financial inclusion levels correlate with increased official savings, which foster national development. Zawaira et al. (2021) analyzed the connection between gender inequality in sub-Saharan Africa and financial inclusion, indicating a prevalent reliance on informal finance sources by individuals, particularly women, including saving clubs and borrowing from acquaintances rather than via formal financial channels. Ajide (2021) explored the influence of financial inclusion on the participation of the female gender in Africa's labour force, assessing the moderating impact of trade openness (TO) and advancements in information technology on this relationship in twelve African countries. The outcomes revealed a non-linear association between financial inclusion and female participation, proposing that an increase in financial inclusion within a range of 33-57 per cent could boost women's engagement in economic endeavours. Additionally, the study demonstrated that ICT acts as a moderator between the participation of females in economic activities and financial inclusion at a level of 38.17 per cent, with similar effects observed for TO at a value of 80.90 per cent. When alternative proxies for the participation of the female labour force and various estimation methodologies were employed, the results remained robust. Onyeoma and Ogbeide-Osaretin (2020) investigated gender inequality within sub-Saharan Africa, as impacted by financial inclusion. Using the moments' technique method, the study found that financial inclusion had a substantial mitigating effect on gender inequality. The study also discovered that accessibility to financial inclusion reduced gender inequality. Moreover, the research revealed a noteworthy negative correlation between female educational attainment levels and gender inequality. As a recommendation, the study emphasized the necessity for an expansion of commercial bank branches to enhance the accessibility of financial services. George and Thomachan (2018) examined women's empowerment in India as influenced by financial inclusion, with an emphasis on financial literacy. Data collection included a combination of primary and secondary sources, while the Chi-Square (χ^2) test of association was employed for analysis purposes. The study's results underscored the significant enhancement of women's empowerment in India through improved accessibility to financial services. Notably, the results confirmed a direct correlation between women's financial security and access to financial services, thereby leading to women's empowerment. Eton et al. (2018) conducted a study on women's empowerment in Uganda and financial inclusion, focusing on the Lango sub-region. A five-point Likert scale facilitated the rating of responses for the structured questionnaire items. The questionnaire endured validation testing, yielding credible and reliable results. Financial data indicated a prevalence of 66.7% of mobile money account usage amongst participants, with the remaining not utilizing such accounts. Additionally, 46.8% possessed saving accounts, while 53.2% did not. Interestingly, among the women who had savings accounts, 67.8% were government employees. This highlighted the influence of a woman's educational level on her employment opportunities, suggesting a higher likelihood of formal sector employment for those with advanced educational qualifications. The Chi-square test for women empowerment and financial inclusion revealed a robust and statistically significant association between the two variables.

Wang (2019) investigated the potential of gender empowerment to enhance the financial inclusion of women by scrutinizing disparities in financial service access and utilization across approximately 120 countries from 2011 to 2017. Applying multivariate regression analysis on panel data while accounting for country-specific and temporal factors that relate to account ownership and digital payment usage, it was found that gender empowerment did indeed foster the financial inclusion of women. By employing cross-country regression, the findings validated that those nations where women represent a substantial portion of the workforce and hold significant political influence witnessed a rise in the number of women who have financial accounts and who engage in digital transactions. Consistent with these results, the study highlighted a positive association between educational attainment and women's demand for financial services. Furthermore, the research affirmed the proposition that legal safeguards pertaining to gender norms, like anti-discrimination measures in employment and equitable property ownership rights, elucidate part of the cross-country variances in digital payment utilization and female account ownership. Moreover, the study showed that factors such as a lack of security for women, exemplified by instances of violence against females, impeded women from harnessing the advantages of financial inclusion. From a policy viewpoint, the dissertation has certainly enriched the existing body of literature, exploring the nexus between women's financial inclusion and gender

empowerment. Asaolu et al. (2018) conducted a study that measured women's empowerment in sub-Saharan Africa. The authors found that women's empowerment and status influenced their nutrition, health, and socio-economic conditions, as well as that of their children. Health surveys and demographic data from 19 countries in four African regions were utilized for the study. A total of 26 indicators covering education, economic, health and socio-cultural factors were studied with variables defined for the four categories in the different regions. The study indicated that education, attitude towards violence, labour force participation, and access to healthcare, were the major contributors to women empowerment. While education was the second highest factor in Central and West Africa, it was not important for women's empowerment in East Africa. Since labour force participation was a prominent indicator in the study, it was concluded that the economic empowerment of women is key for women's development in the SSA.

3. Methodology

This research was based on an *ex post facto* research design. Secondary data on selected women empowerment variables from 39 sub-Saharan African countries, whose data was available in the Global Findex database, was collected for 2011, 2014, 2017, and 2021. Due to the 2020 COVID-19 pandemic, the Global Findex data for that year was collected in 2021. At the time of this research study, the 2023 database had not yet been published. The selected variables for women empowerment in this study included the female labour force as a percentage of the total labour force (FLF), equal ownership rights to property (EOR), non-discrimination of women in employment (NDW), choice of where to live by women (CWL), female mean years of schooling (MYS), and women's political empowerment (WPE). Panel data regression was used for the studied 39 countries in sub-Saharan Africa, serving as cross-sectional units of the panel data and the years of observation as the time series. This study adopted the Wang (2019) model, which used multivariate regression analysis to explore the extent to which gender empowerment factors influenced women's account ownership and financial account usage, controlling region, and year characteristics, as shown below.

$$yk = \alpha Gender\ Empowerment_k + \beta Controls + \gamma ak + \delta year + \epsilon k,$$

where: yk was a financial inclusion variable, proxied by account ownership and making or receiving digital payments by women; *Gender Empowerment* represented a list of women empowerment and gender equality variables; the control variables were log GDP, log GDP per capita, GDP per capita annual growth, polity score, and financial globalization; ak represented a vector of region fixed effects; $year$ was a vector of time fixed effects; and ϵk was the error term.

Similarly, this research model was $Y_{it} = X_{it}^{(1)}\beta_1 + X_{it}^{(2)}\beta_2 + \dots + X_{it}^{(j)}\beta_j + \epsilon_{it}$, where: i represented country; t referred to the years; j was the number of explanatory variables;

Y_{it} was the dependent variable, and X_{it} was the j th gender empowerment (explanatory) variable for the country i in terms of time t . Applying the model to the specific objectives revealed the following:

$AO_{it} = \beta_0 + \beta_1 FLF_{it} + \beta_2 EOR_{it} + \beta_3 NDW_{it} + \beta_4 CWL_{it} + \beta_5 MYS_{it} + \beta_6 WPE_{it} + \epsilon_{it}$, where: AO_{it} referred to account ownership for the country i at time t ; FLF_{it} represented female labour force for the country i at time t ; EOR_{it} was equal ownership rights to the property for the country i at time t ; NDW_{it} referred to non-discrimination of women in employment for the country i at time t ; CWL_{it} was the choice of where to live by women for the country i at time t ; MYS_{it} represented mean years of schooling for the country i at time t ;

WPE_{it} referred to women political empowerment for the country i at the time t ; and ε_{it} was the error of the model.

Testing for Heteroscedasticity Using the Lagrange Multiplier (LM) Test

Ho: Homoscedasticity or no heterogeneity (no panel effect).

Ha: Heteroscedasticity or heterogeneity (panel effect).

Decision rule: If the p value < 0.05 , reject Ho and accept Ha.

Table 1: Breusch and Pagan Lagrangian multiplier test for random effects

$$ao[con, t] = Xb + u[con] + e[con, t]$$

The estimated results are shown below.

	Var	sd = sqrt(Var)
ao	493.5345	22.21564
e	97.10996	9.854438
u	130.8892	11.44068

Test: $Var[u] = 0$ $chibar2(01) = 6.86$ $Prob > chibar2 = 0.0044$

(Source: Authors' compilation using STATA)

Since the p -value (0.0044) < 0.05 , the authors accepted Ha and concluded that there was a panel effect on the model, rendering the model adequate for panel data analysis.

Testing for Autocorrelation Using the Baltagi - Wu LBI Test

This test is used for unequally-spaced panel data, which was the situation in this dataset owing to missing data.

Ho: There is no first-order autocorrelation.

Ha: There is first-order autocorrelation.

Decision rule: Reject Ho if the p value < 0.05 and accept Ha.

Table 2: Using account ownership fixed effect AR (1) reminder disturbance

FE (within) regression with AR (1) disturbances Number of obs = 58

Group variable = con

Number of groups = 32

R-sq: within = 0.5165

between = 0.5370

overall = 0.4851

Obs per group: minimum = 1

average = 1.8

maximum = 3

$F(4, 22) = 5.87$

$Corr(u_i, Xb) = -0.7050$

$Prob > F = 0.0023$

Ao	Coef.	Std. Err.	T	P> t	[95% Conf. Interval]	
Flf	-1152355	.5471363	-0.21	0.835	-1.249927	1.019456
Ndw	40.43812	18.05932	2.24	0.036	2.985385	77.89086
Cwl	12.12237	8.134416	1.49	0.150	-4.747376	28.99212
Mys	8.634211	6.216269	1.39	0.179	-4.257542	21. 52597
_cons	-36. 53725	10.9366	-3.34	0.003	-59.21837	13.85614
rho_ar	.58429353					
sigma_u	19.808843					
sigma_e	7.147773					
rho_fov	.88479612	(Fraction of variance because of u_i)				

(Source: Authors' compilation using STATA)

The F test revealed that all $u_i = 0$: $F(31, 22) = 2.08$
 Modified by Bhargava et al. Durbin-Watson = 1.0039336
 Baltagi-Wu LBI = 1.8924516 Prob > F = 0.0386

Since the p value (0.0386) < 0.05, there was a presence of autocorrelation. This affected the standard error, which would not be reliable if the autocorrelation were not controlled. The issue was resolved by using Robust (clustered) Standard Error, which was managed by the STATA software, as shown below.

Table 3: Robust (clustered) standard error

Fixed-effects (within) regression Number of obs = 96
 Group variable = con Number of groups = 38
 R-sq: within = 0.5635 between = 0.4729 overall = 0.4209
 Obs per group: minimum = 1 average = 2.5 maximum = 4
 F (4, 37) = 48.44
 corr (u_i , X_b) = -0.9215 Prob > F = 0.0000

(Std. Err. adjusted to 38 clusters in con)

	Coef.	Robust Std. Err.	T	P> t	[95% Conf. Interval]	
Flf	1.475042	.1936651	-7.62	0.0	-1.867445	-1.08264
Ndw	-4.165774	3.220909	-1.29	0.204	-10.69196	2.360408
Cwl	16.77328	3.853422	4.35	0.000	8.965486	24.58104
Mys	18.31087	2.94682	6.21	0.000	12.34005	24.2817
_cons	29.08322	10.22593	2.84	0.007	8.363512	49.80294
sigma_u	39.810757					
sigma_e	9.8544384					
Rho	.9422654	(Fraction of variance because of u_i)				

(Source: Authors' compilation using STATA)

This study adopted the Listwise deletion method to manage missing data since the authors assumed that they had data that was missing randomly (MCAR). This was done by using the STATA software.

4. Results and Discussions

Table 4: Regression analysis of study variables on female account ownership

Dependent Variable: AO Number of obs: 95 F(6, 88): 20.25
 Prob > F: 0.0000 R-squared: 0.5800 Adj R-squared: 0.5513 Root MSE: 14.932

Variable	Coef.	Std. Err.	t-statistic	Probability
FLF	-.3193859	.1206766	-2.65	0.010
EOR	-.9548892	3.719209	-0.26	0.798
NDW	12.92842	4.655528	2.8	0.007
CWL	14.06265	4.074093	3.45	0.001
MYS	5.505042	.7266237	7.58	0.000
WPE	21.0958	14.87886	1.42	0.160
_CONS	-9.870198	11.32003	-0.87	0.386

(Source: Authors' compilation using STATA)

Table 4 above indicates that the following women empowerment variables, namely FLF, NDW, CWL and MYS, were significant since their probability values of 0.010, 0.007, 0.001 and 0.000, respectively, were all less than 0.05. EOR, with a probability of 0.798, and WPE, with a probability of 0.160, both above 0.05, were insignificant.

Country and Time Effects

To further study the impact of the significant women empowerment variables on account ownership, the model was re-specified without the statistically insignificant explanatory variables as a form of data reduction, as shown below:

$$AO_{it} = \beta_0 + \beta_1 FLF_{it} + \beta_2 NDW_{it} + \beta_3 CWL_{it} + \beta_4 MYS_{it} + \varepsilon_{it}$$

To analyze the re-specified model above, the authors considered the panel data models presented below.

Account Ownership Pooled Regression (the Constant Coefficients) Model

This model assumed that there were neither significant country nor time effects. This means that account ownership was the same across SSA and equally the same across the period. Hence, the data had to be pooled, and the OLS regression was applied. The pooled OLS had intercept and slope coefficients that were constant across countries and time.

Table 5: Pooled regression model

Dependent Variable: AO Number of obs: 96 F(4, 91): 29.01 Prob>F: 0.0000
 R-squared: 0.5605 Adj R-squared: 0.5412 Root MSE: 15.048

Variable	Coef.	Std. Err.	t-statistic	Probability
FLF	-.2866132	.1168271	-2.45	0.016
NDW	14.60227	4.034292	3.62	0.000
CWL	14.19943	3.897386	3.64	0.000
MYS	5.711636	.6358805	8.98	0.000
_CONS	.3898044	7.363361	0.05	0.958

(Source: Authors' compilation using STATA)

According to the above table, the R-squared of 0.5605 shows that FLF, NDW, CWL and MYS accounted for about 56% of the variation in female account ownership for the sub-Saharan African countries under study, leaving 44% unexplained. The adjusted R-squared was 0.5412, while the root mean squared error (Root MSE) was 15.04. The marginal effects of NDW, CWL and MYS were all positive, as expected, and highly significant. However, when combining different countries at separate times, one may not see the uniqueness among the countries. Each country's individuality was subsumed in the disturbance term, u_{it} , correlating the error term with some regressors and rendering the estimate of the pooled regression biased. To account for the uniqueness of the various countries, the authors applied the fixed effect dummy variables, as outlined below.

Slope Coefficients Constant but Intercept Varied Across Countries

The above implies that there were no critical time effects but rather significant differences among the countries. Each country had a separate intercept, which was estimated by including a dummy variable for each country in the model.

Table 6: Account ownership least square dummy variable country effect

Dependent variable: AO Number of obs: 96 F(41, 54): 10.46 Prob > F: 0.0000
 R-squared: 0.8882 Adj R-squared: 0.8032 Root MSE: 9.8544

Variable	Coef.	Std. Err.	t-statistic	Probability
FLF	-1.475042	.4317986	-3.42	0.001
NDW	-4.165774	13.55005	-0.31	0.760
CWL	16.77326	6.102016	2.75	0.008
MYS	18.31087	2.739714	6.68	0.000

Country	Coef.	Std. Err.	t-static	Probability
Angola (_cons)	73.48944	42.67842	1.72	0.091
Benin	-10.353	8.827054	-1.17	0.246
Botswana	-122.941	24.84978	-4.95	0.000
Burkina Faso	3.223714	12.14568	0.27	0.792
Burundi	9.173859	12.95875	0.71	0.482
Cameroon	-32.63407	19.18169	-1.70	0.095
Central African Republic	-34.25859	10.93011	-3.13	0.003
Chad	-26.44979	23.81633	-1.11	0.272
Comoros	-84.3266	22.13536	-3.81	0.000
Democratic Republic of Congo	-53.87568	22.23614	-2.42	0.019
Congo Republic	-64.36588	20.46545	-3.15	0.003
Cote d'Ivoire	-67.40395	21.08882	-3.20	0.002
Gabon	-126.6026	31.41099	-4.03	0.000
Gambia	-43.87355	16.0886	-2.73	0.009
Ghana	-75.53046	15.3886	-4.91	0.000
Guinea	5.982507	10.53432	0.57	0.572
Kenya	-14.1898	12.26565	-1.16	0.252
Lesotho	-86.94901	16.31033	-5.33	0.000
Liberia	-4.39225	10.5125	-0.42	0.678
Madagascar	-38.33388	11.12299	-3.45	0.001
Malawi	-23.18066	10.20365	-2.27	0.027
Mali	-2.862347	11.33815	-0.25	0.802
Mauritania	-105.1248	33.21021	-3.17	0.003
Mauritius	-106.3911	25.0983	-4.24	0.000
Mozambique	20.0883	12.34671	1.63	0.110
Namibia	-65.48579	18.72492	-3.50	0.001
Niger	-11.17495	19.61551	-0.57	0.571
Nigeria	-65.88103	17.74924	-3.71	0.000
Rwanda	10.18565	10.60624	0.96	0.341
Senegal	-25.135	19.1651	-1.31	0.195
Sierra Leone	-23.16868	12.72968	-1.82	0.074
South Africa	-109.3677	26.68046	-4.10	0.000

Sudan	-70.48277	19.82341	-3.56	0.001
Tanzania	-31.0099	10.73038	-2.89	0.006
Togo	-29.85421	11.89866	-2.51	0.015
Uganda	-35.78249	11.15249	-3.21	0.002
Zambia	-69.87356	14.01561	-4.99	0.000
Zimbabwe	-71.08159	15.63548	-4.55	0.000

(Source: Authors' compilation using STATA)

The results shown above for FLF, NDW, CWL and MYS are different from those from the earlier pooled regression, which showed the country effect. The country heterogeneity was also highly significant. The intercept refers to the value of account ownership when other explanatory variables are zero. The country's account ownership for the 39 SSA countries under study is indicated in Table 6. The account ownership of countries with a p -value < 0.05 was significant, namely Botswana, Ghana, Nigeria, South Africa, and Zimbabwe, to mention a few. The account ownership of countries with a p -value > 0.05 was not significant at a 95% level of significance. Examples of these countries include Benin, Burkina Faso, and Niger. However, some were significant and positive, while others were significant and negative.

The intercept for the base country, Angola, was provided by the constant intercept of the model, namely 73.4894, while the intercepts of other countries were derived as follows:
 Benin = $73.4894 - 10.353 = 63.1364$; Nigeria = $73.4894 - 65.8810 = 7.6084$; and
 South Africa = $73.4894 - 109.3677 = -35.8783$.

Slope Coefficients Constant but Intercept Varied Over Time

The above implies that there were no significant cross-country differences but significant time effects.

Table 7: Account ownership least square dummy variable time effect

Dependent Variable: AO Number of obs: 96 F(7, 88): 33.68 Prob > F: 0.0000
 R-squared: 0.7282 Adj R-squared: 0.7066 Root MSE: 12.034

Variable	Coef.	Std. Err.	t-statistic	Probability
FLF	-.2128103	.0940232	-2.26	0.026
NDW	13.6448	3.235179	4.22	0.000
CWL	9.876151	3.181246	3.10	0.003
MYS	4.940085	.5198069	9.50	0.000
Time	Coef.	Std. Err.	t-statistic	Probability
2011	-7.742853	6.195264	-1.25	0.215
2014	5.528162	3.3805	1.64	0.106
2017	18.56347	3.553323	5.22	0.000
2021	22.91416	3.493982	6.56	0.000

(Source: Authors' compilation using STATA)

All the women empowerment variables were significant and positive, except FLF, which was significant and negative. The values of the coefficients were also significant. In terms of the time dummies, the earlier years, namely 2011 and 2014, were insignificant, while the later years, 2017 and 2021, were significant and positive with high coefficient values. This indicates that account ownership changed over time and was confirmed by R² of 0.7282 against the pooled regression with R² = 0.5650, rendering an increment of 0.1632 in R² from the pooled OLS.

Slope Coefficients Constant but Intercept Varied Over Country and Time

Table 8: Account ownership least square dummy variable country and time effect

Number of obs = 96 F (44, 51) = 18.05 Prob > F = 0.000
 R-squared = 0.9397 Adj. R-Squared = 0.8876 Root MSE = 7.448

Source	Ss	df	MS
Model	44056.6878	44	1001.28836
Residual	2829.09259	51	55.4724037
Total	46885.7804	85	493.53453

ao	Coef.	Std. Err.	T	P> t	[95% Conf. Interval]	
Flf	-.6340566	.3542718	-1.79	0.079	-1.345287	.0771737
Ndw	-7.878146	10.39082	-0.76	0.452	-28.73858	12.98229
Cwl	3.070577	5.109266	0.60	0.551	-7.186702	13.32786
Mys	-6.17185	4.277763	-1.44	0.155	-14.75982	2.416117
Con						
2	-24.35452	7.006393	-3.48	0.001	-38.42044	-10.2886
3	34.87804	30.79959	1.13	0.263	-26.95472	96.71081
4	-41.51866	11.4278	-3.63	0.001	-64.46091	-18.5764
5	-33.58025	11.93466	-2.81	0.007	-57.54009	-9.620417
6	-16.03912	14.9379	-1.07	0.288	-46.0282	13.94997
7	-33.49008	8.27299	-4.05	0.000	-50.0988	-16.88136
8	-61.50098	18.88315	-3.26	0.002	-99.41049	-23.59417
9	-32.25331	18.85214	-1.71	0.093	-70.10056	5.593931
10	-26.11523	17.85556	-1.46	0.150	-61.96175	9.731293
11	-15.83992	17.57133	-0.90	0.372	-51.11584	19.436
12	-26.6306	17.28837	-1.54	0.130	-61.33845	8.077245
14	-4.624929	30.61571	-0.15	0.881	-66.08854	56.83868
16	23.43841	19.16868	1.22	0.227	-15.04431	61.92113
_cons	97.17188	33.02206	2.94	0.005	30.87733	163.4664

The complete table is attached as an appendix. All the women empowerment variables were insignificant, while all the time effects were significant and positive. The country effect had a stronger influence on the results than the time effect, as indicated by the results of the country effect alone. R-squared of 0.9397 was the highest of the four regression models, which implies that the country and time effect model is the best model since it explained about 94% of the variation in female account ownership.

To Test for Fixed Effect or Random Effect

Before the Hausman test, fixed effect and random effect regression tests were conducted.

Table 9: Fixed effects (within groups) regression for account ownership

Fixed effects (within) regression Number of obs: 96
 Group variable: con Number of groups: 38
 R-sq: within: 0.5635 between: 0.4729 overall: 0.4209
 Obs per group: minimum: 1 average: 2.5 maximum: 4
 corr(u_i, Xb): -0.9215 F(4, 54): 17.43 Prob > F: 0.0000
 Dependent variable: AO

Variable	Coef.	Std. Err.	t-statistic	Probability
FLF	-1.475042	.4317986	-3.42	0.001
NDW	-4.165774	13.55005	-0.31	0.760
CWL	16.77326	6.102016	2.75	0.008
MYS	18.31087	2.739714	6.68	0.000
_CONS	29.08322	34.37515	0.85	0.401
sigma_u	39.810757			
sigma_e	9.8544384			
Rho	.9422654			

(Source: Authors' compilation using STATA)

The F test revealed that all $u_i=0$: $F(37, 54) = 4.29$ Prob > F = 0.0000

Decision: If probability < 0.05, reject null and accept alternate hypothesis.

According to the above table, beta coefficients indicate changes in account ownership (AO) when the predictors, namely female labour force percentage (FLF), non-discrimination of women in employment (NDW), choice of where to live by women (CWL) and mean years of schooling (MYS) changed one unit over time. When CWL increased by one unit, account ownership of women increased by 16.77 units. Also, when MYS increased by one unit, account ownership increased by 18.31. FLF and NDW showed an inverse relationship with account ownership; a one-unit increase in FLF resulted in a corresponding 1.47-unit decrease in account ownership, and a one-unit increase in NDW yielded a 4.17-unit decrease in account ownership. This implies that an increase in mean years of schooling and choice of where to live by women would lead to a corresponding geometric increase in account ownership.

The above table shows that NDW and intercept were not significant, with *p-values* of 0.760 and 0.401, respectively. The *p values* of FLF, CWL and MYS were all significant at 0.001, 0.008 and 0.000, respectively, showing that the predictors impacted account ownership significantly. The *F* test was used to assess the model's overall significance, namely whether all the coefficients in the model were jointly different from zero. If the *F value* < 0.05, the model would be significant. The *F value* from the data was 0.0000, showing that the model was adequate. The intraclass correlation (rho) indicated the percentage of variance in account ownership caused by country specifics, which amounted to 94%.

Table 10: Random effect regression for account ownership

Random-effects GLS regression Number of obs: 96
 Group variable: con Number of groups: 38
 R-sq: within: 0.4678 between: 0.6138 overall: 0.5570
 Obs per group: minimum: 1 average: 2.5 maximum: 4
 corr(u_i, X): 0 (assumed) Wald chi2(4): 80.24 Prob > chi2: 0.0000
 Dependent variable: AO

Variable	Coef.	Std. Err.	t-statistic	Probability
FLF	-.3104787	.1534584	-2.02	0.043
NDW	13.37003	5.265865	2.54	0.011
CWL	16.47866	4.644508	3.55	0.000
MYS	6.933747	.9544831	7.26	0.000
_CONS	-4.682321	10.89979	-0.43	0.668
sigma_u	11.440681			
sigma_e	9.8544384			
Rho	.57407752			

(Source: Authors' compilation using STATA)

Close examination of the fixed and random effects for account ownership in Tables 9 and 10, respectively, show that the NDW signs and the intercept changed for the two models. The beta coefficients also varied for the models, apart from CWL, which had approximate comparative values. The Hausman test was applied to select between the fixed or random effects models. The test determined whether the individual characteristics would correlate with the regressors.

Table 11: Hausman test for account ownership model

Hausman fe re

		Coefficients			
		(b)	B	b – B	Sqrt(diag(V_b-V_B
		fe	re	Difference	S.E.
	FLF	1.475042	0.3104787	-1.164564	0.4036094
	NDW	-4.165774	13.37003	-17.5358	12.48497
	CWL	16.77326	16.47866	0.2946038	3.957669
	MYS	18.31087	6.933747	11.37713	2.568072

(Source: Authors' compilation using STATA)

B = consistent under Ho and Ha: obtained from xtreg

B = inconsistent under Ha, efficient under Ho: obtained from xtreg

Test: Ho: difference in coefficients not systematic

Chi2(4) = (b-B)'[(V_b-V_B)^(-1)](b-B)= 26.23

Prob>chi2= 0.0000 Ho: random effects Ha: fixed effects

Since $prob > chi2$ was < 0.05 , the null hypothesis Ho was rejected, namely the random effect, while the Ha, namely the fixed effects, was accepted. The above analysis revealed that $prob > chi2 = 0.0000$; therefore, the authors accepted the fixed effects model. By implication, the country effects present in the data set correlated with the explanatory variables; hence, the choice to use the fixed effects model.

The Principal Component Analysis (PCA) of the selected women empowerment variables corroborated the results of the pooled regression analysis since the variables, namely non-discrimination of women in employment (NDW), female mean years of schooling (MYS), and choice of where to live (CWL) explained 73% of the total variances.

5. Conclusion

Both the pooled regression and principal component analysis confirmed that the variables, namely non-discrimination of women in employment, choice of where to live and female mean years of schooling, had positive and significant impacts on account ownership by women in sub-Saharan Africa. Therefore, we concluded that women's empowerment positively and significantly impacts the financial inclusion of women in sub-Saharan Africa. This confirmed the findings of Wandeda et al. (2023), Giron et al. (2022), Zawaira et al. (2021), Onyeoma et al. (2020), Eton et al. (2018) and Asaolu et al. (2018), among others.

The female labour force variable had a negative and significant impact on account ownership. This counteracts a priori expectation of a positive and significant impact and opposes the findings of Elouardighi and Oubejja (2023), Ajide (2021), and others in this respect. Similarly, equal ownership rights to property and women's political empowerment had negative and not significant and positive and not significant impacts on

account ownership in SSA, respectively, countering Wang's (2019) findings. This raises the question of the quality of data of these non-significant variables, as well as other women variables that relate to the region. Hence, the authors came to the conclusion that there is a dire need to improve the quality of data for women variables in sub-Saharan Africa. According to results from the *R-squared* values of the regression analysis of country and time effects, the authors concluded that the individual peculiarities of each country play a significant role in the financial inclusivity of its women. Hence, the outcome of the study strengthens Laoba (2023) and Wang (2019) findings, which led to their recommendation that policies on financial inclusion should be based on a country's realities.

Furthermore, enhancements in development and technology have had a strong positive and significant impact on the financial inclusion of women in sub-Saharan Africa. The results of the time effects on account ownership by women underscore this fact. Stemming from the above analysis, the following recommendations should be taken into consideration:

1. For the fact that women empowerment has a significant and positive effect on the financial inclusion of women, governments within sub-Saharan Africa should enact policies with legal frameworks for women emancipation through gender equality. This will allow them to reap corresponding benefits, including the financial inclusion of women and the reduction of multi-dimensional poverty in the region.
2. SSA governments should establish female education as a priority at all levels owing to its strong positive impact on the financial inclusivity of females. Secondary education, which is the level of basic financial literacy, should be the minimum level of education for the girl child.
3. SSA governments should begin to invest in data collection in collaboration with academic and research institutions to gather effective and reliable data for productive research in the region and, subsequently, good policy and decision making for the region.
4. The authors echo Laoba (2023) recommendation that policies around financial inclusion should be based on country specifics and realities to yield the best results. Policies that work in developed economies may not work in developing economies.
5. Since the variables, namely equal ownership rights to property, non-discrimination of women in employment, and choice of where to live impacted positively and significantly on account ownership of women in SSA, African governments and policy makers should enact policies that encourage employers to recruit, train and develop more women.
6. African governments should establish policies and legal frameworks to deal with women's discrimination in the workplace.
7. African governments that do not have laws for equal ownership rights to property are encouraged to do so in order to reap the attendant benefits for their economies.

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Does Fiscal Inefficiency and Human Capital Affect Poverty in Aceh Province, Indonesia? A Threshold Approach

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Abstract. Poverty is a significant social issue that affects all countries, including Indonesia. The various shortcomings and helplessness experienced by those living in poverty highlight this problem. The government considers poverty a severe issue that requires attention every year. Although the government has implemented several measures to alleviate poverty, reducing or eradicating it is challenging due to the numerous dimensions involved. This study investigates the impact of fiscal inefficiency on poverty in 23 districts/cities in Aceh province. Socio-macroeconomic indicators such as education as proxy human capital, economic growth, and inequality are also examined. This research uses balanced panel data from 2011 to 2022. Research data on remaining government spending comes from the Directorate General of Fiscal Balance (DJPK) of the Ministry of Finance. In contrast, education, economic growth, inequality, and poverty are based on the statistics of Aceh Province. The analysis used is the threshold panel. The study results found that education had a negative effect while inequality had a positive effect. The threshold test results on the unspent fund found an optimal value of 1.817 percent. If the remaining spending is above the threshold, poverty will increase, and vice versa. If the remaining spending is below the threshold, then poverty will decrease. Based on these findings, it is necessary to increase the length of schooling, reduce inequality, and increase efficiency (according to planning).

Keywords: Poverty, Inefficiency fiscal, Education, Economic growth, Inequality, Threshold panel.

JEL Codes: H50, H70

1. Introduction

Indonesia has abundant natural resources, but many residents live in poverty. This starkly contrasts what we might expect, as we would assume that abundant natural resources would benefit the population. However, experts believe abundant natural resources can be a curse (Bahar & Santos, 2018; Rahim et al., 2021). One of the reasons for this is that many people in poverty don't have access to these resources, which limits their ability to benefit from them (Olopade et al., 2019). It is essential to use these resources in a way that is optimal both at the national and regional levels to ensure that everyone can benefit from them.

Poverty is a significant social issue that affects all countries, including Indonesia. The various shortcomings and helplessness experienced by those living in poverty highlight this problem. The government considers poverty a severe issue that requires attention every year. Although the government has implemented several measures to alleviate poverty, reducing or eradicating it is challenging due to the numerous dimensions involved. Consequently, there are several challenges in addressing poverty.

Proper local government relies on resources to drive activities. The primary resource is financial, which is used to fund administration. Regional finance includes assets owned by the region related to rights and obligations in implementing government within the Regional Revenue and Expenditure Budget (APBD). This budget, managed by the local government, plays a crucial role in regional development by reflecting the

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region's ability to explore and manage income sources for appropriate spending and financing. The APBD must prioritize improving people's welfare and reducing poverty.

Immediate action must be taken to address the issue of poverty, as it can quickly become a significant problem. Figure 1 shows that poverty in the district is in a very serious condition, namely above 10 percent on average. The government has made efforts to reduce poverty, and it is essential to note the connection between the budget and poverty. A significant amount of funds is required to resolve poverty. Aceh Province has a larger budget than other provinces in Indonesia, as it was granted special autonomy funds, known as the Special Autonomy Fund (DOKA), along with Papua Province. The government budget receives over 10 trillion rupiahs annually, which can play a crucial role in reducing poverty, but the budget needs to be utilized more effectively. According to data released by the Ministry of Finance in 2023 (Figure 2), the Aceh provincial government has a fiscal inefficiency of over 1 trillion rupiah or 8%, which is spread across 23 districts/cities. The latest 2022 data states that the remaining government spending is around 3 to 4 trillion rupiah. A large inefficiency fiscal is considered detrimental, reflecting poor planning and budgeting quality. If addressed, this issue will have long-term consequences.

Figure 1. Poverty in 23 Districts/Cities in Aceh Province 2011-2022

Source: Statistics of Aceh Province (2023)

Several previous studies revealed that poverty arises from socio-macroeconomic changes such as inequality (Fosu, 2015), education (Gounder & Xing, 2012), and economic growth (Balasubramanian et al., 2023). Based on data from the Statistics of Aceh Province (2023), inequality, as measured by the Gini ratio, is experiencing a movement in the Gini ratio. However, it is slowly starting to increase, thus signalling that poverty is increasing. At the same time, a small proportion is experiencing an increase in income. Finally, education is an expensive utility to obtain. Getting a higher education is an achievement expected by someone, including the poor (Gounder & Xing, 2012). Poor groups still need access to education, so the opportunity to resolve poverty individually is challenging because jobs require specific skills and education to work optimally (Arias et al., 2016). Then, the government's focus on pursuing economic growth has always been the main thing. Economic growth is expected to reduce the problem of poverty. Based on this background, the research problem formulation is how the inefficiency of fiscal, inequality, education, and economic growth affect poverty in the 23 districts/cities of Aceh Province. What is the optimal value in the inefficiency of fiscal spending to reduce poverty?

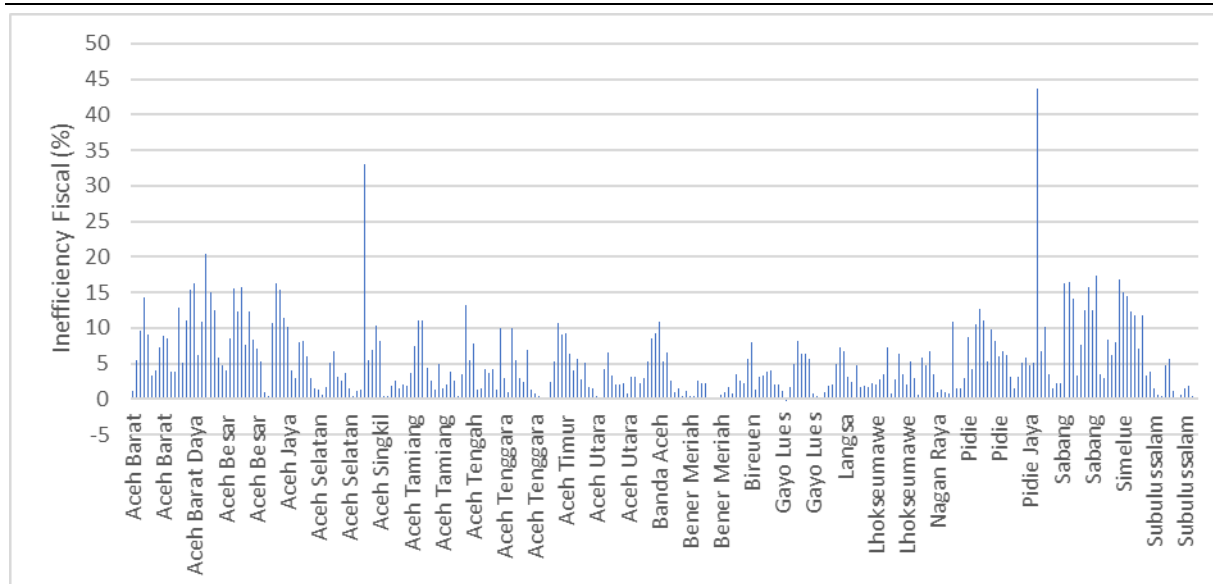


Figure 2. Inefficiency Fiscal 23 Regencies/Cities 2011-2022
 Source: Ministry of Finance (2023)

This research has contributed to several views. First, the research examines the relationship between fiscal inefficiency and poverty, in contrast to previous research, which focused more on using government spending, such as those of Adegboyo (2020) and Miar & Greece (2020). Second, the researcher uses a threshold panel to measure the threshold for remaining government spending. Previous research, such as those by Miar & Greece (2020), Taruno (2019), and Adegboyo (2020), used the linear method. This method is expected to help policymakers use the budget. Third, this research was conducted in Aceh Province, a province with special autonomy status in Indonesia. To the researcher's knowledge, this study has never been conducted.

The paper is structured into distinct sections, each focusing on a specific aspect. Part 2 delves into the study of literature, while Section 3 comprehensively covers the data and research methods employed. Section 4 presents the empirical findings and discussion, and Section 5 succinctly outlines the conclusions and recommendations of the research.

2. Literature Reviews

In this section, the researcher uses several references related to the research under study to see the findings that have been made. Asra (2004) conducted a study of inequality and poverty in Indonesia. Estimation is done using a data decomposition approach based on actual data from the National Socioeconomic Survey (SUSENAS Survey). This research found that increasing inequality only significantly impacts poverty in a short time. Still, the effects of inequality can be felt in the long term, both in cities and villages. Tachibanaki (2006) conducted a similar study of inequality to poverty in Japan. The analysis used the mediation model approach. The study results show that reducing inequality by providing financial subsidies does not solve the problem of poverty. However, providing pension assistance can reduce poverty effectively.

Sawar (2011) studied efforts to reduce poverty by linking education in Pakistan. Estimation is carried out using a logistic regression approach where education is essential in reducing poverty. Gounder & Xing (2012) found that education is an effort to increase the power of poor households in gaining access to health, income, and sanitation. The research model was analyzed based on the quantile regression method. A

study in Indonesia by Putra & Lisna (2020) found that the human development index can significantly reduce the poverty rate. This study was analyzed using the Random Effect Model approach.

Adegboyo (2020) examines the impact of government spending on poverty in Nigeria. The model used to analyze the problem is Autoregressive Distributed Lag (ARDL). The findings from this study explain that several types of government spending can reduce poverty significantly, such as social spending. Meanwhile, a study on government spending and poverty in Indonesia was conducted by Miar & Greece (2020) using a multiple regression approach. The findings show that government spending negatively and significantly impacts poverty. Taruno (2019) uses the FEM approach to find that government programs such as health spending significantly impact poverty in urban areas. Meanwhile, spending on health and education significantly negatively impacted rural areas. A study in Aceh by Yusri (2022) using the Synthetic Control Method explains that government spending from the special autonomy allocation significantly reduces the poverty rate. Campoy-Munoz et al. (2021) researched using a different approach: Computable General Equilibrium (CGE) on fiscal variables. The results of the micro model simulation found that fiscal reduction had a significant impact on poverty and inequality. If the government plans to increase taxes to increase spending, there will be an increase in poverty. However, the goal of raising taxes has succeeded in reducing inequality. The duality of emphasizing poverty or inequality is a dilemma for the government, and it needs to make the right decisions.

De Matteis (2013) sees that economic growth is related to poverty. The study was conducted in 78 countries from 1980-2008 using a simultaneous method. The results of his research explain that economic growth has a negative and significant effect. Balasubramanian et al. (2023) examine the impact of economic growth as a key indicator of reducing poverty in low- and middle-income countries. Based on the elasticity method, economic growth significantly negatively affects poverty in five years and annually. However, Kaouassi & Gakpa (2022) found a different sign in theory, namely positive in West Africa. The findings explain that economic growth will increase poverty by 0.25 percent. Furthermore, Sasmal & Sasmal (2016) looked at India's per capita side of poverty using the Fixed Effect Model. They found that per capita economic growth reduced the poverty rate by 0.001 percent.

Furthermore, Fosu (2015) conducted a study linking inequality and poverty in Sub-Saharan Africa. The research model uses multiple regression. The study results found that inequality positively and significantly affects poverty. Capuno (2022) examines studies on the distribution of inequality and poverty in the Philippines. These two variables are very closely related. His findings explain that emphasizing inequality will reduce poverty at the national and provincial levels. Hofmacher (2021) tries to examine education and poverty in European countries. Several models are used in research, such as OLS and 2SLS. The findings explain that education is very influential in reducing poverty. The range of decline varies widely from 0.01 percent to 0.1 percent.

In Indonesia, there are still very few empirical studies using the inefficiency fiscal variable as an independent variable for poverty, such as Nalle & Affoan (2022). Nalle & Affoan (2022) uses the multiple linear regression method as an analysis tool. The results of his research found that fiscal inefficiency had a positive effect on poverty but was not significant. Therefore, research is motivated to analyze the impact of fiscal inefficiency and macro-social elements on poverty.

Based on this literature, the researcher takes the following hypothesis:

H1: Inequality has a positive effect on poverty.

H2: Education has a negative effect on poverty.

H3: Economic growth has a negative effect on poverty.

H4: Inefficiency fiscal has a positive effect on poverty.

3. Data and Method

This study uses balanced panel data from 23 districts/cities in Aceh Province from 2011 to 2022, with a total sample of 276. The research data consists of poverty, inefficiency fiscal, the average length of education, economic growth, and inequality. The research data comes from the Aceh Statistics Center and the Ministry of Finance's DPJK. Details regarding our research data are presented in Table 1.

Table 1. Operational variables and data sources

Variable	Symbol	Description	Sign	Source
Poverty	Pov	Percentage of the number of poor people	N/A	Statistics of Aceh Province
Inefficiency fiscal	IF	Percentage of remaining government spending on budget realization as proxy inefficiency fiscal	+	Directorate General of Fiscal Balance (DJPK) Ministry of Finance
Education	Edu	The average length of education as proxy human capital	-	Statistics of Aceh Province
Economic growth	Eg	Economic growth rate based on 2010 base year	-	Statistics of Aceh Province
Gini coefficient	Gini	Inequality ratio	+	Statistics of Aceh Province

This research data analysis uses a threshold panel by Hansen (1999), which requires balanced data (Lin & Li, 2020). The threshold panel is the regression coefficient in the model given a structural break. The regime separates the research sample, so there is no need to include dummy variables based on unknown structural breaks (Mehrra et al., 2015). Su et al. (2022), threshold panels can effectively capture structural mutations in sample data and accurately deal with nonlinear problems in economic systems. This method performs well in general panel data models. In addition, this approach considers aspects related to the problem of fixed effects in data processing. Usually, nonlinear problems are solved by adding the squared terms of the explanatory variables to the regression equation. However, the problem of high collinearity between the explanatory variables and their squared terms must be addressed.

Based on Hansen (1999), the primary form of a single panel threshold is as follows:

$$y_{it} = \delta_i + \beta_1 x_{it} I(q_{it} \leq \gamma) + \beta_2 x_{it} I(q_{it} > \gamma) + \beta_i Z_{it} + e_{it} \quad (1)$$

Where y_{it} is the dependent variable; x_{it} is the independent variable; i is region; t is time; q_{it} is threshold variable with γ whose threshold value is unknown; e_{it} is residual with $iid(0, \sigma^2)$; and regime function indicator by threshold variable q_{it} . Whereas Z_{it} is the control variable. Since $q_{it} \leq \gamma$, coefficient value x_{it} is β_1 ; whereas $q_{it} > \gamma$, coefficient value x_{it} is β_2 . In the basic model, the threshold panel can also be illustrated separately (piece-wise) as follows:

$$y_{it} = \begin{cases} \delta_{it} + \beta_1 x_{it} + e_{it} & q_{it} \leq \gamma \\ \delta_{it} + \beta_2 x_{it} + e_{it} & q_{it} > \gamma \end{cases} \quad (2)$$

Based on equation (1), it is possible to enter the single panel threshold research variable as follows:

$$pov_{it} = \delta_i + \beta_1 IF_{it} I(q_{it} \leq \gamma) + \beta_2 IF_{it} I(q_{it} > \gamma) + \beta_3 edu_{it} + \beta_4 eg_{it} + \beta_5 gini_{it} + e_{it} \quad (3)$$

Where pov_{it} is poverty in region i at time t ; $SiLPA_{it}$ is the remaining government spending in the region i at time t ; edu_{it} is the length of school education, eg_{it} is real economic growth, and $gini_{it}$ is inequality. Education, economic growth, and inequality are Z_{it} vector control variables. In equation (3) it is explained that IF is placed as a threshold variable with a regime indicator in the form $I(\cdot)\delta_i$ is an individual effect and e_{it} is residual.

Determination of the threshold value (IF) can be seen by the minimum squared residual threshold model. According to Wang (2015), if γ is known (or has been determined) then the model is not much different from the general linear model. However, if γ is not known, there will be problems with parameters where the estimator γ is not standardly distributed. In order to find the γ value, this study followed the steps described by Xu et al. (2020) where there are three steps using the threshold model. First, the threshold model is included in the γ element, then it is transformed into a linear form and the sum of squared residuals ($S_1(\gamma)$) and the β coefficient is estimated by least quadratic regression (OLS). Second, the estimation process is repeated 300 times with different γ values. Finally, the smallest γ is the appropriate threshold for the β coefficient.

Testing whether or not there is a threshold effect can be seen from the F statistic (Song, 2021). If the hypothesis $H_0: \beta_1 = \beta_2$ found that there is no threshold effect of residual government spending on poverty. Meanwhile, if a hypothesis is found $H_1: \beta_1 \neq \beta_2$ then there is the existence of differences in the threshold effect of inefficiency fiscal on poverty. The statistical F construct is formed as follows (Wang, 2015):

$$F_1(\gamma) = \frac{S_0 - S_1(\gamma)}{\hat{\sigma}^2} \quad (4)$$

This study used the likelihood ratio statistical test by Hansen (1999) to determine the internal confidence threshold. According to him, this is the best way to test the territory without rejection. Hansen (1999) assumes that the estimated threshold value of γ is consistent with the same truth value of $\gamma(\gamma_0)$. The likelihood ratio test calculation $\gamma = \gamma_0$ is as follows:

$$LR_1(\gamma) = \frac{\{LR_1(\gamma) - LR_1(\hat{\gamma})\}}{\hat{\sigma}^2} \quad (5)$$

Table 2. Descriptive Statistics

Variable		Mean	Std.dev	Min	Max
Pov	Overhall	16.99	3.92	6.9	25.5
	Between		3.65	7.68	21.32
	Within		1.59	13.89	21.45
IF	Overhall	5.32	5.19	-0.23	43.59
	Between		2.93	1.01	11.36
	Within		4.32	-2.88	41.14
Edu	Overhall	8.95	1.32	6.24	13.03
	Between		1.26	7.18	12.49
	Within		0.46	7.74	10.10
Eg	Overhall	3.43	2.77	-20.34	13.23
	Between		1.57	-1.26	7.27
	Within		2.30	-15.63	11.90
Gini	Overhall	0.28	0.03	0.19	0.45
	Between		0.02	0.23	0.35
	Within		0.02	0.22	0.41

Source: Author work.

Where $LR_1(\gamma)$ is the sum of squared residuals and $\hat{\sigma}^2$ is the variance of the residuals. Hansen (1999) formulated the calculation of the area of rejection with the rejection hypothesis $LR(\gamma) > -2\ln(1 - \sqrt{1 - \alpha})$ with a significance level of α . With these calculations, critical values can be determined easily at the 10%, 5%, and 1% levels (Xu et al., 2020) so that researchers can make decisions quickly and precisely. In addition, this LR calculation can be used at two thresholds (Xu et al., 2020; Raouf, 2022) or three thresholds (Deng et al., 2013; Su et al., 2022).

Before entering the data analysis stage, the researcher presents a summary of the data in Table 2 and the data correlation in Table 3. Based on Table 1, the average poverty rate in Aceh is 16.99 percent. The average inefficiency fiscal is 5.32 percent. The average education is 8.95 years with an economic growth of 3.43 percent. Finally, the average inequality is 0.28. Movement of highly fluctuating data is on poverty, inefficiency fiscal, and economic growth.

Table 3 is the research correlation between variables. The correlation of the coefficients of the independent variables to the dependent variable was found to be very low except for education at 0.066. Meanwhile, the correlation between the independent variables was found not to have a high relationship. Therefore, the research model to be analyzed does not indicate multicollinearity.

Table 3. Correlation Matrix

Variable	Pov	IF	Edu	Eg	Gini
Pov	1				
IF	0.110	1			
Edu	-0.665	-0.014	1		
Eg	0.016	0.079	0.104	1	
Gini	-0.389	-0.009	0.348	0.005	1

Source: Author work.

4. Empirical Result and Discussion

Entering the panel threshold analysis stage, the researcher first tested the existence of a gap structure in the studied model, namely the inefficiency fiscal. The test results are presented in Table 4 where the existence of a threshold only occurs as much as one for the inefficiency fiscal variable for 23 districts/cities in Aceh Province. Previously tested thresholds were in the form of two and three, but the results were inconsistent and not significant. The value of the F-statistic threshold was found to be 9.51 and a significant value of 5%. The test was repeated 300 times. Based on these findings, we can divide the gap in inefficiency fiscal below and above the threshold.

Table 4. The existence of threshold effects

Threshold	RSS	F-stat	P-value	Crit10	Crit5	Crit1	Bootstrapping
Single	169.21	9.51	0.030**	6.34	7.84	10.52	300

Source: Author work. * Mean 5% level of significance.

After knowing the existence of the threshold, the next step is to estimate the threshold value. Table 5 shows a known threshold of 1.817% for remaining budget. The lowest confidence intervals are 1.783%, and the highest is 1.858%. This confidence interval limit is rational because it is close to the estimated value. In other words, the estimation results are feasible as an analysis tool.

Table 5. Threshold value and 95% confidence intervals

	Estimate	Lower	Upper
Threshold (γ)	1.817	1.783	1.858

Source: Author work.

Table 6 is the result of estimating the coefficient of the threshold variable with three independent variables. The education variable was found to have a negative and significant effect at the 1% level. If education increases by one year, poverty will be reduced by 2.495%, assuming ceteris paribus. This finding is in line with Sarwar (2011), Gounder & Xing (2012), and Putra & Lisna (2020). Poverty has more complex problems, so this group cannot escape the vicious circle. One reason is the low level of education. Education reflects a person's opportunity to get a better job. In addition, higher education significantly impacts the wages received (Gounder & Xing, 2012). In addition, higher education provides opportunities to gain access to better health.

Table 6. Threshold regression for single threshold models

Variable	Coefficient	Std. error	t	Upper	Lower
Edu	-2.495	0.130	-19.16***	-2.752	-2.239
Eg	0.019	0.023	0.84	-0.026	0.064
Gini	4.876	2.178	2.24**	0.584	9.168
<i>Threshold</i>					
IF < threshold	-0.102	0.046	-2.21**	-0.194	-0.011
IF > threshold	0.039	0.011	3.67***	0.018	0.061
Cons	37.827	1.265	29.88***	35.332	40.321
Obs.	253				
Number of cross	23				
R-squared	0.423				
F-stat	79.25***				

Source: Author work. **, *** mean 5% and 1% level of significance.

Furthermore, the empirical results of economic growth were found not to affect poverty. This finding differs from De Matteis (2013) and Balasubramanian et al. (2023). Next, inequality is known to have a positive effect on poverty. Statistically, the effect of inequality is at a significance level of 5%. Thus, if inequality increases by 0.1, poverty will increase by 0.48 percent, assuming ceteris paribus. This finding aligns with Asra (2004) and Tachibanaki (2006). According to their study, inequality has an important impact on the problem of poverty. Inequality is not only in terms of income but also how a group gets other important utilities such as education and health. Inequality in villages and cities is generally more pronounced and unequal because all needs are in the cities. In terms of education, of course, people in cities are better than those in villages in terms of health. The bigger the gap, the more poor people will be created.

The remaining expenditure section is divided into two forms, namely below the 1.187% threshold and above 1.817%. The two forms have different signs, which are negative and positive. Statistically, both have a significant effect at the 5% and 1% levels. The interpretation for the area below the threshold is that if an area has remaining government spending lower than 1.187, then poverty will decrease by 0.102%. However, if an area has more than 1.187% of spending left, poverty will increase by 0.039%. Indirectly, the emphasis on remaining government spending is significant in reducing the poverty rate in Aceh Province. An illustration of the threshold for remaining government spending is presented in Figure 3. It can be seen that the greater the inefficiency fiscal, the indirectly the planning and implementation of activities are not completed, causing a real effect on increasing poverty in Aceh Province. However, if the government optimizes inefficiency fiscal to below 1.817%, poverty will decrease significantly. This finding is in line with research conducted by Adegboyo (2020), Miari & Greece (2020), Taruno (2019), and Yusri (2022) but contrasts with Nalle & Affoan (2022).

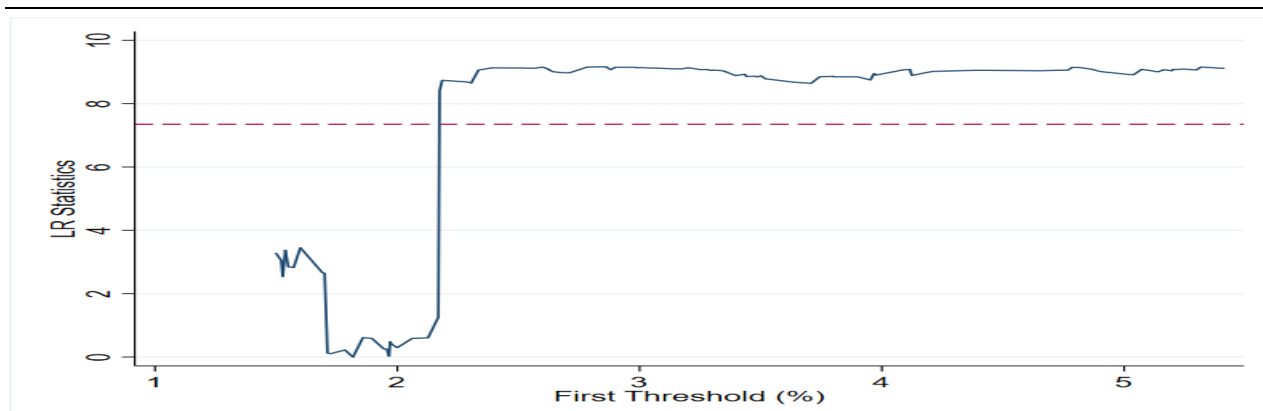


Figure 3. Threshold Inefficiency Fiscal

4.1 Robustness Checks

To ensure model reliability, Thanh (2015), Chu et al. (2019), Abdulahi et al. (2019), and Raouft (2022) suggest using the Generalized Method of Moments dynamic model. The dynamic model is characterized by the existence of a lag dependent which is included as an independent variable. The quadratic function is implemented on the inefficiency fiscal on the GMM equation model, which is formed as follows:

$$Pov_{it} = \theta_0 + \theta_1 Pov_{it-1} + \theta_2 IF_{it} + \theta_3 IF_{it}^2 + \theta_4 Edu_{it} + \theta_5 Eg_{it} + \theta_6 Gini_{it} + \quad (6)$$

Table 7 displays the estimation results from the poverty in the dynamic panel. It can be seen that the inefficiency fiscal has the same sign and is consistent with the estimation results of the threshold panel, namely negative and positive. Furthermore, the inefficiency fiscal variable gives a solid signal to poverty where there is a U relationship. This indicates that the initial stages of fiscal inefficiency still have a poverty reduction effect. However, poverty will increase significantly if the fiscal inefficiency exceeds a specific limit. Meanwhile, education and inequality have the same negative and positive signs. Both are significantly influential at the 1 percent level. Even though economic growth does not have the same sign, statistically, both the GMM and the threshold models have no significant effect. Finally, based on the Sargan test, the instrument in the model is valid, and the accuracy of the model described by the AR serial correlation was found to have no problem with serial correlation. Based on the results of this test, the threshold model in this study is solid to be used as an analysis model.

Table 7. Dynamic system GMM estimation

Variable	Coefficient	Std. error	z-stat
Pov(t-1)	0.677	0.059	11.40***
IF	-0.066	0.029	-2.30**
IF ²	0.003	0.001	2.22**
Edu	-0.884	0.246	-3.58***
Eg	-0.005	0.007	-0.79
Gini	7.364	2.732	2.70***
Cons	11.215	3.075	3.65***
AR(1)	-2.53***		
AR(2)	1.11		
Sargan test	68.31		
Number of instruments	131		

Source: Author work. **, ** mean 5%, and 1% level of significance.

5. Conclusion and Policy Recommendations

This article explores the connection between fiscal inefficiency and poverty in 23 districts/cities of Aceh province, as well as various indicators, including education, economic growth, and inequality, from 2011 to 2022. To address the issue of poverty, we utilize the panel threshold method as novelty. Through this approach, we discovered that education has a negative effect on poverty by 2.495%, while inequality has a positive effect on poverty by 0.487%. On the other hand, economic growth does not seem to have a significant impact on poverty. Increasing inefficiency fiscal contributes (above threshold 1.817%) to a rise in poverty by 0.039%, while decreased inefficiency fiscal (below threshold 1.817%) leads to a reduction in poverty by 0.102%. The robustness model test was also applied using the GMM approach, and the results showed the same sign as the threshold.

Based on these empirical findings, there are several policy recommendations. First, education is an important key to overcoming the problem of poverty in 23 districts/cities in Aceh province. The impact it gives is greater than the others. For this reason, the government needs to encourage the community to have 12 years of compulsory schooling and improve public education by increasing activity programs such as formally and informally improving skills, expanding access to education for people who can't afford it, and providing subsidized assistance to the poor. The goal is for people to get higher education and equal opportunities to get decent jobs.

Second, the government must reduce inequality through equity in villages and cities. So far, cities have been seen as areas with better access than villages, resulting in jealousy and eliminating opportunities for certain groups, especially the poor. Therefore, equalization measures from all aspects (economy, education, health) need to be done. Also, the government needs to put forward social need subsidy programs for the poor. The focus on equity is not only in developed regions but also in other districts/cities.

Third, based on empirical findings from inefficiency fiscal, the government needs to increase the effectiveness of planning so that government spending (not becoming a large remainder) can help reduce poverty. This step is important because the government is the main motor in suppressing the problem of poverty. In addition, there is a need for synchronization from planning to activity output so that the remaining spending is not higher than a certain limit so that activities are more effective and beneficial to the community, especially the poor. If not immediately pursued, then the problem of poverty will reappear in the future.

Although the research provides valuable insights, it does have some limitations. Firstly, the study only examined government spending (from the inefficient fiscal side) and socio-economic indicators in 23 districts/cities in Aceh Province. It would be beneficial for future research to investigate the impact of provincial spending on poverty in Aceh Province, as special autonomy funds are divided between provinces and districts. Additionally, researchers could consider including other variables like social spending, education, and health to obtain more comprehensive results. Secondly, there is scope for further development of analytical methods like the ARDL Panel to achieve long-term outcomes.

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The citizens 'psychological perception of housing in the environment of the housing crisis in Central Europe: Pardubice case study, Czechia

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Abstract. *One of the problems in contemporary Europe is the high real estate prices, which do not allow young couples to start their professional careers and family life in places that would suit them. Such problems cause social and economic problems. Public administration is trying to create building-favorable conditions at the level of the state, regions, or counties, as well as individual municipalities. Market pressures on rising housing prices have at least partially eased. In order for such a procedure to achieve the desired results, a coordinated policy must be developed and implemented in accordance with modern approaches to the management of municipalities, cities, and regions. Such a policy also includes the principles of strategic planning in the case of housing issues summarized in the concept of housing development. The aim of the paper is to identify the key points in the process of preparing the housing concept for a medium-sized city. There was used a mix of personal interviews and questionnaires spread by the important actors in local social policy. The outputs from the research led to the concluding recommendations for the improvement of the housing situation at the local level.*

Keywords: social policy, housing policy, housing development concept, housing support, regional development, city management

JEL Codes: R28

1. Introduction

Social policy is one of the most dynamically changing segments of public policy. Economic development, which was the main issue during the 20th century, has been replaced by sustainable development in Western countries. (Hobson & Cowen, 2020) Also the other countries have joined the idea that social aspects are crucial for the development of the state. (Wang, 2021, García, 2021) Man as a unique being is a key player in this policy. The decentralized tendencies, which are common in Western Europe (Pfau-Effinger & Grages, 2021), are becoming more and more popular in the Central and Eastern Europe as well. Within this policy the key ministries are delegating more and more competencies to lower levels of the public governance systems. (Binswanger-Mkhize et al., 2010) Financing social policy is one of the biggest burdens on the state budget, without social policy having direct tools to recoup these investments. Therefore, ways are being sought to spend the expenses as efficiently as possible (Stelina, 2020).

Strategic planning proved to be one of the tools supporting the efficiency of the usage of public funds as early as the 1990s. As part of this process, there is a detailed analysis of the state of the art, setting visions and goals, which are followed by specific outputs and actions. All these issues are fitted in the institutional

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framework of the state, as well as in the financial framework. Strategic planning also defines how strategies are implemented and how to evaluate their impacts. (Wilkinson & Monkhouse, 1994, Slack et al., 2020)

The existence of strategic plans for cities and municipalities, as well as sectoral strategies at the local level, is also one of the main aspects that enables the interconnection of state, regional, and municipal objectives. This connection is subsequently applied in practice mainly through subsidy policies at various levels, which are directly linked to individual strategies. (European Commission, 2016)

Creating a local community is an important part of creating strategies (Grynevych & Buslaev, 2024). This requires regional representatives to bring together key actors in the local community (Lee & Chan, 2024), legislative boundaries and political visions (European Commission, 2016). Social issues concern the public when they affect themselves. At the same time, each individual is a potential user of social support with regard to age, health and / or social situation. It is, therefore, often difficult to identify regional priorities (Oza, Sanchaniya, Kundziņa, Lapuke, 2024). Another aspect of this problem is the elected representatives' perceptions of the real needs of the citizens, which do not always correspond to the resulting political agendas. It is, therefore, necessary to define specific areas that the local strategy will prioritize.

1.1. Current State of Research

These basic demographic trends need to be taken into account when designing all strategies:

- the time when people become independent, i.e. they live longer with their parents, increases,
- the age limit for entering into a first marriage, which is an important determinant of independence, is increasing,
- the population is ageing - so life expectancy is increasing and related to the need to provide care for these people if they are unable to take care of themselves. (Cummings-Vaughn, 2017, Kupiszewski et al., 2008, van der Vleuten & Kok, 2014).

This means that greater demands are placed on the dynamic processes that take place in society. Local and regional authorities are facing tasks that require the involvement of a wider range of participants (Kwok-yu, Wai-wan, 2024). They constantly have to deal with limited competencies and the fact that in the Czech Republic, the state administration often transfers its responsibilities to self-government without providing sufficient material support:

- Absence of affordable housing.
- Reconciling family and work life.
- Increasing problems and greater dynamics of these problems among socially excluded people (ie increasing poverty).
- Subjectively perceived insufficient communication between the state and the citizens. (Ministry of Labour and Social Affairs of the Czech Republic, 2014, Isaacs, 2017, Wokoun, 2015, Blažek 2019)

There can be attached great importance to system project support, which is spent on the creation of appropriate concepts in the monitored issues. Decentralist tendencies are a positive motivator, however, actively regulating state interventions in the operation of the project are often counterproductive. If the primary project leader is a ministry that supports subprojects in its activities, it is necessary to emphasize equal partnership communication and not compete for who understands the problem more.

The presented research deals with a specific case of housing policy-making at the local level. It thus combines the theoretical approaches that have been presented in the above research and at the same time is based on them in the design of specific measures.

Many research projects have been done to deal with the housing market and housing prices (e.g. Makalima, 2024; Ciesla, 2024; Beer et al. 2024). Contemporary economic and social development has led to the rise of real-estate prices. Even though it is not an easy-to-solve problem (Schuetz, 2020), there are steps that could be taken by the local municipalities (Hoyt, 2020) to improve the situation of their citizens who are searching for affordable housing opportunities.

2. Research Elaboration

2.1. Research Methodology

The aim of this paper is to identify the key points of the process of preparing the housing concept of a medium-sized city. Following the research goal, the following research hypothesis was established: There are fundamental defects in the market functioning of the housing market, the identification and elimination of which can contribute to the improvement in the housing market.

The paper is based on an analysis of documents, structured interviews, and a questionnaire survey, which were conducted during the key analysis, from which this text advances key conclusions. The use of these methods in specific practice will be described below. These methods form the absolute basis of scientific procedures. Subsequently, within the qualitative considerations, the methods of scientific induction were used in the interpretation of the findings and in order to verify the established hypothesis. At the same time, deductive considerations of qualitative indicators were used. As a result, the presented findings were synthesized into specific outputs, which are the aim of the paper, and basic facts about the research phenomenon were provided. Within the whole analysis, the overall output, which is the subject of discussion, was divided into individual parts in terms of greater clarity and the possibility of verifying the established hypothesis. The descriptive part cannot be omitted when the key facts of the problem are stated primarily. The basis is the analysis of documents, which is often a neglected procedure, which is simply explained as a search for resources. In our view, document analysis is used to acquaint with the results of research by other authors and the study of relevant sources of information to understand the problem. In practice, the method can be used to compare the realities of other organizations, procedures, developments, etc. The document analysis method is used in most human activities, whether it is decision-making processes (production, political, decision-making, etc.) or planning or feedback reflection. The only prerequisite for using the document analysis method is sufficient relevant study material. That was enough in our case (Giddens, 2009, Disman, 2011, Jeřábek, 1993, Surynek, Komárková, Kašparová, 2001).

The creation of the housing policy concept of the city of Pardubice in the Czech Republic was chosen as a case study for this paper. Although the legislative conditions in the area of housing in the countries of Central Europe are different, unfortunately, the problems are similar. The specificity of the countries of the former Eastern bloc is the high share of owner-occupied housing, which together with the inflexible system of permitting new buildings and reducing the number of people living in the same household and very low mortgage rates in recent years, leads to significant pressure on the real estate market and significant price increases. In this area, the Czech Republic has been one of the countries with the worst ratio of real estate prices to the average income for several years. However, even such advanced social housing markets, such as the Austrian market, are not spared rising prices. However, the Czech Republic was chosen for the case study precisely because of its very high real estate prices compared to the population's income. (Deloitte, 2020, Deloitte, 2021). Due to the fact that the situation in the capital is always relatively specific, the city of Pardubice was chosen as an example of a regional centre with a population of almost 100,000, which can be considered a medium-sized city in Central Europe.

Interview

There were two ways how to conduct the respondents' opinions. Due to the scope of the research, the number of people interviewed and the difficulty of the interview itself, intermediaries were asked for help. They came from cooperating organizations as well as from public bodies; some respondents were approached by the organization's designated social workers. The advantage of this procedure lies in the greater trust of the respondent in the interviewer. This is because the interviewer knows the respondents well from his/her experience, which eliminates the level of lie scores. The disadvantage, however, is that the interviewer, although familiar with the purpose of the research, may not always accurately capture the intent of the research. The interview record sheet was divided into a total of five sections of ten pages: Identification (demographic) data; Housing - current situation; Preferred housing; Barriers to housing; Support. A structured interview was designed to be used most effectively in the interview process and in a place such as a homeless squat. For the purpose of clarity, some results can be simplistically quantified. Despite its structured nature, there was no lack of space for the respondent to express any thoughts. The interview contained 34 core questions and 10 sub-questions.

The respondents represented the target groups of social services clients - seniors, persons with disabilities, families with children, persons with mental illness and socially excluded persons - and included low-income families represented by women in a difficult situation that has a direct impact on their housing situation. The sample also includes people living in hostels or other precarious housing but actively addressing their situation through social institutions, homeless people or foreigners. Thus, willingness to respond and belonging to the target group were the main criteria. Social service workers had the most significant contribution for securing respondents.

Questionnaire

The research sample was divided into four categories according to age according to the agreement with the client. In order to ensure representativeness, the corresponding ratio to the specified number of respondents was calculated on the basis of data from the Czech Statistical Office. At the same time, the gender ratio was maintained. The last moment was the determination of quotas for individual city districts, and the interviewers looked for defined respondents within the city districts. The results represent the opinions of a total of 740 people who are looking for housing and do not own any real estate. It did not matter whether they could afford a specific change of housing at the moment of questioning. At the same time, another 160 people were approached, who have their own property but are interested in changing their existing housing or buying it as an investment.

The questionnaire contained 33 questions and one question about housing parameters had 10 sub-questions. The questionnaire was composed of closed, semi-closed and open questions. The interviewing took place throughout the city by trained interviewers, who purposefully searched for specific people who had permanent residence in the given district.

2.2. Case Study

The city of Pardubice is located in the Elbe lowland, 100 km east of the capital of the Czech Republic. Together with the neighbouring town of Hradec Králové, it is a part of the bicentric agglomeration of Hradec Králové-Pardubice, which numbers approximately 350 thousand inhabitants. It is the fourth largest functional agglomeration in the Czech Republic. The economy in the city is focused primarily on the chemical industry. The city is directly connected to the European TEN-T network by rail. Its advantage is also a direct connection to the highway with the capital. Above all, the good and very fast accessibility of the capital by rail makes the city a convenient place to live for those who cannot afford to live in Prague but at the same time do not want

to live in a smaller city. This fact also has an impact on the price of housing in the city. (The City of Pardubice, 2021a)

The city's housing policy is based on the principles set at the state level. Thanks to state support, the City of Pardubice participated in a project implemented by the Ministry of Labor and Social Affairs of the Czech Republic within the system project "Social Housing - Methodological Support in the Area of Social Agendas". This project helps to pilot local social housing strategies. The project is primarily to contribute (Ministry of Labour and Social Affairs of the Czech Republic, 2016) to strengthening competencies in solving issues of social housing, including accompanying services and actors (municipalities, employment offices, universities, etc.). The piloting served to ensure the goal and one of the participants was the Statutory City of Pardubice. The project was built on the following basic pillars:

- Establishing international cooperation and transfer of good practice.
- Preparation of key analyses and methodologies for the implementation of the social housing system.
- Provision of education together with teaching materials.
- The existence of a support contact centre.
- Creation of educational and awareness activities.

Pardubice, therefore, implemented an individual project entitled "Pilot verification of the social housing system at the local level in the municipality of Pardubice". The basic determinants of the considerations were based on the existing concept of social housing from 2016 and it was a matter of verifying the feasibility of setting up the entire system (The City of Pardubice, 2017). At the same time, he also focused on the creation of social work methodologies in the field of housing, social work performance, optimization of the local concept of social housing, elaboration of analyses needed to update the concept and education, and exchange of experience with foreign partners.

The overall results of the project serve as a basis are also an implemented part of the newly created "Housing Strategy for the City of Pardubice", which is to help the city in planning territorial development, managing its own housing stock or supporting affordable housing (The City of Pardubice, 2021b).

The activities described above served to fulfil the goal and there can be subsequently considered the following as basic outputs (The City of Pardubice, 2017):

- Case studies in social housing in Pardubice.
- A comprehensive evaluation of the functioning of the social housing system in Pardubice.
- Methodology of social housing project Pardubice.
- Availability of housing in Pardubice.
- Evaluation of the burden on the housing of seniors and 55+ households in Pardubice.
- Affordable housing concept.

The key analyses will be discussed in detail, one of which is called "Availability of housing in Pardubice". The selection is intentional, as the research included the main aspects of housing in the city: (Mandys et al., 2019, p. 3).

1. "Evaluation of the current situation in the field of housing in Pardubice.
2. Implementation of a survey of people in housing need.

3. A survey was implemented to focus on issues of rental and owner-occupied housing availability in Pardubice and the surrounding area. "

The analysis was designed to provide a holistic picture of housing problems. The methodological procedure for the solution was as further described. The situation in the area of housing was primarily processed with the help of searches of available information sources (i.e. analysis of documents) in the area of demographic and political facts about the monitored locality, including a description of housing policy. Publicly available resources and internal materials provided by the contracting authority were used for this purpose. The most complicated part was focused on the housing situation. Getting data on the state of commercial housing is not easy and there are few resources available. Therefore, commercial entities that sell real estate and provide housing financing were contacted. This has proven to be the most effective way. Searching the public registers of the cadastral office, postulating conclusions on the basis of real estate offers from the Internet, and comparisons with general data of the Czech Statistical Office was a way that would not bring the desired effect. The cooperating organization was selected with regard to its position on the market in Pardubice and was therefore approached by one of the most prestigious organizations in the region. The resulting data were processed in a quality that exceeds the capabilities of the university's academic staff.

The second part of the analysis was based on structured interviews with people in housing need. A total of 50 respondents (24 women and 26 men), who in most cases were users of some social services, were deliberately selected. The sample of respondents reflects the representation of all target persons of assisting institutions, including persons living in precarious housing. The "ETHOS Typology" (FEANTSA, 2021) was also used. The aim of the analysis was to find out what is the citizens' perception of housing aspects and what are the actual needs of the respondents in the area of housing and problematic areas from the point of view of the respondents preventing the provision of long-term housing. Another aim was to find out to what extent the respondents are informed about the possibilities of housing assistance by the city and organizations working in the social field. The interviews were conducted in two ways. Some graduated from the research team, some were implemented by contact persons in selected social services. This is where the trend, which is growing at least in the Czech Republic, has fully manifested itself. This is the reluctance of social service users to engage in similar research.

The third part (Mandys et al., 2019), which concerned the availability of housing from the point of view of the public, was solved with the help of a questionnaire survey among the inhabitants of the city of Pardubice (our analysis). The aim was to find out the actual needs of respondents in the field of housing and the problematic barriers to securing long-term housing. Another aim was to find out to what extent the respondents are informed about the possibilities of housing assistance by the city and organizations working in the social field. Pardubice is ranked among the highest quality of life in various satisfaction surveys. There are plenty of job opportunities, transport services (not only train) to other regions is at a good level, which will be further improved by the completion of the planned D35 highway. The results included the views of a total of 740 people who were looking for housing and did not currently own any properties. It didn't matter if they could afford a specific change of housing. Another 160 people who have their own real estate but are interested in changing their existing housing or acquiring it as an investment were also contacted.

The analysis and the whole project were based on the principles of the strategy "Concept of Social Housing in the Czech Republic 2015-2020". This document contains conceptual and strategic starting points for solving the situation of a growing number of people who are in housing need or are directly at risk. It contains the vision, goals, and tasks that the government of the Czech Republic has set itself. One of these goals was the preparation of the law on social housing (Ministry of Labor and Social Affairs of the Czech Republic, 2016). The law on social housing was not approved even after several years of discussions, and due to the parliamentary elections that took place, its adoption was postponed indefinitely.

3. Results and Discussions

The housing market is affected by a number of social indicators, including the demographic situation. Population growth in the 1970s brought increased demand for one's own housing 30-40 years later. Due to the low quality of living in the city centre, part of the population moved to the suburbs. This results in, for example, lower tax collection, increased demands on the administration of the territorial unit, etc.).

In the long run, the number of people who want to live outside the city is increasing and they are buying new or older houses or land (their price is comparable to apartments). They then commute daily for work, including commuting to schools. This results in a very problematic traffic situation (disproportionately thickens). The settlers are leaving the settlers, more and more flats are being rented, which has resulted in further migration of inhabitants. One can describe the ideal living in the following way (with a bit of exaggeration) = it represents a new terraced family house with a layout of 4 rooms and a kitchen corner, an area of about 90 m², in a quiet location and as close as possible to the centre.

People in need who have been surveyed are afraid to describe their households. Usually, their small apartments or rooms have only the equipment necessary for everyday life. Achieving commercial housing for these people is virtually impossible. These people are often in a financial trap that does not allow them to change their situation. This includes both the debt and the total money that these people can raise to meet their needs. In Pardubice, the number of homeless people has increased from 150 to about 400 at present in the last three years. This number will continue to rise. Virtually none of them are guaranteed a permanent income or permanent housing. Many of them are completely excluded from the housing market. If a person lives on the street for more than a year and has debts higher than approximately CZK 250,000 (ca € 9,700), he is older than 45 and has no chance of a better life than staying in a hostel for the rest of his life. Shelters are limited to a period of one year only.

The main obstacles that prevent these people from securing housing are:

- Rental prices.
- Deposit (usually two rentals).
- Indebtedness.

It is becoming increasingly common that respondents deal with their situation most often in the asylum house - hostel or application for a city apartment. this cycle between institutions has been going on for years, and sometimes children who continue in this cycle grow up in it. He sees the starting points that would allow them to change their situation primarily in the following measures:

- Cheap municipal flats with no deposit.
- Enough starting flats not only for young people.
- Cooperation with social workers (positively perceived as functional).
- Construction of a new municipal hostel without foreigners.

The availability of housing from the public's point of view is based on the basic demographic fact and the fact that the age, at which people become independent and start households, is increasing. A rental apartment is the most common place where respondents live. The amount of costs associated with housing corresponds to the prices in the current market; the results show no differences. Therefore, it is important to know what percentage of your income a person spends on housing. From the results, there can be concluded that housing is the most important item in the respondents' budget. This means that the cost of housing is also a key determinant when deciding on your own or another home.

Table 1: Respondents' expenditures for the housing costs.

		What percentage of the respondent's total income is housing costs?			
		Less than 25%	25 – 50%	51 – 75%	More than 75%
Monthly expenses for current housing	Up to 6000 CZK	185	99	14	1
	6001 – 10000 CZK	54	168	14	1
	10001 – 14000 CZK	23	108	31	1
	More then 14 000 CZK	6	27	8	0

(Source: Mandys et al., 2019, p. 82)

According to various indicators, the quality of life in Pardubice has been at a high level for a long time. This is significantly reflected in apartment prices. Respondents for reasons of dissatisfaction with their housing situation most often stated:

- Expensive housing, small apartment.
- Living with other people (most often with relatives).

They are often interested in exchanging an apartment for a family house, which is confirmed by previous results from the analysis of the commercial apartment market. The analyze has shown the determinants of the intended departure from the city, it is primarily more affordable housing in the surrounding towns and villages in the area. Inadequate housing supply and possibly better employment possibilities in Prague and Brno, which are the two largest cities in the Czech Republic.

Five years is the most common time when respondents are able to think that they will change their housing situation. The shorter time is not practically unthinkable, more often than not 5 years. If a person does not have the initial capital, cannot expect the help of the family, the waiting time for the possibility of obtaining housing is very long.

Respondents strongly prefer living in their own house. When considering housing, respondents consider as important:

- The purchase price or amount of rent (excluding housing-related costs).
- Regular monthly housing costs (mortgage amount, payment for energy, services, and other fees).
- Proximity to work or school.
- The quality of the environment around the place of residence and safety.
- Transport services and plenty of parking spaces in the area.
- Layout, design, size, and energy consumption.

Respondents perceive the following categories as key barriers to access to housing:

- Prices of new buildings (apartments and houses), including rents in them - clear barriers,
- The prices of older real estate are not a clear barrier, nor is the offer of real estate for rent or sale.

Respondents have virtually no idea about the possibility of financing the purchase of the real estate. Own financial savings are the expected most important source for the acquisition of real estate. Respondents do not expect the family or acquaintances to help them with housing financing in any way. A mortgage and then a loan will be the most commonly used housing finance too.

4. Conclusions

The development of the strategy at the local level has shown aspects of good practice that can be transferred to other European countries. Above all, it is about the involvement of local representatives in solving the problem, including political support for the proposed solution, while it is also appropriate to use local universities and institutions to provide analytical data and to use the third role of the university in local/regional development. The wide range of actors would be involved. Universities can play the role of facilitators in the participation and strategy-creating processes. Their position as an independent institution from public and local offices as well as from commercial developers is a significant advantage.

Equally important is the use of structural support and national strategies (positives of vertical linking of strategies at the local – regional – national – European level).

One of the few ways to provide housing for people with low incomes (including families) is to put aside the commercial interests of developers and prioritize those projects that create affordable housing. Another way is through socially responsible projects. The recommended option is small apartments according to the interest of the target group. Speculators pose a significant risk if they would deny this group of people the opportunity to acquire these apartments, or who would receive disproportionately high sums of money for their accommodation in the form of social housing benefits.

A significant factor that affects housing is the tax incentives of large companies, which motivate them to build apartment buildings for their employees. Local governments do not have such options and offer the involvement of regional deputies or senators. A similar connection has proven to be historically successful. At the same time, the municipality should increase the number of beds in its residential hotel, because the capacity of the municipal hostel does not correspond to real needs. Most of the positions are filled by foreign workers from large companies. This is also related to the capacity and condition of residential social services, which are owned by the city. At the same time, it makes sense to rent municipal apartments to aid organizations, which then run various housing support programs for their users.

Among the recommendations resulting from the research is the dispersion of socially excluded people throughout the city, not the creation of localities with concentrations of problematic people and thus phenomena. This point is related to the flexible and deliberate allocation of the capacities of municipal residential hotels. It is also important to continuously analyse the number of problematic persons and evaluate their unfavourable situation, who are disqualified from obtaining accommodation in municipal facilities due to their debts. The analyses are related to the setting up of a system of continuous data collection in the field of housing (also aimed at the public), including the acquisition of time series. This element is currently very often missing in the social area, or the data are monitored either randomly or in a form that is not suitable for evaluating the social impacts of policies. At the same time, it is possible to expand the survey to include new topics (e.g. what is the unavailability of obtaining a mortgage). At this point, the output of scientific research from the same country as well as from abroad would be implemented. Another important question here is the methodology as well. The data as well as the studies must be done with clear and respectable methodology and data and outputs' interpretation. A very important point is to preserve the housing stock owned by the city, and thus to suspend the sale of apartments owned by the city.

Construction of your own rental apartments is one of the ways to regulate rental housing prices, which are constantly rising. Excessive regulation of the housing market (as shown by the development in the Czech Republic) leads to the degradation of the housing stock. (Deloitte, 2021) The size of the intervention of self-government is therefore primarily a political decision, which should be as flexible as possible to the requirements of society. It should act as a prevention for cases where many people do not have commercial

housing, even though they have a slightly above-average salary. More and more large cities in Europe are facing this problem.

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The Role of AI in E-commerce Brand Recognition: A Malaysian Perspective

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Abstract: Artificial Intelligence (AI) has transformed retail strategy and operations, introduced branding strategies, and improved consumer shopping experience. E-commerce growth in Malaysia requires established and emerging companies to compete in order to maintain their fitness. Brands need to be more systematic in their strategies to maintain brand recognition across multiple e-commerce platforms using AI and other advanced technologies. This study explores the drivers of brand acceptance among Malaysian e-commerce users, with a focus on AI techniques such as big data analytics, machine learning, AI platforms, and more. The results show that machine learning and AI platforms meaningfully influence brand recognition, while big data analytics may not have a significant impact. The study proves to be a foundational reference point for future research and provides useful implications for brands looking for effective strategies to build brand recognition among e-commerce consumers in Malaysia.

Keywords: brand recognition, artificial intelligence (AI), big data analytics, machine learning, AI platforms, e-commerce.

JEL Codes: C42, M1, N35, O33.

1. Introduction

Brand plays an important role in influencing consumer choice in the market (Karthik & Vijayalakshmi, 2024). Materials have enduring value as assets over the long term. When used properly, the brand has long-lasting power, extending decades or even centuries, as exemplified by respected institutions like Harvard University, founded in 1636, PepsiCo, founded in 1898, and Yen Yen & Walia (2017); the aforementioned brands maintain their vibrant value at the moment. Brand recognition refers to the strategic implementation of the marketing strategy by firms, which is considered successful when individuals can quickly and effortlessly recognize, distinguish, or recall the brand through cues associated with the said brand (Rahman, new, 2020). Logo, the tagline in these cues, slogan, or packaging materials. Companies conduct a lot of market research to evaluate the effectiveness of their brand awareness program. Marketing strategies have numerous essentials, such as logos, advertisements, slogans, unique colour schemes, and text options. They comprise direct mail advertising, reminders to encourage customers to buy products, customer registration on websites, discount promotions, promotional campaigns and new products. Consumers find brands, share opinions about them on special forums, recommend or criticize products or services from fellow consumers or competitors, or acquire knowledge to be developed (Morokhova et al., 2023). Establishing a brand reputation is significant for companies because it permits consumers to stand out for their uniqueness or distinctiveness compared to their competitors (Shaily & Emma, 2021). Artificial intelligence (AI) refers to a collection of theories and algorithms that empower computers to carry out tasks that usually necessitate

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human intelligence, such as visual perception, voice recognition, or the interpretation of text while considering its context (AL-Araj et al., 2022). The advancement and progression of artificial intelligence (AI) have revolutionized the efficiency of commercial enterprises on a global scale. Nevertheless, the implementation of AI-based comprehensive solutions in organizations is limited due to a lack of expertise regarding the technology. The technology can aid the organization in comprehending the clients and enable it to more effectively target customers and customize advertising and marketing strategies and messaging (Arumugam et al., 2024). In certain instances, AI can even enhance these capabilities. Machine learning is a branch of artificial intelligence (AI) that has gained significant popularity in recent times. The COVID-19 pandemic expedited the acceptance of AI, altered the approach of global businesses towards emerging technologies, and significantly contributed to the growth of the AI solutions industry. In the future, businesses will increasingly require advanced solutions that seamlessly incorporate artificial intelligence with other digital technologies, such as the Internet of Things, next-generation communication, and distributed ledger systems. In the foreseeable future, this will facilitate the shift from disjointed to methodical advancement of AI technologies across the whole value chain. In the future, the use of AI solutions in cloud infrastructure will become more common, indicating that corporations consider deploying intelligent technology in the cloud to be a more effective and adaptable approach (Kraus et al., 2022). According to Lin et al. (2022), consumers perceive AI marketing communication as having little efficacy in influencing their brand evaluations and affecting their consumption behaviors. Prominent multinational corporations such as Google, Microsoft, Apple, Amazon.com, and Alibaba have strategically prioritized artificial intelligence (AI) research within their own business frameworks. In the present era, artificial intelligence (AI) has not only brought about transformations in company models and operations, but it has also exerted an impact on brand management strategies and customer behavior (Davenport et al., 2019). In the context of the electronic commerce (e-commerce) business, Alibaba's Fashion AI, in collaboration with Taobao's TECH department, has implemented a smart mirror system (Thakur et al., 2024) This system aims to enhance the promotion and recommendation of items by analyzing the items that customers bring into the fitting room. A significant obstacle to the widespread implementation of artificial intelligence (AI) is the constrained financial resources available for the continued advancement of cutting-edge technologies. Despite the numerous advantages offered by the digital market, organizations allocate substantial resources and time to ensure the efficacy of their brand recognition strategies (Shaily & Emma, 2021). The lack of research on the reasons for organizations' failure to incorporate artificial intelligence (AI) into their marketing strategies is disproportionate to the immense potential value that AI features can offer. However, it should be noted that there are contradictions present in the findings. Eriksson et al. (2020) additionally demonstrated that the machine exhibits a notably sluggish pace, and the subsequent cohorts display a lack of inclination towards embracing change due to perceived time constraints. There exists a prevailing dearth of empirical research that specifically concentrates on emerging countries like Malaysia. The majority of studies have been carried out in affluent nations such as the United States and several European countries. However, it is important to acknowledge that there are certain limitations within the existing body of research (Mulili, & Wong, 2011). In order to enhance the inclusivity of research samples, it is imperative to expand the scope of the study to encompass a wider range of countries and cultural regions (Chen et al., 2021). Malaysia's foray into e-commerce commenced in 2004 with the introduction of eBay Malaysia. In 2023, it is estimated that Malaysia's eCommerce industry will reach a value of US\$ 10.19 billion and is expected to grow to \$16.98 billion by 2027, with a compound annual growth rate (CAGR) of 13.6%. The country is presently trying to integrate its e-commerce strategy, counting features such as availability, payment, and distribution, as well as regulatory requirements, with a well-established online shopping market (Kashyap, 2023). Deficiency of research on the use of artificial intelligence (AI) in marketing In his 2017 review, Anthony Mullen highlights

the need for technology and product marketing to have a broader knowledge of how artificial intelligence (AI) can be used has played a role in their application in the Malaysian context. The Norzelan et al. (2024) study examines AI acceptance among finance and accounting department leaders in the shared service industry. Results show performance expectancy, attitude, skill, and technical capability significantly influence AI acceptability. However, there is no correlation between AI acceptance and effort expectancy, social influence, or facilitating conditions. The findings provide insights for prioritizing AI adoption in finance and accounting. Nevertheless, businesses continue to face difficulties in obtaining the essential IT literacy skills and resources, despite the existence of skill development initiatives led by industry organizations like the National ICT Association of Malaysia, commonly referred to as PIKOM. Furthermore, there is a limited presence of AI integration within local e-commerce brands in Malaysia. Insufficient scholarly investigation exists regarding the factors contributing to China's ascension as the foremost force in the digital industry, as well as the mechanisms by which Alibaba, a digital commerce enterprise, has achieved a monopolistic position inside the domestic market (Zhang et al., 2020). According to Chung (2022), in the Malaysia Retail Report 2022, a significant majority of Malaysian consumers, specifically 87%, exhibit a higher inclination towards shopping with retailers who employ technology to augment the overall customer experience. This percentage surpasses the corresponding figures of 55% internationally, 64% in the Asia-Pacific region, and 74% in Singapore. The study, commissioned by global financial technology firm Adyen and sponsored by KPMG, showed that Malaysian businesses are among the top performers in the region when it comes to using data for decision-making and customer engagement. Malaysian businesses have been identified as high performers in optimizing data for decision-making and customer engagement, according to a survey conducted by global financial technology firm Adyen and sponsored by KPMG. The worldwide survey was conducted between late 2021 and early 2022, covering a sample size of 40,000 consumers from 26 markets and 11,500 companies from 23 countries. The poll in Malaysia included a total of 1,000 consumers and 500 businesses. Considering the objectives and gaps identified previously, the research questions for this study are: What is the impact of big data analytics, machine learning, and AI platforms on brand recognition in e-commerce? In addition, this study aims to enhance brand recognition by utilizing three key AI components and cognitive dissonance theory principles. It aims to improve understanding of AI components and marketing tactics, promoting AI adoption for brand recognition.

The study offers valued insights for entrepreneurs, marketers and politicians in the Malaysian e-commerce sector. It helps make informed decisions about AI strategy, optimizes resource allocation and creates a competitive advantage. The findings can be replicated for marketing communications, highlighting the impact of AI on brand recognition. The study provides a valuable resource for policymakers and regulatory agencies, guiding the development of legislation that encourages innovation and consumer protection. The study also serves as a benchmark for future scholarly research, enabling it to be generally applicable to e-commerce contexts worldwide. It can also be beneficial for smaller, growing companies, helping them develop more effective brand awareness. The findings could increase consumer awareness and trust, as brands can mention about their usage of AI technology.

2. Literature Review

2.1 Brand Recognition

The branding and advertising industry offers important potential for growth. By strategically selecting and executing branding and advertising campaigns, leveraging technology, hiring experts, and targeting specific market segments, companies can address weaknesses and mitigate risks. Internal factors play a critical role in determining success in this field. External influences likewise impact the industry, but by adopting

proactive and responsive strategies, businesses can adapt to external challenges. In a study by Taguimdje and colleagues (2020), brand identity and reputation were identified as significant intangible assets within companies. The use of artificial intelligence (AI) technologies to recognize brand logos on social media provides new ways to understand what users are interested in. Photos shared on social media platforms provide valuable visual insights into users' behavior, desires, and needs, which marketers often overlook (Capatina et al., 2020). Research by Jarek and Mazurek (2019) suggests that AI can boost brand value by producing personalized experiences that foster intimacy, assist with purchases, and reduce post-purchase uncertainty. Chung et al.'s (2020) study found that luxury brands can use AI mechanisms to deliver individualized care for their customers beyond traditional human-to-human interactions (Lin et al., 2022). AI has revealed unexpected contradictions in strategy, with user experiences influencing their perceptions of AI in branding. Using AI for marketing presents challenges in brand management and shaping consumer buying habits. According to Kumar et al. (2019), artificial intelligence (AI) has likely to advance personalized marketing in both the short-term and long-term. This is realized through the creation of brand trust and the delivery of improved brand experiences. Capatina et al. (2020) assert that artificial intelligence (AI) technologies have confirmed to be valuable in the realm of personalized content delivery, exactly in the context of audience analysis. Additionally, these technologies have established their efficacy in enabling astute marketers to identify and differentiate brand logos presented in social media material using picture analysis.

2.2 Big Data Analytics

For businesses to improve the use of e-commerce platforms, they must comprise web analytics tools such as Big Data. These tools permit data collection, measurement, analysis and reporting on-site visitation, thus giving businesses a holistic understanding of their online operations and improving their performance. In predicting and preventing possible image crises, the use of big data from social networks is of considerable importance. This is done through emotional sentiment analysis involving social mentions, as highlighted by Capatina et al. (2020). Scholars are advised to persevere in using cloud computing for big data to create instruments that will improve the decision-making capacity of practitioners in B2C. This can be achieved by implementing artificial intelligence (AI) applications and advancements along with integrating blockchain technology. Mainly these innovations stand to be useful in domains like e-commerce order management processes and forecasting regarding online shopping behavior. The effectiveness of value chains in e-commerce is determined by transparency and usage of data across information systems (IT) systems (Reinartz et al., 2019). In a recent study (Chen et al., 2021), the rise of big data on the internet has led to a vast growth in the amount of data available. This big data gathered through data mining online varies from traditional customer surveys. The study acknowledged five main characteristics of big data: volume, accuracy, speed, diversity, and significance. For example, e-commerce sites like Amazon.com have a large number of online reviews, but not all of them are equally significant. Customers are often stimulated to share their experiences with products they have purchased. Consumer behavior and preferences can be monitored and analyzed not only through online shopping platforms but also on several social media platforms, review websites, and news portals (Micu et al., 2020).

2.3 Machine Learning

Eriksson et al. (2020) highlight the benefits of artificial intelligence (AI) for organizations. It permits the automated processing of large amounts of data, replacing manual efforts. AI utilizes probabilistic machine learning (ML) models to extract meaningful insights from data, enabling organizations to make informed

decisions. The use of artificial intelligence (AI) and machine learning (ML), a subset of AI, is revolutionizing how businesses operate. AI and ML are changing processes and improving efficiency in companies (Taguimdje et al., 2020). The use of technology enhances the intelligence of organizations. Machine learning allows computers to learn from data on their own, boosting their capabilities (Chen et al., 2021; Jarek & Mazurek, 2019). To make AI systems more effective, the way algorithms typically used in them is being changed. As stated by Nair & Gupta (2020), machine learning algorithms can look at past data to figure out which ads are shown the most often and what stages of the buying process those ads correspond to. Machine learning is a computer-based technique that uses algorithms to study and understand data. It allows computers to learn from the data, making independent decisions without human intervention. Jarek & Mazurek (2019) believe machine learning (ML) exceeds traditional digital marketing methods. ML allows businesses to gather more data to improve content and engage customers effectively. Machine learning (ML) lets companies uncover insights and make general statements from data that's been analyzed. ML comprises a wide range of techniques, such as finding patterns, modeling statistics, exploring data, discovering knowledge, making predictions, analyzing data, creating adaptive systems, and building self-organizing systems (Khoei et al., 2024). Machine learning models can understand the context of images on social media. They can use techniques like image recognition to predict how people behave on social media based on the images they share (Capatina et al. 2020). Machine learning algorithms empower B2C marketing operations to harness data-driven insights for diverse tasks, such as: Identifying potential and prospective customers, strengthening customer relationships, personalizing interactions and communications, understanding customer requirements, tailoring content, Generating and monetizing insights, creating new offerings, automating responses to common issues, Performing customer analytics (Mikalef et al., 2021). Nair and Gupta (2020) indicate that machine learning algorithms improve the implementation of flexible pricing strategies, making the process more efficient. ML streamlines the distribution of targeted promotions by identifying customers who are both likely to make purchases following a special offer, and those who will make purchases irrespective of such an offer. By adopting a flexible pricing approach, companies can increase their sales and maximize profits.

2.4 AI Platforms

Many popular platforms practice artificial intelligence (AI) for diverse tasks: Personal assistance: Alexa, Siri, Cortana, Music streaming: Pandora, Travel planning: Mezi, Financial planning: Olivia, Credit scoring: Lenddo, Language translation: Liv, Legal help: Legal Robot, Task automation: Amazon MTurk, Facial recognition: Haystack, Home automation: Nest, Pre-built AI solutions: Fluid AI (Hagan et al., 2021; Chan-Olmsted & Wolter, 2018). These platforms are designed for both personal and professional use. AI solutions have become widely used in different sectors, such as online shopping and internet marketing, as demonstrated by the popularity of Sentient (Hagan et al., 2021). In the realm of marketing, a prevalent approach is the use of technologies to gain a deeper comprehension of the most effective AI platforms for advertising purposes, as well as the extent to which they enhance the performance of a specific product. This tool has the capability to gather data pertaining to client involvement as well as metrics like clicks and impressions. According to Micu et al. (2020), the application of artificial intelligence (AI) in marketing involves the utilization of AI algorithms to automate specific marketing operations, with the primary objective of discerning consumer satisfaction. IT experts assert that artificial intelligence technologies guarantee the precision of decision-making, enhance the effectiveness of internal and external organizational operations, and enhance the customer experience. However, the benefits of utilizing artificial intelligence extend beyond those mentioned. In fact, artificial intelligence enables a substantial acceleration of processes,

which is currently the primary competitive edge for the majority of corporate organizations (Kraus et al., 2022). One prominent example of this is the implementation of a consumer relationship management (CRM) program. The responsibility of management teams inside e-commerce enterprises entails the implementation of automation strategies and the optimization of data transmission through predictive analytical platforms utilizing AI algorithms. One example of an AI platform in real-world applications is IBM's Watson, which possesses the capability to analyze vast quantities of data and engage in communication through natural language processing (Eriksson et al., 2020). Another instance is Albert AI, an algorithm-driven marketing platform utilized by Red Balloon to identify and target new customers (Sutton, 2018).

2.5 Hypothesis Development

Cognitive dissonance theory (Festinger, 1957) is central to this study, focusing on how brand recognition influences consumer behavior. This theory explains that psychological tension arises when actions contradict beliefs, leading individuals to adjust their attitudes for internal consistency. Castelo et al. (2019) identify two key factors affecting technology perceptions: its effectiveness and user discomfort. Technological effectiveness impacts cognitive assessments, while discomfort relates to emotional responses. Discomfort, indicating psychological unease, often prompts avoidance of the technology (Albarracin & Shavitt, 2018). The literature shows that attitudes toward technology are shaped by both cognitive and affective factors (Lin et al., 2022; Ajzen & Fishbein, 1980). Discomfort with AI elements, in particular, can lead to negative attitudes and reduced usage (Li et al., 2021). As per Festinger (1957), such discomfort drives attitude changes to resolve dissonance (Fazio & Cooper, 1983). This study uses cognitive dissonance theory to examine how brand recognition and technology perceptions impact consumer behavior.

Big Data Analytics offers valuable company intelligence that can drive beneficial transformations, such as enhancing current products or augmenting revenue per customer. Brand awareness is an additional avenue via which the utilization of big data can exert a substantial influence on marketing strategies (Hagan et al., 2021). By using large amounts of data, marketers can create customized content for each customer. This helps make the brand more well-known both online and in stores. Using big data enables businesses to match the effectiveness of large, established brands despite having limited marketing resources. Big Data Analytics empowers businesses by permitting them to examine and extract meaningful information from vast amounts of data gathered from various sources. This analysis provides valuable insights into customer patterns and preferences. These valuable insights gained from customer feedback can be used to guide business strategies and improve the quality of customer service, leading to increased customer satisfaction and loyalty (Chandra & Verma, 2023). By tracking a customer's online purchases, companies can determine what products or services they might want in the future. This information helps businesses provide targeted discounts and promotions based on each customer's interests and needs. If customers are satisfied with a positive transaction, they are more likely to remember and recommend the brand. This leads to improved brand recognition, which benefits both the business and the customer. Customers become more satisfied and strongly attached to the brand as a result of this situation.

H₁: Big Data Analytics has a significant relationship with brand recognition.

Machine Learning

By using machine learning techniques, businesses can enhance brand awareness by identifying potential customers who are more likely to remember the brand for future purchases, as suggested by Ooi et al. (2023). Machine learning can assist in understanding the exceptional traits and behaviours that differentiate potential long-term customers from those who only make isolated purchases. Machine learning permits marketers to use a brand's own data to uncover and predict patterns in customer behavior that drive beyond the most noticeable ones. Machine learning often helps marketers in identifying potential clients who are more likely to be drawn to and interested in a brand. Machine-learning algorithms employ contemporary client data in order to comprehend the specific promotions to which they are likely to respond. This involves determining the appropriate messaging, timing, and channels through which to engage with them. Collectively, these factors simplify the perpetual reinforcement of brand awareness and instantaneously empower personalized marketing possibilities. It is imperative for brands to keep in mind that their client base is heterogeneous and, hence, lacks uniformity. Every individual exhibits a distinct shopping pattern that brands must comprehensively comprehend in order to maintain their loyalty as clients (Trang., 2022). Machine learning is considered to be a very effective and optimal technology for marketers to segment and target potential consumers in order to enhance brand recognition. This is mostly due to its ability to recognize intricate patterns on a far larger scale than what can be achieved by humans. Customers can exhibit unpredictable behavior; nevertheless, through the utilization of machine learning, brands can now recognize strategies to effectively retain their attention (Zhou, 2022).

H₂: Machine Learning has a significant relationship with brand recognition.

AI Platforms

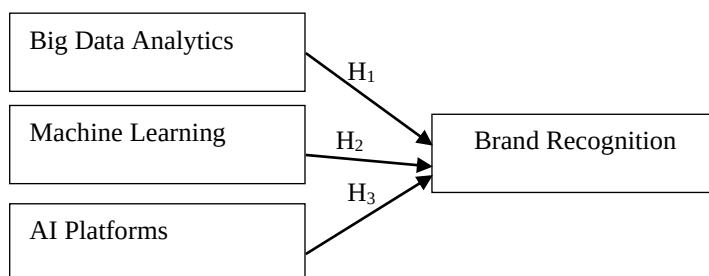
The utilization of AI platforms has the potential to provide advantages for small firms through the optimization of critical functionalities on their corporate websites, resulting in the efficient allocation of resources such as time and finances (Chowdhury et al., 2023). AI platforms have the potential to collaborate with sales teams, thereby enhancing e-commerce income by assuming the role of the customer's primary point of contact. The utilization of AI platforms, such as chatbots, to engage with visitors and potential prospects on websites has the potential to enhance brand recognition. This is due to the fact that individuals are more likely to retain a stronger memory of a brand when they have a distinctive and personalized interaction with it. This phenomenon facilitates businesses in enhancing their brand recall value, resulting in increased awareness among individuals regarding AI platforms such as chatbots and their potential benefits. Consequently, individuals are more inclined to actively interact with and recommend AI bots. The ease of interaction and constant availability of virtual assistants such as Siri, Alexa, and chatbots foster a favorable user-product connection. As a consequence, users allocate a greater amount of time on the website, actively interacting with the material, leading to increased brand recognition for the company. The upcoming generation of AI platforms possesses the potential to analyze user input and effectively meet customer demands, thanks to a mix of inherent functionalities and adaptability. The process of experimentation plays a crucial role in enabling brands to enhance customer experience through the utilization of messengers, with chatbots emerging as a significant and influential element in this regard (Lin& Wu, 2023). By integrating a customized approach with the efficacy of artificial intelligence, enterprises have the ability to leverage AI platforms in order to enhance their financial gains and establish a stronger brand presence. The AI Platform facilitates customer interaction with the business through online channels, enabling them to access information and receive personalized product recommendations. This is achieved without experiencing the burden of recurring chores, such as enduring long wait times on hold or being moved between several

departments. AI platforms are known for their ability to operate with speed and efficiency, hence contributing to heightened levels of customer satisfaction (Gupta & Jain, 2023). Additionally, these platforms serve as a means to differentiate a firm from its competitors, ultimately enhancing brand awareness. Artificial intelligence (AI) enables brands to effectively preserve a uniform, seamless, and favorable consumer experience (Santos & Bacalhau, 2023).

H3: AI Platforms have a significant relationship with brand recognition.

Theoretical Framework

Figure 1. Research Conceptual Framework



3. Research Methodology

3.1 Data Collection and Measurements

Malaysia's 32.7 million population, with 81% online shoppers, has limited survey opportunities due to limited marketing and AI knowledge. A limited number of 150 surveys were distributed online, with an 84 percent confidence level response and a minimum of 126 sample sizes. Probability and non-probability sampling techniques were used to ensure the sample was representative of the Malaysian population. When using random sampling methods to target internet users, there is a higher chance of reaching potential e-commerce customers. Non-probability sampling, where individuals are chosen based on accessibility, offers a convenient and cost-effective option for preliminary data collection. The research employs Likert scales to gather data through a questionnaire that gauges understanding of big data analytics, machine learning, artificial intelligence platforms, and brand recognition. The study utilized an internet-based survey developed using Google Forms to gather data from Malaysian individuals who both purchase and sell goods online. This user-friendly platform simplified the process for participants to comprehend and provide information about their experiences (Table 1). The survey was made available to participants through various social media platforms, including Facebook, LinkedIn, WhatsApp, and Ms Teams. This ensured easy access and convenience for respondents to complete the questionnaire. Ethical guidelines were followed in this study by ensuring that participants joined willingly, that their information was kept private, and that their identities were shielded. A spreadsheet in Excel was used to gather data, Google Forms was used to store the data, and IBM SPSS software was used to examine the data further. Additionally, a completed questionnaire can be collected in a short period of time. Through the hyperlink, the respondents were invited to access the questionnaire and used a one-time survey strategy. The questionnaire also includes the purpose of the research and an explanation related to the instructions for completing the questionnaire. The questionnaire was posted on Facebook and LinkedIn, which are related to marketing groups and Malaysian e-commerce buyers and sellers through telecommunication applications such as WhatsApp and MsTeams. Because of the open-sharing link, no specific total number of questionnaires has been distributed. For every respondent who has completed the questionnaire, the data is collected in a data file.

The data file is automatically stored in the Google Forms database in the form of an Excel spreadsheet. Next, the data is transferred to IBM SPSS software version 29 for further analysis.

Table 1 Measurements of Constructs

Code.	Materials	Scale				
BDA1	Customer profiling may increase consumer-perceived value	1	2	3	4	5
BDA2	Customer profiling helps the company to see which offerings generate more profit	1	2	3	4	5
BDA3	Customer profiling helps the company see which segments are more attractive	1	2	3	4	5
BDA4	Customer profiling may help the company to customize pricing for the individual customer	1	2	3	4	5
BDA5	Good customer relationship management (CRM) may increase the quality, performance and capability of the platform to influence customers' trust and loyalty	1	2	3	4	5

Source: Akter, S., & Wamba, S. F. (2016). Big Data Analytics in e-commerce: A systematic review and agenda for future research

Code	Materials	Scale				
ML1	It's good that smart features can understand human emotion and offer emotional comfort to the customer	1	2	3	4	5
ML2	It's good that smart features can be a good companion by mimicking customer's styles of communication	1	2	3	4	5
ML3	Smart features can be useful to develop Customer Knowledge Creation	1	2	3	4	5
ML4	Smart features can be useful to create the profile of future customers	1	2	3	4	5
ML5	Smart features can be useful in developing relationship strategy	1	2	3	4	5

Source: Bag, S., Gupta, S., Kumar, A., & Sivarajah, U. (2021). An integrated artificial intelligence framework for knowledge creation and rational decision-making in B2B marketing is needed to improve firm performance.

Code.	Materials	Scale				
AIP1	AI platforms can automate answers to customers' most-asked questions	1	2	3	4	5
AIP2	AI platforms can automate repeated tasks when interacting with customers	1	2	3	4	5

AIP3	AI platforms can handle more questions from customers automatically	1	2	3	4	5
AIP4	AI platforms can provide personalized experiences to customers	1	2	3	4	5
AIP5	AI platforms can deal with customers' specific needs or requests	1	2	3	4	5
AIP6	AI platforms can interact with customers 24/7 (any time of the day)	1	2	3	4	5
AIP7	I can see the benefits of AI platforms that can deal with customers' requests better than humans	1	2	3	4	5
AIP8	I believe AI platform can perform well during customer interactions	1	2	3	4	5

Source: Lin, X., Shao, B., & Wang, X. (2022). Employees' perceptions of chatbots in B2B marketing: Affordances vs. disaffordances.

Code.	Materials	Scale				
BR1	I enjoy the content when Artificial Intelligence (AI) is being used in marketing campaigns	2	3	4	5	
BR2	I get irritated when brands show irrelevant advertisements	2	3	4	5	
BR3	I prefer it when AI predicts my personality traits	2	3	4	5	
BR4	I prefer when marketers use AI platforms to provide a better user experience	2	3	4	5	
BR5	Through improved brand recognition e-commerce can target more customers	2	3	4	5	

Source: Shaily, S., & Emma, N. (2021). Integration of Artificial Intelligence Marketing to get Brand Recognition for Social Business

3.2 Data Analysis and Findings

3.2.1 Pilot Study

The study conducted a pilot test of a questionnaire in a Malaysian context to assess its feasibility and reliability. The pilot test involved nine machine learning experts in three countries to ensure the clarity and suitability of the questions. The study aimed to prevent misconceptions and misinterpretations of questions and study purposes. The questionnaire was designed with input from experienced professionals in the marketing and AI industries. After the pilot study, corrections were made to the topic. A sample of 23 individuals similar to the study population was selected to examine respondents' understanding of the questionnaire. From the 23 respondents, a reliability analysis was carried out using SPSS, and the results are shown in Table 2, and all items met the specific specifications.

Table 2 Reliability Analysis of Variables for Pilot Test

Variables	Materials	Cronbach's Alpha
Big Data Analytics (BDA)	5	0.861
Machine Learning (ML)	5	0.830
AI Platforms (AIP)	8	0.826
Brand Recognition (BR)	5	0.788

Source: collected by the researchers

3.3 Descriptive statistics (respondent profile)

In this study, the questionnaire is shared via telecommunication applications such as WhatsApp and MsTeams and shared via social media groups such as Facebook and LinkedIn that are related to marketing groups. The questionnaire is created using online Google Forms, which enables it to be shared easily by sharing the questionnaire link. In total, 126 respondents answered the questionnaire that was distributed, and all 126 were valid and completed. The data were collated within the month of November 2022.

Among the total respondents, about 64.3 percent (81) of the sample population are female, while the males constituted only 35.7 percent (45). This is considered common as males are more objective-focused when purchasing compared to females, and as a result, females will easily purchase more than males (Parengkuan, 2017). Most of the respondents are adults aged 31 and above from the millennial generation, which represents 45.2 percent. The majority of respondents are Malay (85.7 percent), followed by Chinese (9.5 percent), and only 4.8 percent are Indian. Thus, it indicates that all the respondents are local Malaysians. Most of the respondents have obtained a bachelor's degree (81 respondents); this corresponds with the age group majority, which is the graduating age. Nowadays, most universities are equipped with technology and digitalization to further enhance their educational systems. Therefore, this shows that most respondents (92.9 percent) have more than 10 years of experience using digitalization. The use of the Internet first arrived in Malaysia in 1995, which indicates that most respondents were born and raised in the Internet era. This makes them familiarize themselves with the use of digitalization and technology, which corresponds with the result shown above. To further fortify this hypothesis, a question related to Internet experience has also been conducted among the respondents. With years of Internet experience, most of the respondents that participated in the survey have experience in online shopping (97.6 per cent), which makes the data more valuable as it fits the research's topic. The result proves that the growth of digitalization and internet connectivity has further changed the way consumers purchase their products, transitioning from physical purchases to online purchases. In addition, the majority of the respondents (97.6 percent) prefer Shopee as their e-commerce platform to purchase products online, followed by Lazada with 54.8 percent. Shopee is a multinational technology company that was established in 2015 and has been expanding its operations throughout Southeast Asia. Most of the respondents are from the M40 income group with monthly household income, which is more than RM10,000 (47.6 percent). In terms of spending behavior, the majority of respondents (83.3 percent) spent below RM1,000 per month on online shopping, and most of the respondents (47.6 percent) shop only when needed. The knowledge of artificial intelligence (AI) has also been conducted among the respondents. All respondents are aware of AI and understand its meaning. However, only 88.1 percent have encountered AI in marketing. In addition, Table 4 shows that the independent variable 'Big Data Analytic (BDA)' has the highest mean score of 4.41, while the lowest mean score of 4.12 is secured by another independent variable, which is 'AI Platforms (AIP)'. Despite being the lowest mean, it still qualifies as a high rating score, according to Cohen, Manion, and Morrison (2000). This result indicates that the majority of the respondents have a positive attitude and impact towards the three factors that influence brand recognition on an e-commerce platform. Besides that, the normality of the data distribution is also calculated to a certain extent by the skewness and kurtosis values for each variable within the range of -2 and +2.0 (Mandisa, 2010).

3.4 Pearson Correlation Analysis

The purpose of conducting a multiple collinearity analysis is to measure the predictiveness between variables (Table 3). Based on the result of the Pearson correlation analysis shows that all independent variables (big data analytics, machine learning, and AI platforms) express a positive and significant correlation with the dependent variable (brand recognition). If the correlations show a positive result, this means that the relationship between the variables supports each other and has a strong relationship with the dependent variable of brand recognition (BR). The strongest positive relationship with dependent variables (BR) is AI platforms (0.669), and the weakest positive relationship with dependent variables (BR) is big data analytics (0.436).

Table 3 Pearson Correlation Analysis

Variables	BDA	ML	AIP	BR
Big Data Analytics (BDA)	1			
Machine Learning (ML)	0.662	1		
AI Platforms (AIP)	0.367	0.382	1	
Brand Recognition (BR)	0.436	0.558	0.669	1

* Correlation is significant at the 0.01 level (2-tailed); **Source: SPSS Analysis**

3.5 Multiple Regression Analysis

The regression produces the correlation coefficient (r), coefficient of determination (R²), and adjusted coefficient of determination (adjusted R²). The purpose of this indicator is to show how efficient the predictiveness of an independent variable is towards the outcome of a dependent variable. The coefficient of determination (R²) serves as the degree of variance assessed by the independent variable. This is to say, the R square (R²) specifies creating a value that is related to the percentage of the total variation in the dependent variables that is related to the independent variables or collectively (Yao et al., 2018). As for the F value, it is used to measure the overall efficiency of the regression model in analyzing, predicting, and explaining the variation in the dependent variable (Pope & Webster, 1972). The multiple regression analysis was conducted using SPSS software, version 29. The prime objective of this study is to assess and measure the significant relationship between the three independent variables and the dependent variable. From the regression analysis, the model summary, as shown in Tables 4, 5, and 6 below, determined that the dimensions of big data analytics, machine learning, and AI platforms have an influence on brand recognition. The result of the multiple regression analysis gave answers to the research objectives as well as the hypotheses in this study.

Table 4 Regression Analysis for Brand Recognition

Model	R	R ²	Adjusted R ²	Std. Error of the Estimate
1	0.745	0.555	0.544	0.42307

Predictors: (Constant), BDA, ML, AIP

Table 5 ANOVA (Significance of Regression Model)

Model	Sum of Square	Df	Mean Square	F	Sig.
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1	Regression	27.260	3	9.087	50.767	.001 ^b
	Residual	21.837	122	0.179		
	Total	49.097	125			

Predictors: (Constant), CSQ, PP, PQ, BI, ^B Predictors (Constant)

Table 6 Regression Analysis for Brand Recognition

Variables	B	Beta (β)	T	Sig.
Big Data Analytics	0.012	0.010	0.117	0.907
Machine Learning	0.392	0.348	4.234	0.001
AI Platforms	0.575	0.533	8.046	0.001

Dependent Variable: Brand Recognition; **Source: SPSS Analysis**

Through the regression analysis, it is found that only two dimensions of independent variables (Machine Learning and AI Platforms) have significant relationships with brand recognition. This is derived at a significant level of $p < 0.05$. Machine learning ($t = 4.234$, $p\text{-value} = 0.001$) and AI platforms ($t = 8.046$, $p\text{-value} = 0.001$) While Big Data Analytics ($t = 0.117$, $p\text{-value} = 0.907$) is not significant towards the dependent variable, which is brand recognition, Comparatively, the strength of the relationship between independent variables and dependent variables comes from the AI platforms, where $\beta = 0.533$, followed by machine learning, where $\beta = 0.348$, and big data analytics, where $\beta = 0.010$. Therefore, the dimension relating to big data analytics, machine learning, and AI platforms should be emphasized in order to increase brand recognition on e-commerce platforms. In addition, Table 7 shows the standardized beta coefficients for AI platforms ($B = 0.575$), machine learning ($B = 0.392$), and big data analytics ($B = 0.012$). Integration with the AI platform will increase brand recognition on the e-commerce platform by 0.57. Integration with machine learning will increase brand recognition on the e-commerce platform by 0.39 percent. Integration with big data analytics will increase brand recognition on the e-commerce platform by 0.01 percent. Based on the results (Table 7), it can be concluded that H2 and H3 are accepted as the independent variables that have shown a positive relationship with brand recognition, and H1 is rejected.

Table 7 Summary of findings based on Hypothesis Testing

Hypotheses	P – Value Significant ($P < 0.05$)	Decision
H₁ : There is a relationship between Big Data Analytics and brand recognition.	($P = 0.907$) Not Significant	H₁ Rejected
H₁ : There is a relationship between Machine Learning and brand recognition.	($P = 0.000$) Significant	H₂ Accepted
H₁ : There is a relationship between AI Platforms and brand recognition.	($P = 0.000$) Significant	H₃ Accepted

Source: SPSS Analysis

4. Discussion of Findings

In short, the respondents have a positive response towards big data analytics, machine learning, and AI platforms that lead to brand recognition on e-commerce platforms. Based on the results, the study shows that brand recognition generated positive reflections with an average value of 4.19 out of the range of one (strongly disagree) to five (strongly agree). The indicators for big data analytics, machine learning, AI

platforms, and brand recognition also had a high mean of 4.41, 4.20, 4.12, and 4.03, respectively. The indication shows that the three main independent variables play an important role in creating a great opportunity for brand recognition on e-commerce platforms. Besides that, there is proof that machine learning and AI platforms are the main reasons for the brand to gain brand recognition on e-commerce platforms. Among the significant independent variables, the strongest strength of the relationship between the independent variables and the dependent variable (brand recognition) is machine learning ($t = 4.234$, $p\text{-value} = 0.001$, and $\beta = 0.348$), followed by AI platforms ($t = 8.046$, $p\text{-value} = 0.001$, and $\beta = 0.533$). Meanwhile, Big Data Analytics shows that brand recognition is insignificant ($t = 0.117$, $p\text{-value} = 0.907$, and $\beta = 0.010$) but still shows a strong relationship between the independent variables and the dependent variable.

4.1 Integration of Big Data Analytics and Brand Recognition

This study investigates the relationship between big data analytics and brand recognition towards e-commerce platforms in Malaysia. Big Data Analytics refers to analytics tools that help collect, measure, analyze, and report data to web visitors in order to understand and optimize the use of e-commerce platforms (Micu et al., 2021) that may lead to brand recognition. In this study, the context for big data analytics refers to data mining and creating customer profiles from consumers' shopping habits, shopping patterns, and consumer feedback. The result of the regression analysis indicates that there is no significant relationship between big data analytics and brand recognition in e-commerce platforms. Hence, the result indicates that hypothesis 1 is rejected as there is no significance. Therefore, without the integration of big data analytics, e-commerce can still gain brand recognition among online shoppers in Malaysia.

4.2 Integration of Machine Learning and Brand Recognition

The extension of this study also examined the relationship between machine learning and brand recognition. The term machine learning in this context is described as the techniques needed to work intelligently with a large amount of data by developing useful algorithms for synthesizing, classifying, or sorting this data (Micu et al., 2021). In this context, machine learning in e-commerce platforms involves smart features such as image recognition (lens), facial recognition, and voice recognition that are able to understand or mimic human emotion and then offer emotional comfort or other better communication styles to consumers. The positive results from the analysis prove that the respondent agrees and feels that machine learning is among the best elements of AI marketing that e-commerce uses when developing its platforms that lead to brand recognition. To a certain extent, the perception of machine learning is also associated with the algorithms, which is also another factor that influences brand recognition. The evolving digitalization and computer enhancement machines have enabled the brand to be noticed; hence, high-quality machine learning is able to perform its function without any error or accident. This can be achieved by increasing the accuracy of the machine learning model and by improving machine learning algorithms. It is hypothesized that building, training, and deploying machine learning will result in an improvement in brand recognition and the possibility of developing a relationship between the customer and the brand, especially on e-commerce platforms. Therefore, the objective of machine learning is to integrate into e-commerce platforms, which results in brand recognition.

4.3 Integration of AI Platforms and Brand Recognition

Artificial intelligence possesses anthropomorphic qualities and acquires knowledge and expertise through social interaction and experiential learning. Within a genuine business setting, the utilization of robots and

robotic machinery is being discussed for various purposes, such as production, customer service, and warehousing logistics. The functional capabilities of AI include predictive analytics, control methods, planning and dispatching, knowledge storage, processing and presentation, speech recognition, computer vision, biometrics, image and video segmentation, character recognition, object tracking, general vision, and natural language processing, which encompasses the extraction of new knowledge, machine translation, and dialogue. These functions have the ability to be utilized separately or together (Kraus et al., 2022). Most importantly, AI has the power to create a greater customer experience while simultaneously strengthening internal retail operations. The integration of AI will effectively address the need for resolving customer service problems instantly and offer innovative shopping features such as virtual fitting rooms and mirrors, as well as cashier-less stores and other advanced retail concepts (Nagamalleswara et al., 2023). In the context of e-commerce, AI Platforms such as Sentient and Chatbots which is able to automate answers to customers' most-asked questions, automate repeated tasks when interacting with customers, handle more questions from customers automatically, and interact with customers any time of the day. The positive and significant relationship between AI platforms and brand recognition has been proven and confirmed, and it is supported by previous literature by the researcher (Shaily & Emma, 2021). That describes AI platforms as having a positive influence on brand recognition in e-commerce as well as in social business industries. AI platforms nowadays are taking brands into consideration when developing their products to get brand recognition. Hence, it can be concluded that AI platforms have an impact on brand recognition, especially in the e-commerce market. Hence, managing and strategizing AI Platforms is essential in improving brand recognition, especially in the e-commerce market in Malaysia.

5. Theoretical Implication, Practical and Industrial Implications

The findings of this study indicate the importance of AI marketing elements as a factor towards brand recognition on e-commerce platforms. This study has proven that there is a positive relationship between the contributing factors (machine learning and AI platforms) and brand recognition, which is supported by Festinger's cognitive dissonance theory. This study is similar to previous studies conducted by Shaily and Emma (2021), who found significant and positive contributions of big data analytics and AI platforms in influencing brand recognition in social business in Bangladesh. Therefore, it further developed and strengthened the theoretical view by confirming and contradicting previous research on the two factors of machine learning and AI platforms as important drivers that lead to brand recognition in e-commerce in Malaysia by improving the consumer's perception of technology.

The present study has various practical and industrial applications concluded as:

Strategic Marketing and Branding: Companies can utilize the findings from the study to enhance and optimize their strategic marketing endeavors. Comprehending the influence of AI components on brand awareness empowers marketers to customize their branding tactics for maximum efficacy.

Competitive Intelligence: This research gives local marketers tools to gather competitor data. By analyzing how rivals use AI for brand recognition, marketers can uncover industry trends, allowing them to stay ahead in the market. The research highlights that mechanisms of AI donate to personalized user experiences. By leveraging this data, companies can implement AI-based strategies, leading to increased customer satisfaction and loyalty.

Preparing Employees and Enhancing Skills: This study delivers valuable information that enables businesses to determine which AI-related abilities and expertise are necessary for their staff. This

information is crucial for preparing employees and directing the development of training programs that address any existing skill deficiencies.

Refining Positioning Strategies: Marketers can analyze their competitors' press releases and social media presence to identify central keywords. By using this information, they can progress their own positioning strategies and become more competitive in the marketplace.

Driving Product Development and Innovation: When businesses understand how AI technology effects brand awareness, they can uncover valuable information that drives the creation and enhancement of their products. This knowledge allows companies to develop products that meet the evolving demands of consumers and align with the latest market dynamics.

Expanding into New Markets and Internationalization: By highlighting the significance of integrating AI, the study delivers businesses with a rich plan for navigating implementation challenges in their technology adoption journeys. This guidance is crucial for businesses aiming to increase their customer base or increase globally. It includes industrial applications in marketing, branding, customer service, employee training, and overall business strategy. E-commerce industries can benefit from the insights provided in this study.

6. Limitations of the study and recommendation for future research

The study's main limitation is its eight-month time constraints, which may not fully reflect the impact of AI marketing on brand recognition. The sample size is mainly from a certain age, ethnicity, income status, and educational background, and the knowledge and awareness of AI in marketing are mixed. Additionally, the scarcity of contemporary studies on AI and strict ethical standards limit access to resources. Potential Avenues for Future Research in the Field of Communication: The study focuses on filling the research gaps regarding AI and brand recognition in rising nations such as Malaysia. This paves the way for future research opportunities in the field of communication. It motivates researchers to investigate the changing interactions between technology and communication. This study is essential for a communication-focused journal because it not only corresponds to the current technological environment but also provides valuable insights for professionals and scholars seeking to understand the complex connection between AI, brand recognition, and communication strategies in the digital era.

7. Conclusions

AI marketing and brand recognition are positively correlated, with AI marketing enhancing customer service and consumer engagement. This study provides a theoretical framework for understanding e-commerce user perceptions and characteristics in Malaysia. The findings show that millennials are familiar with AI elements, but big data analytics is insignificant. AI platforms, such as Siri, Alexa, or chatbots, are the most powerful elements in AI marketing, leading to brand recognition in the e-commerce industry. Big Data analytics does not lead to brand recognition, but rather, meaningful customer experiences infused with sentimental and emotional values through machine learning can help brands re-strategize their strategies. AI marketing can help brands increase consumer engagement and brand recognition if used effectively and efficiently. The two elements of AI marketing (machine learning and AI platforms) have a strong relationship with dependent variables, and AI marketing has the potential to create brand intelligence in the e-commerce industry. This study investigates the influence of artificial intelligence (AI) on the recognition of brands among users of electronic commerce (e-commerce) in Malaysia. The results suggest that machine learning and AI platforms have a substantial influence on brand recognition; however, the impact of big data

analytics may not be significant. The results offer useful information for firms aiming to develop effective strategies to establish brand recognition among e-commerce shoppers in the region.

Author contribution statement:

ELKHANSA MEDJEDEL: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

AHMED SAID SAKOUCHE: Performed the experiments; Analyzed and interpreted the data.

ABU BAKAR ABDUL HAMID: Conceived and designed the experiments; Wrote the paper.

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Improving Tax Compliance Intentions and Self-Assessment System: Approach to the Theory of Planned Behavior

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Abstract. *Tax compliance is a cornerstone of the social contract, whereby citizens get government services in exchange for monetary contributions, and hence, it is essential for the government to maintain fiscal stability. This research intends to measure taxpayers' willingness and ability to accurately self-report their compliance with tax legislation by investigating the taxpayer's perspective through attitude, subjective norms, and behavioral control. Structural Equation Modeling (SEM) was combined with Partial Least Square (PLS) analysis and snowball sampling for the data processing. The sample for this research consisted of 430 individual taxpayers in Indonesia's Banten Province. The results show that attitudes, subjective norms, and perceived behavioral control affect taxpayers' compliance intentions and the self-assessment system. The self-assessment system is an additional factor that indirectly influences compliance intentions. The study establishes a fundamental framework for gaining a more profound understanding of tax compliance intentions and can serve as the groundwork for future investigations aimed at constructing more advanced models and theories to elucidate tax compliance intentions. These findings can assist countries in developing more efficient tax policies to enhance taxpayer compliance and optimize the tax system to maximize tax collections.*

Keywords: Behavioral Control, Tax Compliance Intentions, Subjective Norms, Attitudes, Self-Assessment.

JEL Codes: H21, H24

Introduction

Ensuring tax compliance is crucial for governments to maintain fiscal equilibrium. Taxes are an integral component of the social compact, wherein governments offer goods and services to residents in return for tax contributions (Robbins & Kiser, 2020). Taxes serve as the primary means of generating public funds for promoting economic growth in both emerging and established nations (Gangl et al., 2016). The problem of tax collection has consistently afflicted various countries worldwide. As a result, this could lead to financial difficulties for governments and a decline in overall societal welfare (Masunga et al., 2020).

The issue of tax compliance is a worldwide challenge that governments across the globe are grappling with. In order to enhance compliance, governments must utilize their jurisdiction to establish taxpayer confidence in the tax system (Surugiu et al., 2021). Many taxpayers perceive compliance as an onerous obligation that results in increased expenses and reduced profits (Ernest et al., 2022). Doubts regarding the equity of the tax system can result in decreased rates of compliance. Ensuring tax compliance is crucial for enhancing tax collections and fostering economic growth (Hassan et al., 2021). A nation's economy expands when there is robust economic growth. The metric employed to assess a nation's economic expansion is its monetary worth, denoted by the Gross Domestic Product (GDP) figure (Saepuloh et al., 2019). The majority of countries utilize GDP as a means of assessing economic growth circumstances. GDP refers to the total

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monetary value of all profits generated by a nation's commercial endeavors (Hasbi et al., 2023). The growth of the economy, as evidenced by an increase in GDP and tax income, highlights the global challenge of tax compliance (Khlif et al., 2016).

The level of adherence to tax obligations by taxpayers directly impacts the amount of revenue generated by the state. A low tax ratio indicates that the government should take more measures to optimize income generation. The primary source of economic development stems from taxation, from which individuals derive indirect benefits (Vincent, 2022). Tax revenue serves as the primary source of governmental income for developing countries (Taing & Chang, 2021). The issue of tax compliance is currently a prominent public policy concern (Vincent, 2022). The government of Yemen incurs significant financial losses due to a lack of adherence to tax regulations, resulting in detrimental effects on the country's development (Obaid et al., 2020). A study conducted in Malaysia has demonstrated that the presence of economic incentives serves as a driving force for individuals to fulfil their tax obligations. These findings indicate that economic factors exert a substantial influence on the behavior of Malaysian taxpayers (Sritharan & Salawati, 2019).

Attitudes towards taxation are correlated with the moral values of taxpayers, and individuals with strong moral values tend to exhibit high levels of compliance with tax regulations (Taing & Chang, 2021). Taxpayers evaluate the policies of the tax authority and thereafter determine their course of action. Thus, attitudes might serve as a manifestation of taxpayers' convictions and anticipations toward fulfilling their tax responsibilities (Novianti & Uswati Dewi, 2018). Studies have demonstrated that tax morale exerts a beneficial impact on the level of taxpayer compliance (Zhiwei et al., 2020). Contrarily, additional research has indicated that tax morale is ignored and does not play a substantial role in augmenting taxpayer compliance (Amah et al., 2021). This paper seeks to reassess the significance of attitudes in connection to tax morale and taxpayer compliance in light of the contradictory findings in prior research.

Subjective norms also have an impact on an individual's intention to comply with tax payments, in addition to their attitude. Subjective norms refer to individuals' perceptions of the expectations and beliefs held by others regarding their behavior (Caspers, 2020). Individuals who perceive societal pressure to adhere to tax regulations are more inclined to comply with them. Studies have demonstrated that people's inclination to participate in tax avoidance diminishes when they adhere to explicit social norms (Wahyuni et al., 2019). Francis & Bishagazi, (2022) discovered that subjective norms exerted a substantial influence on tax compliance. However, Adellia & Islami, (2020) discovered that other elements, such as the fairness of the tax system and the degree of trust that taxpayers have in the government, can have an impact on subjective norms. The paper aims to analyze the subjective norm variable in taxpayer compliance, particularly its association with the equity of the tax system and the trust that taxpayers place in the government.

Tax compliance is associated with taxpayers' perception of their ability to regulate their conduct, which subsequently affects their intentions (Bulutoding et al., 2020). This perception of control can hinder individual behavior (Novianti & Uswati Dewi, 2018). According to Hamdah et al., (2020), research has demonstrated that exercising behavioral control has a beneficial effect on tax compliance. Contrarily, Galib et al., (2018) discovered that perceived behavioral control does not have an impact on taxpayer intentions. This paper seeks to perform additional research on the function of behavioral control in tax compliance in light of the inconclusive results found in prior studies.

Ensuring tax compliance is especially crucial in the age of self-assessment systems. Under a self-assessment system, taxpayers bear the responsibility of ascertaining, remitting and declaring their taxes. The tax system places a significant level of reliance on taxpayers, as tax authorities depend on individuals to precisely determine their tax obligations. Self-assessment systems provide several benefits, such as streamlined revenue collection, expedited assessment processing and reduced compliance expenses (Adimassu & Jerene,

2016). Studies have demonstrated that self-assessment systems can exert a substantial and favorable influence on taxpayer compliance (Hantono, 2021). Nevertheless, additional research has indicated that the degree of adherence to self-assessment methods remains insufficient (Wahyudin et al., 2022). This work seeks to reassess the influence of self-assessment system characteristics on tax compliance, taking into account the conflicting results found in earlier studies.

Many countries have implemented Self-Assessment System (SAS) to enhance their tax systems and promote compliance. For example, SAS has been implemented in New Zealand (1988), Pakistan (1979), Sri Lanka (1972), Japan (1947) and the United States (1913). The Indonesian Directorate General of Taxes employs SAS as a tactic to enhance tax income. Many countries view SAS as a contemporary method for tax administration (Nguyen et al., 2020). Under SAS, tax administrators are required to cultivate a service-oriented mindset towards taxpayers to guarantee that they are provided with the necessary information and support to meet their tax responsibilities (Terrefe, 2016). The implementation of SAS in Indonesia has been completed since 2004. They exhibit distinct variations from the preceding Official Assessment System (OAS) in multiple aspects. Initially, SAS was only utilized by taxpayers, whereas OAS was employed by both taxpayers and tax administrators. Secondly, SAS is carried out manually. Furthermore, in the context of obligations and amounts owed, their eligibility for exemptions and relief must be assessed (Sritharan & Salawati, 2019).

Taxpayers who base their tax payment decisions on moral principles are more inclined to comply compared to those who do not. Studies have demonstrated that attitude exerts a beneficial impact on taxpayer compliance (Daniel & Uchenna, 2020). Nevertheless, certain research has discovered that tax compliance within the self-assessment system, when approached from a tax-moral perspective, still necessitates enhancement (Songgubun et al., 2022). This work aims to reassess the attitude variable towards the self-assessment system, taking into account the conflicting results found in earlier research.

The low level of taxpayer compliance can be attributed to various causes, such as the level of faith that taxpayers have in tax institutions, the intricacy of tax legislation, limited public awareness and the efficiency of tax administration. Studies have demonstrated that the way people perceive fairness plays a significant role in influencing their compliance with tax obligations (Maruak et al., 2022). Nevertheless, additional research has indicated that the intricacy of tax legislation exerts a notable impact on individuals' adherence to tax requirements (Ibrahim & Lawal, 2023). This implies that an effective self-assessment system (SAS) should be uncomplicated and readily comprehensible, hence necessitating the need for research on self-assessment systems (Nurlatifah & Nisa, 2019; Taufiqurahman, 2019). According to the findings of this study, there are deficiencies in the research outcomes. The author aims to reevaluate the subjective norm variable of the self-assessment system.

Understanding and knowledge of tax laws and regulations is essential for individuals and businesses to adhere to tax requirements. Nevertheless, a considerable number of individuals lack the anticipated level of tax consciousness. A study has demonstrated that tax socialization can enhance individual taxpayer compliance and reinforce the connection between e-system implementation and individual taxpayer compliance (Kemuning et al., 2022). Nevertheless, alternative research has indicated that modifications in taxpayer conduct lack the necessary efficacy to bolster tax compliance (Wahyudin et al., 2022). This study aims to reassess the variable of perceived behavioral control about the self-assessment system, considering the inconclusive results found in earlier research.

Prior studies on tax compliance intentions have been substantial, but they have primarily concentrated on individual characteristics, neglecting the influence of the self-assessment system. Furthermore, there are still deficiencies in the research findings on the connections among various variables. This study seeks to fill these knowledge gaps by investigating the direct and indirect connections between attitude, subjective norms,

perceived behavioral control, the self-assessment system and tax compliance intentions. The analysis will be conducted using Structural Equation Modelling (SEM) with the Partial Least Squares (PLS) approach, utilizing SmartPLS software version 3.0.

Literature Review

The Theory of Planned Behavior (TPB) is a conceptual framework that explains an individual's intentions and propensity to participate in particular behaviors. This theory is a derivative of the Theory of Reasoned Action (TRA), developed by Fishbein and Ajzen in 1981. TPB suggest that not all persons possess absolute autonomy over their actions, therefore emphasizing the significance of perceived behavioral control as a crucial determinant. According to TPB, an individual's likelihood of engaging in a desired behavior is determined by their favorable attitude towards the behavior, the norm subjective that supports the behavior and their individual's perception of self-control to regulate the behavior (Ajzen, 1991).

The Theory of Reasoned Action (TRA) and Theory of Planned Behavior (TPB) models play an important role in predicting intentional behavior, with TRA combining attitudes and subjective norms, and TPB adding perceived behavioral control as an additional predictive variable (Madden et al., 1992). Studies show TPB has higher predictive validity than TRA in a variety of behaviors (Sharma, 2007; Sideridis et al., 1998). These two theories are widely applied in the health, education, and entrepreneurship sectors (Mahyarni, 2013; Tewari, 2023), and meta-analyses support their effectiveness, especially the TPB which explains more of the variance in physical activity behavior (Hagger et al., 2002). Despite criticism that both theories focus more on prediction than explaining behavior change (Sharma, 2007), TRA and TPB are still considered important and continuing to develop frameworks (Ms, 2019).

Furthermore, the Theory of Planned Behavior (TPB) has been widely applied to study compliance intentions in various domains. Several studies found that attitudes, subjective norms, and perceived behavioral control significantly influence intentions to comply with tax regulations (Bani-Khalid et al., 2022), and entrepreneurial behavior (Al-Mamary & Alraja, 2022; Lihua, 2022). Some researchers have expanded the TPB model by incorporating additional factors such as patriotism (Bani-Khalid et al., 2022), social support, and transparency of government information (Li et al., 2022). A meta-analysis by Hagger et al. (2002) confirmed that perceived behavioral control moderates the intention-behavior relationship in the health context. TPB has also been applied to understand non-compliance in travel intentions during the COVID-19 pandemic (Wang et al., 2022). Based on the relationship between the Theory of Planned Behavior (TPB) and tax compliance intentions, the researchers tried to explore tax compliance intentions which were analyzed as measured through perceived behavioral control variables, subjective norms, attitudes, and self-assessment systems which were reviewed based on the theory of planned behavior.

Tax compliance refers to the state in which a taxpayer fulfils their obligations by properly registering, paying and filling tax returns in a timely and accurate manner, in line with all relevant tax laws and regulations (Obaid et al., 2020; Schoeman et al., 2022). According to Firmansyah *et al.* (2022), indicators of tax compliance include knowing how to get a Taxpayer Identification Number (NPWP), not having tax arrears, accurately completing tax computations, paying taxes on time, and not committing any tax-related breaches. According to Taing & Chang (2021), tax morale, tax fairness, faith in the government, authority strength, tax complexity, tax information, and tax awareness are all indications of taxpayer compliance. Indicators of taxpayer compliance, according to Pangestu & Rusmana (2012), including filing Tax Returns (SPT) within the allotted time frame, paying taxes due on schedule, and paying taxes in the right amount.

The Self-Assessment method for tax collection in Indonesia was introduced in 1984, following the adoption of an Official Assessment System in the previous year (Directorate General of Taxes, 1983). Under

the Self-Assessment System, taxpayers are obligated to calculate the precise amount of tax they owe annually and submit it to the Tax Service Officer or through the government's online system, following the relevant rules (Erawati & Pawestri, 2022; Nurlis & Ariani, 2020). According to Ramandey (2020), the indicators of the Self-Assessment tax collection system include taxpayers having the power to determine their tax liability, taxpayers actively participating in calculating, paying, and reporting their taxes, and tax authorities acting as supervisors without direct intervention. Rahayu (2017) identifies several indicators of this system, which include autonomous registration with the Tax Service Office, autonomous tax computation, autonomous payment of tax owed, and autonomous tax reporting. Rahayu (2013) outlined the key components of the Self-Assessment tax collection system as follows: self-registration at the Tax Service Office, independent calculation of tax obligations, payment of taxes through authorised financial institutions, submission of deposit reports to the Directorate General of Taxes, and accurate completion of the Tax Return (SPT) to determine the correct amount of tax owed.

The concept of tax morale is often used to summarize taxpayers' attitudes towards paying taxes. Attitude refers to the assessment made by a taxpayer on the act of paying taxes, which can be either favorable or unfavorable (Ajzen, 1991; Robbins & Kiser, 2020). Within the realm of taxation, taxpayer attitudes have the potential to impact tax compliance, as positive attitudes are linked to compliance with tax regulations, while bad attitudes are linked to non-compliance. According to Sani & Habibie (2017), indicators of taxpayer attitudes encompass the inclination to pay less taxes than required, perceptions of opacity in tax utilisation, a sense of being disadvantaged by the tax system, belief that the cost of bribing tax officers is lower than the tax amount, challenges in comprehending tax regulations, the frequency of alterations in tax regulations, and the magnitude and variety of tax rates. According to Depari (2014), indicators of taxpayer attitudes encompass the belief in the positive worth of adhering to tax regulations, the perception of the advantages of tax compliance, the feeling of ease in fulfilling tax obligations, the belief that tax compliance is a way of obeying the law, and evaluations of the legal aspects of taxation. According to Pangestu & Rusmana (2012), taxpayer attitude markers include a strong belief in behaviour, the consequences of behaviour, and the evaluation of behaviour outcomes.

Subjective norms refer to an individual's sense of others' opinions, which can impact their intention to engage in specific conduct (Ajzen, 1991; Bin-Nashwan et al., 2021). In the context of taxation, subjective norms also influence individuals' intentions to comply with their tax obligations. Taing & Chang, (2021) state that subjective norm indicators for taxpayers encompass tax fairness and trust in the government. According to Depari (2014), subjective norms for taxpayers can be measured by looking at their adherence to tax compliance with people in their social circle, the views of their friends and tax officers on tax compliance, and the expectations and support they receive from friends and tax officers regarding tax compliance. Meanwhile, Pangestu & Rusmana (2012) propose that the subjective norm indicators for taxpayers include the degree of conviction in the normative expectations of others and the motivation to meet those expectations.

Perceived behavioral control refers to the subjective assessment of how easy or difficult it is for an individual to do a specific action (Ajzen, 1991; Owusu et al., 2020). Specifically, perceived behavioral control is within the individual's control, based on both internal and external factors. According to Taing & Chang, (2021), authority strength, tax complexity, tax knowledge, and tax awareness are indicators of behavioral control that taxpayers experience. Depari (2014) states that the following factors are included in this indicator: the person's decision to pay taxes, their capacity to do so, their opportunity to do so, and the degree of difficulty involved in fulfilling their tax duties. According to Pangestu & Rusmana (2012), self-efficacy—that is, the belief in one's ability to fulfil tax obligations—and aspects of control (controllability), which refer to an individual's degree of confidence in their ability to control situations related to tax compliance, are indicators of behavioral control felt by taxpayers.

Research Methodology

Using a self-assessment method, the study employed a questionnaire to investigate the influence of attitudes, subjective norms and perceived behavioral control on individuals' desire to comply with tax regulations. The study focused on individual taxpayers residing in Banten Province, Indonesia, which has a population of 343.168. This study utilized snowball sampling to collect data, determining the minimum sample size based on the Hair Formula (Hair et al., 2017). A total of 430 surveys were distributed and all 430 of the returned questionnaires were deemed usable. The research data was obtained from persons who were enrolled as taxpayers in the DJP Banten in 2022. The data-gathering period spanned from February 2023 to July 2023.

The questionnaire was constructed with a total of 26 statements, including 5 statements regarding taxpayer attitudes, 5 statements regarding subjective norms, 5 statements regarding perceived behavioral control, 5 statements regarding the self-assessment system and 6 statements regarding tax compliance intents. The questionnaire utilized in this study is constructed from indicators that have been amalgamated in the preceding literature analysis. The variables were defined based on expert input, resulting in the following indicators. Taxpayer attitudes refer to the firmness of belief in behavior, perception of the positive value of tax compliance, size and several types of tax rates, assessment of behavioral results and assessment of legal aspects of taxation. Subjective norms refer to tax fairness, trust in government, implementation of tax compliance for individuals around them, friends' expectations and support regarding tax compliance and the level of belief in other people's normative expectations. Perceived behavioral control refers to authority strength, tax complexity, tax information, tax awareness and control aspects. The self-assessment system refers to registering independently with the Tax Service Office, carrying out tax calculations independently, paying taxes owed independently, reporting taxes independently and determining the amount of tax owed by filling out a tax return (SPT) independently well and correctly. Tax compliance intentions refer to tax morale, awareness of obtaining an NPWP, carrying out tax calculations correctly, having no tax arrears and not committing tax-related violations.

The study utilized Structural Equation Modeling (SEM) with a Partial Least Squares (PLS) technique using SmartPLS version 3.0 software. SEM-PLS is a statistical technique used to analyze multivariate data. It enables the analysis of correlations among multiple variables simultaneously and assesses if there is a causal relationship between them (Hamid & Anwar, 2019). In SmartPLS, the SEM-PLS analysis entails the creation of two models: the Outer Model, also known as the Measurement Model and the Inner Model, also referred to as the Structural Model (Duryadi, 2021). The Outer Model is a diagnostic tool employed in SEM-PLS analysis to evaluate the soundness and dependability of data-gathering techniques in research. The evaluation includes assessments of Convergent Validity, Discriminant Validity and Composite Reliability. The Inner Model is a diagnostic tool employed in SEM-PLS analysis to investigate the causal connections among latent variables. This is accomplished by assessing the Coefficient of Determination, Path Coefficient, Model Goodness and Predictive Relevance (Ghozali & Latan, 2015).

1. Results and Discussions

Table 1 demonstrates the convergent validity test Run 1 on the variables A, SN, SA and TCI. However, one indicator for variable PBC is deemed invalid (see Table 1). Hence, it is imperative to remove this indicator and thereafter reevaluate the study model.

Table 1: Convergent Validity (Run 2)

No.	Variable	Indicator	Loading Factor	AVE	Result	Description
1	Attitude (A)	A.1	0.818	0.565	Valid	
		A.2	0.782			
		A.3	0.790			
		A.4	0.749			
		A.5	0.599			
2	Subjective Norms (SN)	SN.1	0.684	0.595	Valid	
		SN.2	0.721			
		SN.3	0.798			
		SN.4	0.840			
		SN.5	0.804			
3	Perceived Behavioral Control (PBC)	PBC.1	0.763	0.536	Valid	PBC.2 is removed because it is invalid in Run 1 (Loading Factor 0.335 with AVE 0.445)
		PBC.3	0.784			
		PBC.4	0.727			
		PBC.5	0.648			
4	Self-Assessment (SA)	SA.1	0.747	0.617	Valid	
		SA.2	0.742			
		SA.3	0.776			
		SA.4	0.838			
		SA.5	0.821			
5	Tax Compliance Intentions (TCI)	TCI.1	0.642	0.645	Valid	
		TCI.2	0.830			
		TCI.3	0.843			
		TCI.4	0.813			
		TCI.5	0.853			
		TCI.6	0.821			

(Source: Data Processed by Authors)

The outcomes of the convergent validity assessment conducted on variables A, SN, PBC, SA and TCI in Table 2 indicate that the research model meets the standards of convergent validity.

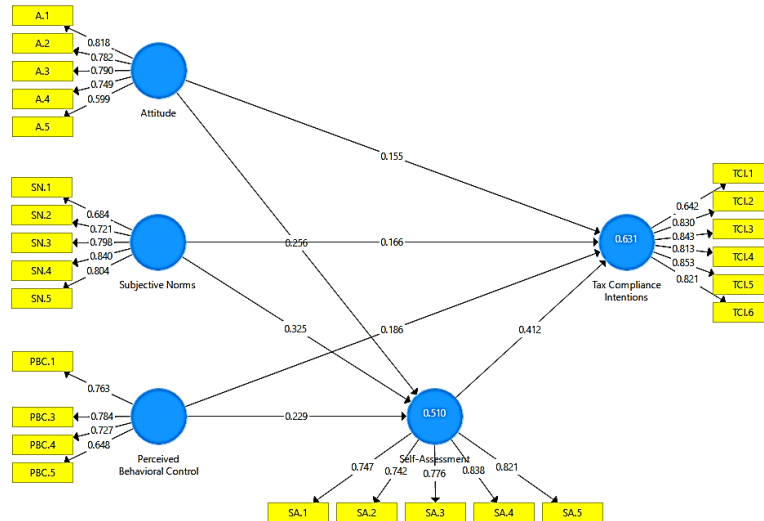


Fig. 1: PLS Algorithm (Run 2)
 (Source: Data Processed by Authors)

Table 2: Cross-Loading

	A	SN	PBC	SA	TCI
A.1	0.818	0.526	0.471	0.559	0.590
A.2	0.782	0.478	0.546	0.389	0.447
A.3	0.790	0.456	0.423	0.508	0.548
A.4	0.749	0.511	0.558	0.442	0.431
A.5	0.599	0.526	0.440	0.377	0.313
SN.1	0.498	0.684	0.497	0.409	0.440
SN.2	0.497	0.721	0.536	0.413	0.407
SN.3	0.433	0.798	0.503	0.519	0.516
SN.4	0.611	0.840	0.583	0.567	0.597
SN.5	0.495	0.804	0.552	0.570	0.568
PBC.1	0.479	0.593	0.763	0.517	0.490
PBC.3	0.558	0.543	0.784	0.484	0.538
PBC.4	0.459	0.436	0.727	0.401	0.414
PBC.5	0.362	0.433	0.648	0.389	0.462
SA.1	0.483	0.501	0.497	0.747	0.536
SA.2	0.415	0.500	0.462	0.742	0.514
SA.3	0.415	0.447	0.455	0.776	0.499
SA.4	0.531	0.546	0.472	0.838	0.633
SA.5	0.552	0.552	0.532	0.821	0.661
TCI.1	0.437	0.488	0.453	0.514	0.642
TCI.2	0.591	0.596	0.559	0.612	0.830
TCI.3	0.550	0.572	0.564	0.641	0.843
TCI.4	0.434	0.495	0.502	0.550	0.813
TCI.5	0.491	0.514	0.528	0.621	0.853

TCI.6	0.541	0.522	0.531	0.564	0.821
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(Source: Data Processed by Authors)

Table 2 demonstrates that each variable indicator has a higher cross-loading value than the others. Table 3 also reveals that, according to the Fornell-Larcker criterion, each variable indicator's square root of the average variance extracted (AVE) is higher than the others. So, all indicators meet discriminant validity standards.

Table 3: Fornell-Larcker Criterion

	A	PBC	SA	SN	TCI
A	0.752				
PBC	0.639	0.732			
SA	0.615	0.617	0.786		
SN	0.656	0.691	0.651	0.772	
TCI	0.636	0.653	0.730	0.664	0.803

(Source: Data Processed by Authors)

Table 4: Composite Reliability

No.	Variable	Cronbach's Alpha	Composite Reliability	Results
1	A	0.807	0.865	Reliable
2	SN	0.830	0.880	Reliable
3	PBC	0.710	0.822	Reliable
4	SA	0.845	0.889	Reliable
5	TCI	0.888	0.916	Reliable

(Source: Data Processed by Authors)

Table 4 demonstrates that cronbach's alpha value and the composite reliability value for all variables exceed 0.70, indicating that all variables are deemed reliable.

Table 5: Coefficient Diterminance

	R-Square	R-Square Adjusted
Tax Compliance Intentions	0.631	0.627
Self-Assessment	0.510	0.506

(Source: Data Processed by Author)

The R-Square and R-Square Adjusted values for variables A, SN and PBC on variables TCI are 63.1% and 62.7%, respectively, as indicated in Table 5. Thus, it may be inferred that the independent variable exerts a substantial influence of 63.1% and 62.7% on the dependent variable, which falls within the moderate range. Table 5 displays the R-Square and R-Square Adjusted values for variables A, SN and PBC about variable SA, which are 51% and 50.6%, respectively. The independent variable exerts a modest influence of 51% and 50.6% on the intervening variable.

Table 6: Model Fit

	Saturated Model	Estimated Model
SRMR	0.073	0.073
D_ULS	1.743	1.743
D_G	0.536	0.536
Chi Square	1354.163	1354.163
NFI	0.779	0.779

(Source: Data Processed by Authors)

Table 6 shows the SRMR value of 0.073, which is below the threshold of 0.10, indicating a good fit. This demonstrated that the overall structural model is a commendable representation. The NFI score of 0.779 is around 0.67, suggesting that the structural model falls into the strong group.

Table 7: Predictive Relevance

	Q ²
Tax Compliance Intentions	0.398
Self-Assessment	0.306

(Source: Data Processed by Authors)

Table 7 indicates that the Q² value of the TCI variable is 0.398, which is greater than 0. Therefore, it can be concluded that the structural model is capable of delivering meaningful and precise predictions. Similarly, since the Q² value of the SA variable is 0.306, which is more than 0, it may be concluded that the structural model is capable of offering significant and precise predictions.

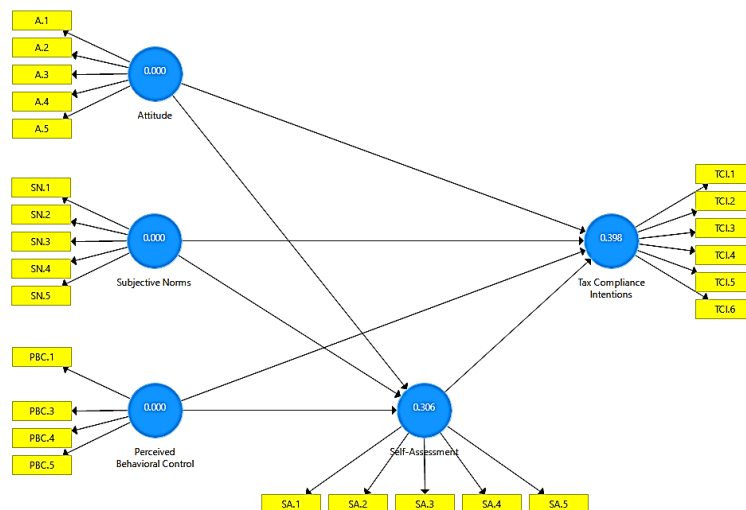


Fig. 2: Blindfolding

(Source: Data Processed by Authors)

Table 8: Direct Influence Hypothesis

	O	M	STDEV	T-Statistic	P-Value
A -> TCI	0.155	0.155	0.050	3.108	0.002
SN -> TCI	0.166	0.165	0.047	3.493	0.001
PBC -> TCI	0.186	0.188	0.051	3.621	0.000
SA -> TCI	0.412	0.408	0.054	7.578	0.000
A -> SA	0.256	0.259	0.070	3.638	0.000
SN -> SA	0.325	0.324	0.055	5.962	0.000
PBC -> SA	0.229	0.227	0.069	3.299	0.001

(Source: Data Processed by Authors)

Table 8 demonstrates the relationship between attitude and tax compliance intentions, with a t-statistic of 3.108. This value surpasses the significance level of 0.05, which is set at 1.96. The p-value of the data is 0.002, which is lower than the significance threshold of 0.05. This demonstrates that attitude has a favorable impact on individuals' intentions to comply with tax obligations. According to Nugroho et al., (2020), the attitude has a favorable and significant impact on tax compliance intentions. These findings are in opposition to the conclusions of Saputri & Khoiriawati, (2021), who concluded that attitude does not have an impact on tax compliance intentions.

Taxpayers are more inclined to comply with their tax responsibilities if they are treated equitably. This indicates that the attitude of taxpayers is a potent and significant internal element, as it arises from inside the taxpayers themselves. Studies have demonstrated that individuals' perceptions of an inequitable tax burden might impact their attitudes and perspectives towards tax payment, thereby affecting their decisions to comply with tax obligations (Madalura et al., 2023).

Table 8 shows that subjective norms positively affect tax compliance intentions, with a coefficient of 3.493 and a P value of 0.001. this finding supports Karwur et al., (2020), who found that subjective standards improve taxpayer compliance. It contradicts Dwianika et al., (2023), who concluded that subjective norms do not affect taxpayer compliance.

Subjective norms refer to the perceived expectations of others and can significantly influence individual taxpayers' inclinations to comply. The impact of the surrounding environment and individuals contributes to the influence on taxpayers' motivation to fulfil their tax responsibilities. Taxpayers who have strong subjective norms are more inclined to enhance their compliance with paying taxes and view taxes as a favorable responsibility (Jannah, 2023).

Table 8 further reveals that perceived behavioral control positively affects tax compliance intentions, with 3.621 more than 1.96 and a P value of 0.000 less than 0.05. This supports Ari et al., (2021), result that perceived behavioral control improves taxpayer compliance. In contrast, Cechovsky, (2021) found that perceived behavioral control does not affect tax compliance intentions.

Perceived behavioral control refers to an individual's evaluation of their capability to carry out a particular behavior. The most crucial determinant in forecasting individual behavior is this. Positive behavioral control is linked to a greater inclination to engage in a specific behavior (Yusuf et al., 2020). Perceived behavioral control in the realm of tax compliance refers to the favorable evaluation of one's capability to meet their tax responsibilities (Karwur et al., 2020).

Table 8 shows that the self-assessment method positively affects tax compliance intentions, with a difference of 7.578 that exceeds 1.96 and a P value of 0.000 that is less than 0.05. This supports Febriana & Limajatini (2022) findings. In contrast, Chandra & Arisman, (2023), found no significant effect of the self-assessment method on tax compliance intentions.

The taxpayer self-assessment method has proven to be a successful tool for increasing overall compliance among taxpayers. When it comes to countries that use this system, it is an essential component of the process of enforcing tax responsibilities. The deployment of the self-assessment system has effectively boosted taxpayer's adherence to filing their taxes. This is evidenced by the fact that the self-assessment system has become more widespread (Hasanah & Ardini, 2021).

Table 8 shows that attitude positively affects the self-assessment system with a value of 3.638, more than 1.96. the P value is 0.000, below 0.05, indicating statistical significance. Yuniarni et al., (2022) found that rational attitudes increase taxpayer compliance. However, Herlambang, (2021) noted that a tax-moral approach could enhance tax compliance in the self-assessment system. According to Ramdhani et al., (2019), moral thinkers are more likely to comply with tax laws.

Morality is a crucial determinant of an individual's character and views towards behavior. Within the realm of tax collection, the self-assessment system places significant importance on the ethical consciousness of taxpayers, urging them to exhibit integrity and openness when it comes to reporting and remitting taxes. Therefore, tax morality can be seen as a favorable disposition that encourages taxpayers to adhere to tax legislation (Mahrurrotul Fikriyah & Trisnaningsih, 2022). The self-assessment system is a tax collection mechanism designed to enhance taxpayers' understanding of their tax responsibilities. The implementation of an effective self-assessment system has been found to incentivize taxpayers to engage in tax compliance activities (Sejati et al., 2023).

Table 8 shows that subjective norms on self-assessment are significant. The t-statistic is 5.962 and the p-value is 0.000, below the significance level of 0.05. These results indicate that subjective norms positively affect the self-assessment system. This supports Oboh & Otululugbu, (2021) claim that justice perceptions influence tax compliance. Ibrahim & Lawal, (2023) found that complexity significantly reduces tax compliance. To encourage tax compliance, a self-assessment system should be simple.

Subjective norms, also known as perceived social expectations, are capable of putting individuals under pressure to conform to the norms established by society. Taxpayers have a greater likelihood of complying with their commitment to pay taxes when they are aware that their social network is counting on them to complete this responsibility (Nemmy & Efriyenti, 2023).

Table 8 shows that perceived behavioral control (PBC) considerably influences the self-assessment system, with a t-statistic of 3.299 and a p-value of 0.001, below 0.05. This study agrees with Kemuning et al., (2022), who found that tax information improves tax compliance. Additionally, it links electronic system adoption to taxpayer compliance. Wahyudin et al., (2022) found that changes in taxpayer behavior do not always improve tax compliance.

Under the self-assessment system, taxpayers are required to honestly and accurately disclose and pay their taxes. Optimal tax revenue is achieved when taxpayers possess knowledge of and adhere to their obligations. Individuals in the vicinity of taxpayers and other environmental factors can influence their attitudes towards tax compliance. Behavioral control refers to an individual's assessment of their capacity to adhere to a

particular behavior. This factor can also influence a taxpayer's level of compliance. Positive attitudes towards tax compliance and stronger subjective norms, which refer to their perceived expectations of others, make them more likely to have a greater sense of control over their behavior regarding taxes. This demonstrates that taxpayers are more likely to fulfil their tax obligations if they perceive them as suitable and if their social circle anticipates them to do so (Aisyah et al., 2023).

Table 9: Indirect Influence Hypothesis

	O	M	STDEV	T-Statistic	P-Value
A -> SA -> TCI	0.105	0.105	0.030	3.463	0.001
SN -> SA -> TCI	0.134	0.133	0.029	4.610	0.000
PBC -> SA -> TCI	0.094	0.093	0.033	2.826	0.005

(Source: Data Processed by Authors)

According to Table 9, attitude has a strong on tax compliance intentions through the self-assessment method ($t = 3.463$, $p < 0.005$). This discovery is in line with the prior research conducted by Mahendra & Oktaviani, (2022). Nevertheless, Zakiah et al., (2023) discovered that attitude did not have a substantial impact on tax compliance.

The attitude of taxpayers have the potential to impact their intentions to comply with tax regulations. Attitude refers to an individual's mental outlook or perspective towards a particular thing and it has the potential to impact their behavior towards that object (Veronika & Umarta, 2023). Individuals who have a favorable outlook on taxation are more likely to have a greater inclination to fulfil their tax obligations. The government relies on the faith it places in taxpayers to execute their tax duties (Qomariyah & Riduwan, 2023). By adopting the self-assessment system, taxpayers exhibit a favorable disposition towards adhering to tax regulations. This technique additionally enhances taxpayers' consciousness of their tax responsibilities (Yunus et al., 2020).

According to Table 9, subjective norms positively affect people's desire to comply with tax laws, particularly through self-assessment. This impact is significant, with a t-value of 4.610 and a p-value below 0.005. This supports Sanita et al., (2018), who found that subjective norms affect taxpayer tax compliance. However, Estiningtyastuti & Karhananto, (2022) discovered that subjective norms did not affect taxpayer compliance.

Subjective norms pertain to perceived social expectations and can exert a substantial impact on individual conduct, such as compliance with tax obligations. Taxpayers are more inclined to adhere to their tax responsibilities if they perceive that their social network anticipates them to do so. The influence of societal and environmental pressures on an individual can alter their attitude and impact their decision to adhere to tax regulations (Hananto et al., 2023). When there is a stronger agreement between people's own beliefs about what is socially acceptable and their willingness to follow tax regulations, there is a higher likelihood that taxpayers will intend to comply (Farida & Irawati, 2023).

Table 9 shows that perceived behavioral control (PBC) positively affects their intention to comply with taxes through self-assessment ($t = 2.826$, $p < 0.005$). Karwur et al., (2020) found that PBC significantly affects taxpayer compliance. PBC positively affects tax compliance intentions, although Estiningtyastuti & Karhananto, (2022) noted that this is not statistically significant.

Perceived behavioral control (PBC) refers to an individual's belief in their ability to carry out a particular behavior. PBC is a crucial determinant of taxpayers' adherence to their tax responsibilities. Individuals with elevated levels of PBC are more inclined to have the notion that they can adhere to tax regulations, thereby resulting in heightened intentions to comply (Adzillah et al., 2023).

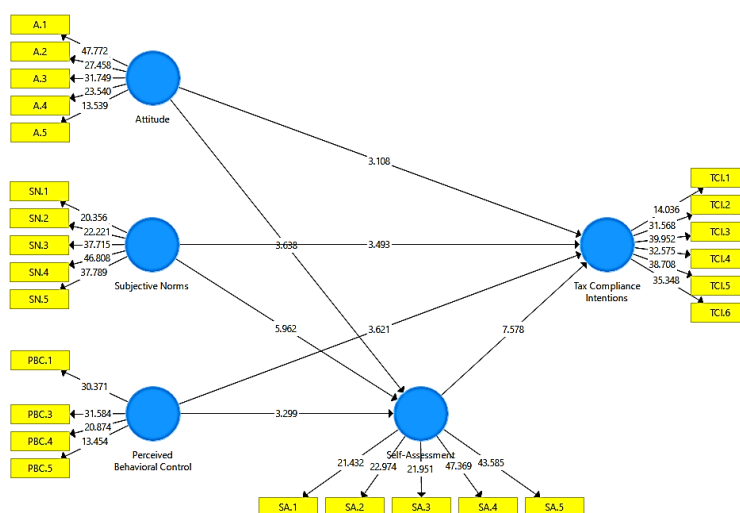


Fig. 3: Bootstrapping

(Source: Data Processed by Authors)

Conclusions

The findings demonstrated that a person's attitudes, subjective norms, perceived behavioral control and self-assessment systems have a significant impact on their intention to comply with tax laws. Attitude, subjective norms and perceived behavioral control are a few factors that affect the self-assessment system. Likewise, Attitudes, subjective norms and perceived behavioral control are all indirectly influenced by the self-assessment system and influence tax compliance intentions.

The findings suggest that psychological factors and self-assessment methods in the tax context have a significant impact on individuals' intentions to comply with their responsibilities. Favorable dispositions towards tax payment, societal expectations that encourage adherence to tax regulations and a perceived ability to manage one's behavior can enhance an individual's inclination to comply with tax payment. In addition, the self-assessment system plays a crucial role in connecting psychological aspects with intentions to comply with tax obligations. Enhancing comprehension of the determinants that impact tax compliance intentions enables the government and affiliated organizations to devise policies and initiatives that are more efficacious in augmenting the extent of public tax compliance. Therefore, the findings of this study are considered crucial in endeavors to enhance tax collections and state finances.

The scope of this study is restricted to a sample taken exclusively from Banten Province. It should be noted that the determinants of tax compliance intentions and behavior may vary across different locations. Furthermore, this research is unable to assess long-term changes in tax compliance behavior and intentions, as these may vary over time. Subsequent investigations should examine significant characteristics that were not observed or evaluated in this study, which could potentially impact tax compliance intentions and behavior in different geographical areas or on a broader scale. Further research should explore if the factors influencing tax compliance intentions and behavior exhibit consistent or distinct characteristics across various locations.

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State support for companies employing people with disabilities as a tool for labor market stabilization

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Abstract. *The increasing number of people in risk groups within the labor market has led to growing state interventions. Social support policies regulate the labor market and integrate specific groups, such as people with disabilities, into the workforce. In the Czech Republic, Slovakia, and Hungary, these individuals are recognized as disabled and receive disability pensions. As of March 2022, people with disabilities constituted more than 13% of the Czech Republic's population (Czech Statistical Office, 2023). Governments are continuously adopting measures to eliminate discrimination and support a stable labor market, but addressing the needs of people with disabilities remains challenging with significant socioeconomic and political impacts (IZA, 2016). This study examines how corporations employing people with disabilities respond to increasing government interventions through employer incentives. The research aimed to validate the income equation proposed by Sedláková (2024) for enterprises employing workers with disabilities. Validation was conducted across all countries despite differing social policies. The study worked with a sample of 14 251 to 14 312 data points from the period 2020 to 2022. Results confirm the income equation's applicability, with adjustments needed for specific firms and countries, such as corporate tax contributions and data management practices. The null hypothesis was rejected annually. The Czech social policy was found to be the most effective, with the lowest unemployment rate and lowest income component from employing workers with disabilities, significantly influencing the labor market with lower costs compared to other countries. Specific adjustments, like reimbursing costs for modifying workplaces, are noteworthy. In Slovakia, these costs can be covered by state funds. Despite the Czech Republic having the lowest average incomes for companies employing people with disabilities, its social policy tools are more effective than those of Slovakia and Hungary in encouraging the employment of this group, reflected in the lowest unemployment rates.*

Keywords: Employing people with disabilities, labour market, social policy, state support, social policy tools

JEL Codes: J08, J58

1. Introduction

As of March 2022, individuals with disabilities constituted over 13% of the Czech Republic's population, making their integration into the labor market a crucial task for both the state and non-profit organizations (Czech Statistical Office, 2022). The term "individuals with disabilities" is more sensitive and community-acceptable than "disabled people," reflecting the terminology used in Western literature (Snyder et al., 2010). However, this term is still retained in Slovak and Czech legislation. At the beginning of 2021, the Czech labor market saw a higher supply of job vacancies than the demand from the unemployed, highlighting the need to integrate workers with disabilities (Czech Statistical Office, 2022). By the first quarter of 2023, the employment rate for those aged 18-64 was 75.55%, and the unemployment rate stood at 2.6%, with long-term unfilled positions in niche specializations (Czech Statistical Office, 2023; Labor Office, 2023).

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Long-term trends in the labor market and the specifically protected labor market in the Czech Republic are complemented by contradictory results from subsequent analyses. Bjelland et al. (2009) highlight the existence of discrimination as a barrier to employing individuals with disabilities. Research shows a growing trend in the inclusion and retention of individuals with disabilities in the labor market, as well as their willingness to work and adapt (Honey et al., 1996; Burkhauser et al., 2014). This is supported by the increasing number of supportive measures from states. Beyond economic incentives for workers with disabilities, corporate motives driven by state support show that employing individuals with disabilities improves their lives in areas of social cohesion, economic quality of life, and psychological stability (Snyder et al., 2010).

The trend of employing individuals with disabilities has persisted for thirty years, demonstrating a long-term interest in their integration into the labor market (Wittenburg et al., 2013). This reality is reflected in the development of social policies in the studied countries, with continuously increasing support measures and compensation. Business corporations increase the number of employees with disabilities for various specific reasons, including the influence of state interventions (Shulman, 2020). High government support for business corporations employing individuals with disabilities is a strong motivation for their employment (Krupa and Lysaght, 2016; Corbière et al., 2019; Evans et al., 2019). These studies indicate that the state uses intervention policies to support the employment of individuals with disabilities, such as lower rates on mandatory health insurance contributions (Sedláková & Pavelková, 2022; Sedláková, 2022).

Wage subsidies for corporations lead to a rapid increase in the employment of individuals with disabilities (Angelov & Eliason, 2018). Fraser (2009) notes that workers with disabilities are more loyal and perform better than their non-disabled colleagues. The motivation to employ individuals with disabilities includes not only state support but also the efforts of the corporations and the workers themselves (Efimov et al., 2022; Hasegawa, 2010). The American ADA law helps identify and implement factors that facilitate the inclusion of individuals with disabilities in the labor market (Blanc et al., 2003). An individual approach to individuals with disabilities is crucial for their effective integration into the labor market (Schur et al., 2005; Collela, 2001). Employing individuals with disabilities brings higher productivity, prestige, and overall efficiency to corporations, although it requires higher integration costs (Lindsay et al., 2018).

2. Theoretical framework of research

The Evolution of the Labor Market and Social Policies: The Role of Workers with Disabilities

Aichner and Shaltoni (2018) map the labor market as an increasingly inclusive space for people with disabilities. Employing individuals with disabilities can bring not only financial benefits to businesses but also social advantages (Sedláková et al., 2023). Despite state interventions, the labor market still shows reluctance to hire people with disabilities (Krus & Schur, 2003). Hasegawa (2010) notes that this participation is driven by a growing population of individuals with physical or mental disabilities, and state support should be increased for these individuals, their families, and potential employers. According to the World Health Organization, as cited by Aichner and Shaltoni (2010), over 15% of the global population has some form of disability, with Angela (2014) highlighting a threefold increase in recognized disabilities between 2000 and 2009. Only 12.7% of disabled individuals aged 18-55 are employed, which highlights a significant underrepresentation in the workforce (Angela, 2014). Dovidio et al. (2011) emphasize the potential for employing people with various types of disabilities, suggesting that job roles and environments can be adapted to accommodate specific needs, benefitting society as a whole. Given the rising number of people with disabilities, new categories with common characteristics need to be defined (Hasegawa, 2010; Aichner & Shaltoni, 2018). Corporations must adapt to this reality by enhancing their market appeal through inclusivity (Aichner & Shaltoni, 2018). Workers with disabilities often exhibit greater sensitivity to injustice compared to their non-disabled peers, and they report lower job satisfaction (Snyder et al., 2010).

Research by Angelov and Eliason (2018) and Anand and Sevak (2017) found that individuals with disabilities are more than twice as likely to drop out of school, which can further limit their employment opportunities. Increasing the employment rate of this group can lead to state cost savings and a greater contribution to social security (Sedláková, 2022). However, despite the benefits, there remains a potential for discrimination and underutilization of this workforce (Bhattacharya & Long, 2015). The reluctance to hire disabled individuals is a long-standing global issue rooted in the last century (Krus & Schur, 2003). Creating certificates of recognized disabilities could simplify hiring processes and improve market integration (Hasegawa, 2010).

Profiling job performance during recruitment can ease decision-making for potential employers and reduce job turnover (Sedláková et al., 2023). In response to Hasegawa's findings, the European Commission adopted the Disability Rights Strategy 2021-2030 to enhance the lives of people with disabilities globally. This strategy builds on previous successes, aiming to remove barriers and ensure equal opportunities and participation in society and the economy. It includes ambitious measures in areas like accessibility, independent living, democratic participation, and anti-discrimination. The European Commission will closely cooperate with member states to implement this strategy and support the rights of people with disabilities (Europa.eu, 2021). State intervention in the labor market, through laws and support measures, can help address issues faced by disabled workers (Bhattacharya & Long, 2015). Snyder et al. (2010) note that disabled individuals often face challenges related to housing proximity to workplaces. State cooperation with employers to provide subsidized or protected housing near workplaces could be beneficial. Several studies have shown that employing disabled individuals can be profitable for businesses (Hartnett et al., 2011). These studies also indicate higher job satisfaction and lower turnover among disabled employees in private sector service companies (Hartnett et al., 2011), with disabled employees often remaining with companies for over three years, highlighting the potential for stable employment relationships (Sedláková et al., 2023).

The positive impact of employing disabled workers, such as increased loyalty, efficiency, willingness to learn, and a sense of belonging, benefits all parties involved (Hartnett et al., 2011). Employers' negative attitudes and concerns about hiring disabled individuals contribute to ongoing reluctance (Siperstein et al., 2006). The Japanese government provides equal employment opportunities for the general public, including disabled individuals (Muroyama, 2010). Literature highlights corporate attitudes towards employing disabled individuals, offering a new perspective for employers (Siperstein et al., 2006). The impact of their practices on disadvantaged groups creates customer feedback, which can influence the overall reputation of the employing corporation (Siperstein et al., 2006). Rehabilitating employer attitudes towards disabled workers is crucial (Maja et al., 2011). This can be achieved through well-developed methodologies for the labor market (Maja et al., 2011). Various countries provide inspiration for different approaches to disability employment (Muroyama, 2010). Raising awareness about minimizing discrimination and maximizing information on older and disabled workers is essential (Maja et al., 2011), explaining why Japan's employment quota increased from 2003 to 2009 (Muroyama, 2010). The loyalty and efficiency of disabled workers, along with their willingness to learn and long-term cooperation, are valuable to employers (Dabirian et al., 2017). In-depth interviews with team leaders working with disabled employees highlight the importance of fostering a sense of belonging among employees (Dabirian et al., 2017). Effective communication between state authorities and corporations willing to hire disabled workers can be facilitated through social media (Backhaus & Tikoo, 2004; Kim & Jang, 2022; Loo, 2020). The popularity of social media can increase the economic activity of disabled individuals (Sedláková & Pavelková, 2022). Research shows that social media interactions are crucial for brand perception and can influence the overall reputation of the employing company (Backhaus & Tikoo, 2004).

3. Methodology and data

This research focuses on applying the income equation to businesses in the Czech Republic, Slovak Republic, and Hungary using secondary data from Sedláková's research (2022, 2023 and 2024). Additionally, public statistics were utilized, with the data adjusted and averaged with publicly available statistics (further details are provided in the sources accompanying the respective data).

Secondary Research

For the initial development of the income equation, a survey was conducted at a security services company for the period 2013-2019. The equation was adjusted according to internal corporate needs and the requirements of individual corporate departments. The initial development was tested on a sample of data from 300 employees with recognized disabilities of levels I-III. Subsequently, it was supplemented with targeted surveys in cooperating companies employing workers with disabilities of the respective levels. The secondary research of this study conducted surveys based on data from 2020-2022 regarding the income component of businesses employing workers with disabilities, focusing on companies in the Czech Republic, Slovakia, and Hungary. The data included averages from 4 Czech companies, 2 Hungarian companies, and 2 Slovak companies. The sample comprised employees with disabilities aged 18 to 75 working under main employment contracts or agreements, including both men and women. These averages were calculated based on a sample of 14,251 to 14,312 employees, considering fluctuations and seasonal variations. The data originates from Sedláková's original work (2024), supplemented or adjusted with public statistics and intra-company data from two establishments: an accommodation facility and a private healthcare facility. This research thus aims to validate the income equation using secondary data.

Table 1: Research Sample Specification for the Period 2013-2019

Sample size	303 respondents
Age	Ages 18-67
Gender	157 men, 146 women
Region	Czech Republic, Slovakia, Hungary
Companies	I, G, K, N
Disability	28 respondents with disability level I

(Source: own)

Table 2: Research Sample Specification for the Period 2020-2022

Sample size	13,200-15,623 employees
Age	Ages 18-78
Gender	Men, women
Region	4 Czech companies, 2 Slovak companies, 2 Hungarian companies
Companies	I, G, K, N, C, P, R, C, F

Disability	Disability levels I to III
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(Source: own)

Income Equations

The income equations were developed and underwent certain modifications during Sedláková's research as part of her doctoral thesis on the Economic Feasibility of Employing People with Disabilities in 2024 at Mendel University in Brno. The originality of this research lies in comparing theoretical foundations and practical verification of supportive measures in the labor market, specifically focusing on the risk groups of people with disabilities, where all three versions of the income equation for companies employing people with disabilities will be verified.

$$ZZ = [(F \cdot H) - N] + P$$

Equation 1: Income equation for one employee with a disability.

Note: This expression describes the difference between customer revenues and employee costs for half a year, where costs include employee wages, employee costs, and revenues from customer billings for a six-month period and contributions from the state for employees with disabilities." (Sedláková, 2024)

"Income equation for one employee after the first adjustment for corporations with hourly billing from customers.

$$ZZ = [(PZ - NZ) \cdot DZP]$$

$$ZZ = [(F \cdot H) - (H \cdot O)] + [(CM + N) + (SP + ZPS)] \cdot DZP$$

Equation 2: Income equation for a corporation employing a person with a disability.

Note: This expression describes the difference between customer revenues and employee costs for one observed period (data for the same time period)." (Sedláková, 2024)

"Income equation after adjustment for corporations with customer billing based on performed services for one employee with a disability:

$$ZZ = [(PZZ - NZ) \cdot DZP]$$

$$ZZ = [(\sum (F1, ..., FN) - H)] + [(CM + N) + (SP + ZPS)] \cdot DZP$$

Equation 3: Income equation for a corporation employing a person with a disability.

Note: This expression describes the difference between customer revenues and employee costs for one observed period (data for the same time period)." (Sedláková, 2024)

Explanation:

F - Average hourly billing from customers.

H - Average number of hours worked on projects per semester.

N - Average employee costs per semester paid by the employer.

P - Average value of the contribution for employees with disabilities from the state for a semester.

ZZ - Profit or loss of the company resulting from employing a worker with disabilities.

M - Average value of the hourly wage of an employee with disabilities.

O - Average hours worked by the employee on the project.

CM - Social and health insurance paid by the employer (CM = SS + HI).

SP - Social insurance paid by the employer.

HI - Health insurance paid by the employer.

OD - Contributions to social and health insurance paid by the employer for an employee with disabilities.

N - Additional costs for an employee with disabilities.

NZ - Average cost of an employee with disabilities (NZ = [(H · O) + (CM + N) + (SP + HI)]).

PZ - Income from customers based on hours worked ($PZ = F \cdot H$).

CIT - Corporate income tax.

ZZ - Profit of the corporation resulting from employing a worker with disabilities.

4. Results

Application of the income equation

Czech Republic

Average income of Czech corporations in 2020: $25,404.04 / 3 = 8,468.01$ CZK per employee with disabilities before taxation.

Average income of Czech corporations in 2021: $1,572,160 / 48 = 32,753.33$ CZK per employee with disabilities before taxation.

Average income of Czech corporations in 2022: $2,106,294 / 48 = 43,881.13$ CZK per employee with disabilities before taxation.

Average income of Czech corporations in 2023: $8,468.01 - (8,468.01 \cdot 0.19) = 6,859.1$ CZK per employee with disabilities after taxation.

Average income of Czech corporations in 2021: $32,753.33 - (32,753.33 \cdot 0.19) = 26,530.2$ CZK per employee with disabilities after taxation.

Average income of Czech corporations in 2022: $43,881.13 - (43,881.13 \cdot 0.19) = 35,543.72$ CZK per employee with disabilities after taxation.

In December 2020, Czech corporations had various levels of income and expenses, affecting their profit/movement before tax. In January 2021, there was a significant increase in both income and expenses, reflected in profit/movement before tax. In February 2021, income and expenses significantly increased again, impacting profit/movement before tax. In March 2021, there was a noticeable difference in expenses between different records. In April 2021, income and expenses varied again depending on the record. In May 2021, income and expenses were once again significantly different depending on the record. From June 2021 to August 2021, there were recurring trends in income and expenses. From September 2021 to December 2022, the levels of income and expenses changed depending on the month but generally remained high. The average income of Czech corporations with employees with disabilities before taxation increases from 2020 to 2022. The average income of Czech corporations with employees with disabilities after taxation increases from 2020 to 2022. The greatest difference in the incomes of companies is observed in the following months: January 2021, where the income ranges from 25,919.87 to 82,869 CZK. April 2021, where the income ranges from 26,496.55 to 94,690 CZK.

Slovak Republic

Average income of Slovak Republic corporations in 2020: 54 281.2 CZK per employee with disabilities before taxation.

Average income of Slovak Republic corporations in 2021: $3\,090\,663.434 / 24 = 128\,777,643$ CZK per employee with disabilities before taxation.

Average income of Slovak Republic corporations in 2022: $3\,615\,579.56 / 24 = 150\,649,148$ CZK per employee with disabilities before taxation.

Average income of Slovak Republic corporations in 2020: $54\,281.2 - (54\,281.2 \cdot 0.21) = 42\,882,148$ CZK per employee with disabilities after taxation.

Average income of Slovak Republic corporations in 2021: $128\,777,643 - (128\,777,643 \cdot 0.21) = 101\,734,338$ CZK per employee with disabilities after taxation.

Average income of Slovak Republic corporations in 2022: $150\,649,148 - (150\,649,148 \cdot 0.21) = 119\,012,827$ CZK per employee with disabilities after taxation.

The average income of Slovak Republic corporations in 2020 was 54,281.2 CZK per employee with disabilities before taxation. This income increased to 128,777.643 CZK per employee with disabilities before taxation in 2021. In 2022, the average income reached 150,649.148 CZK per employee with disabilities before taxation. After taxation in 2020, the average income was 42,882.148 CZK per employee with disabilities. In 2021, this average income after taxation decreased to 101,734.338 CZK per employee with disabilities. However, in 2022, this average income after taxation increased to 119,012.827 CZK per employee with disabilities. The results indicate an increase in the average income of employees with disabilities in Slovak firms over the course of three years. This may signal an effort to improve conditions for this group of employees. Additionally, although the average income is increasing, it is still lower than the income of employees without disabilities, indicating ongoing inequalities in remuneration.

Hungary

Average income of Hungary corporations in 2020: 34 352,61 CZK per employee with disabilities before taxation.

Average income of Hungary corporations in 2021: $3\,092\,495 / 24 = 128\,853,958$ CZK per employee with disabilities before taxation.

Average income of Hungary corporations in 2022: $3\,66\,1937 / 24 = 152\,580,708$ CZK per employee with disabilities before taxation.

Average income of Hungary corporations in 2020: $34\,352,61 - (34\,352,61 * 0,09) = 31\,260,875$ CZK per employee with disabilities after taxation.

Average income of Hungary corporations in 2021: $128\,853,958 - (128\,853,958 * 0,09) = 117\,257,107$ CZK per employee with disabilities after taxation.

Average income of Hungary corporations in 2022: $152\,580,708 - (152\,580,708 * 0,09) = 138\,848,444$ CZK per employee with disabilities after taxation.

The average income of Hungarian corporations for employees with disabilities exhibited significant growth over the span of three years, from 2020 to 2022. In 2020, the average income per employee with disabilities before taxation stood at 34,352.61 CZK. This baseline figure was likely influenced by various economic factors prevalent at that time, including market conditions, labor laws, and corporate performance. By 2021, there was a substantial increase in the average income, reaching 128,853.958 CZK before taxation. This remarkable rise might be attributed to factors such as improved economic conditions, increased productivity, or changes in corporate policies. Continuing this upward trend, the average income in 2022 saw a further surge, reaching 152,580.708 CZK before taxation. This could be indicative of sustained economic growth, approving government policies, or advancements in technology and industry practices. When considering post-taxation incomes, the figures also showed growth over the years. Despite deductions for taxes, the average income for employees with disabilities remained robust. Overall, the increasing trend in average income reflects positive developments within the Hungarian corporate sector, potentially indicating a strengthening economy and improved opportunities for employees with disabilities.

The income equation application utilized the exchange rates provided below. The results for the given years represent the income of the enterprise per one employee with a health impairment for one month. The income is averaged from all corporations of the respective countries and from all expenses and incomes of the enterprise for the given employees.

5. Discussion and Conclusions

The research and literature review reveals a complex landscape for employing individuals with disabilities, shaped by economic, social, and legislative factors across different countries. Aichner and Shaltoni (2018) highlight growing inclusivity in the labor market, offering both financial and social benefits, as supported by Sedláková et al. (2023). Despite this trend, Krus and Schur (2003) point to persistent reluctance to hire

individuals with disabilities, even with state interventions. Hasegawa (2010) emphasizes the need for increased state support to meet the needs of this growing population. Angela (2014) notes that over 15% of the global population has a disability, with a threefold increase in recognized disabilities from 2000 to 2009, yet only 12.7% of individuals aged 18-55 are employed. Dovidio et al. (2011) argue that adapting job roles and environments to meet these needs benefits society. Both Hasegawa (2010) and Aichner & Shaltoni (2018) call for new categories and inclusive practices to enhance market appeal. Snyder et al. (2010) suggest that state support for subsidized housing could address challenges related to housing proximity to workplaces. Sedláková et al. (2023) recommend profiling job performance to improve decision-making and reduce turnover. The European Commission's Disability Rights Strategy 2021-2030 aims to improve access and participation for individuals with disabilities (Europa.eu, 2021). Bhattacharya & Long (2015) and Hartnett et al. (2011) find that state interventions and inclusive hiring can be profitable for businesses. Siperstein et al. (2006) identify persistent employer reluctance due to negative attitudes, while Muroyama (2010) and Maja et al. (2011) stress the need for rehabilitating employer attitudes and developing effective labor market methodologies. Research shows fluctuating incomes for Czech corporations with employees with disabilities from 2020 to 2022. In Slovakia, average income increased from 54,281.2 CZK in 2020 to 150,649.148 CZK in 2022, indicating a positive trend. In Hungary, the average income rose from 34,352.61 CZK in 2020 to 152,580.708 CZK in 2022. These findings reflect a growing state effort to increase employment for this specific group, aligning with recommendations from Schur, Krus, and other authors. The question remains as to where the development of social policies will lead. Further research aims to map all supportive tools provided by social policies and non-profit organizations in these countries for this specific group and for employer corporations. Examining the Union of Equality as the Strategy on the Rights of Persons with Disabilities for 2021-2030 reveals that the countries studied do not have significantly different social policies, and since 2021, the EU has been undergoing strong harmonization and facilitation of life for people with disabilities. The goal of the strategy is to improve the lives of persons with disabilities not only within Europe but also on a global scale. The strategy builds on previous strategies from 2010-2020, which laid the groundwork for a barrier-free Europe, accessibility, dignified quality of life, and independent living. The implementation of the strategy includes introducing the European Disability Card and creating a support platform (European Commission, 2021). In terms of development, all three countries exhibit similar growth patterns. Angela (2014) notes that the development in Romania is strongly consistent with that in the Czech Republic, highlighting a growing trend in the number of recognized disabilities, which tripled between 2000 and 2009. The issue of the increasing number of recognized disabilities is a cross-border problem and needs to be approached from a global perspective. The comparison of the policies in these countries regarding support for businesses and employees with disabilities is summarized as follows. Currently, under the Union of Equality adopted by the European Commission, disability pensions are based not on the amount of compulsory insurance contributions but on meeting employment duration or contribution requirements. Additionally, pensions are based on the average income if the worker with a recognized disability was employed before becoming disabled. (Sedláková, 2024; European Commission, 2021)

Disability classification varies among the studied countries. The Czech Republic uses a three-tier system, ranging from I to III. Hungary has a more complex system that, like Slovakia, functionally mirrors the Czech system but is categorized from A to E, with corresponding numbers indicating the type of disability, such as the reduction in work capacity in percentages and specific conditions like musculoskeletal disorders. Slovakia classifies disabilities as either impaired or severely impaired, with the latter term being considered derogatory in Western literature. Hungary offers the most substantial support for corporations, including an unlimited amount for disability pensions. Both Hungary and Slovakia provide similar support for employing people with disabilities, particularly for businesses with more than 25 employees, requiring a minimum of

4% disabled employees. In Hungary, companies employing workers with disabilities benefit from reduced contributions, with a maximum reduction equal to twice the annual salary per employee. Slovakia and the Czech Republic address this by reducing health insurance contributions paid by both employees and employers. (European Commission, 2021; Sedláková & Pavelková, 2023; Sedláková, 2024)

In the Czech Republic, the maximum monthly contribution for each employee with a disability is 16,700 CZK plus a fixed 1,000 CZK. For employees with only health impairments, the contribution is 5,000 CZK. Slovakia provides up to 35,900 CZK per employee per month, in addition to a placement grant of up to 11,979 CZK monthly, depending on the duration of the placement. This does not include grants for sheltered workshops. Support for employing disabled individuals includes contributions for transportation, workplace adjustments, and subsidies for creating new job positions. For self-employed disabled persons, the support can cover up to 50% of their expenses, including rent, maintenance, and other costs, amounting to approximately 116,500 to 233,300 CZK annually. The Czech Republic offers limited support for workplace adjustments in cooperation with employment offices or through restricted grants for creating new positions. Businesses can receive tax relief based on the disability level of their employees, ranging from 18,000 to 60,000 CZK per employee annually. Hungary also provides project and EU grant support, covering full wage costs through wage and additional subsidies and rehabilitation support for businesses in the Czech Republic and Slovakia, with up to 92,000 CZK per employee.

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The Impact of Social Support, Family Function, Work-Family Conflict, and Marital Satisfaction on the Quality of Life of Working Women in Indonesia

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Abstract. Working women face a reduced quality of life due to the multiple responsibilities. To address this issue, this study aims to investigate the impact of various factors, including social support, family work conflict, family function, and marital satisfaction, on the quality of life of working women. This research was conducted in Bogor, West Java, Indonesia, using a quantitative approach through questionnaire-based interviews with a sample of 300 working women, selected through judgmental sampling, with 150 participants each from the formal and social sectors. The data were analyzed using Structural Equation Modeling (SEM). The results showed that social support, family function, and marital satisfaction significantly impact working women's quality of life. Furthermore, husbands and extended families could provide social support to mothers, such as helping with childcare and household activities. Wives must conduct balancing strategies to reduce family-work conflicts, such as avoiding bringing work home. Family functions can be optimized by flexibly sharing roles and tasks; for proper marital satisfaction, couples should maintain good communication and mutual understanding.

Keywords: Quality of life, support, work-family conflict, working women

JEL Codes: I310

1. Introduction

Families' challenges and problems can affect their physical, psychological, emotional, and behavioral well-being, encompassing objective and subjective aspects (Crusellas, 2014). Families of working women face challenges and vulnerabilities in maintaining their quality of life. The ability of Asian women to possess specific skills in the workplace can provide certain organizational advantages. However, the submissive stereotype of Asian women means that these benefits do not extend to roles that require assertive or controlling behavior (Rosette et al., 2018). Women who choose to work play a dual role: working in the public and caring for domestic work. Life satisfaction factors come from work pressure, namely, work and non-work conflicts, role pressure, and work pressure. Female workers then experience stressors at work. Finally, the aspects of role stressors, work demands, role overload, locus of control, and stress level are the most critical life satisfaction factors (Azzara et al., 2022; Sabri et al., 2021; Pramesti et al., 2021; Vatharkar & Aggarwal-Gupta, 2020). Role overload is the source of pressure on female workers (Pramesti et al., 2021; Vatharkar & Aggarwal-Gupta, 2020). The balance of roles that Indonesian women have, namely, as workers and mothers, has high resilience while being economically independent and empowered in household decision-making (Ang & Lai, 2023). In addition, according to research by Sulphey and Faisal (2020), the work-life balance of female Indian employees is better than that of expatriates. According to prior research, the quality of family life is influenced by various factors, such as social support, family functioning, work-family conflict, and marital satisfaction. Social support, defined as comfort and emotional support received

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from others, positively impacts the quality of family life (Peralta et al., 2018; Rahmawati et al., 2013; Ramadhanti et al., 2022). On the other hand, work-family conflict, which refers to the imbalance of participation in both work and family domains, has been shown to affect the quality of family life negatively (Ahmadyan et al., 2016; Liu et al., 2015). Working mothers experience stress due to the demands of work and the household (Dewi et al., 2022), and mental demands have the most significant contribution to the mother's burden (Rahmawati et al., 2022).

Balancing women's roles in both public and domestic sectors has been identified as a means of improving family life (Seydan & Hesami, 2016). Double burden happens due to various roles (Puspitawati et al., 2012). Furthermore, research has shown a direct effect of role overload on time-based work-family conflict and strain (Dodanwala et al., 2022). Female employees tend to determine their work through affective experiences related to work-life balance. Married female employees' positive experiences can increase work performance, whereas negative experiences can decrease work performance (Anita et al., 2020).

Quality of life in a family is also influenced by various functions, which positively impacts the reduction of depression (Lu et al., 2017). Conversely, dysfunctional families have a low quality of life and exhibit suboptimal relationships, communication, organization, and problem-solving abilities (Azazy et al., 2018). Additionally, marital satisfaction influences family quality, as noted by Hamza et al. (2021), and confirmed by Masood et al. (2017).

Several prior studies have established the impact of various factors on the quality of life, including status and disease (Aguero et al., 2015), women's education, number of illness complaints, income, family function (Lu et al., 2017; Zhang et al., 2021), and economic pressure (Kumalasari et al., 2018). Studies on quality of life have been conducted in different groups, such as older people (Zhang et al., 2021), farming families (Prayitno et al., 2022), fishing families (Kumalasari et al., 2018), families with disabled children (McStay et al., 2014; Pisula & Dorsmann, 2017), and partners undergoing addiction treatment (Nooripour et al., 2013).

This research differs from previous studies in its subject matter, focusing on families in which both husbands and wives are employed. It examines how social support, family-work conflict, family function, marital satisfaction, and quality of life impact families differently. A formal worker is someone with a main job status assisted by permanent or paid employees with a legal contract and who receives decent wages/salaries and benefits, such as facilities, insurance, and benefits. On the other hand, social workers are employed in government or private institutions and possess professional competencies, professions, and care (Aspary et al., 2021). Thus, this study aimed to investigate the factors affecting the quality of life of working women.

This study adopts two theories: structural-functional theory and gender theory. An approach known as structural-functional theory focuses on structure—the way roles are arranged, how institutions are shaped, and how institutions are articulated overall in a society—and aims to explain these structures in terms of their functions or how they contribute to the stability and longevity of societies (Garner, 2019). The structural-functional approach is a sociological theory applied to family institutions. This approach recognizes many diversities in social life. This diversity is part of society's structure, which in turn creates diversity in function according to one's position in the structure of a system. The culture, norms, and values that underlie the community system influence this structure and function. The structural-functional approach emphasizes the balance of social systems in society and that of a stable system in a family. In the family context, the application of structural-functional theory can be seen in the structures and rules that have been implemented. The family structure can make the family institution a unitary system (Allen & Henderson, 2022).

Gender theory discusses the problems women and men face in their social lives. Gender relations are relationships between men and women related to the division of roles in various types and family structures. Moser (2005) divides gender roles into three roles, commonly called Triple Role Models, namely: (1)

reproductive (domestic) roles, consisting of childbirth/raising responsibilities and domestic tasks performed by women, which are necessary to ensure the maintenance and reproduction of the labor force; (2) productive (public) roles, work performed by women and men that produces money or goods; and (3) societal roles, consisting of activities performed by men and especially women at the community level, as an extension of reproductive roles. Based on these issues and theories, this study addresses the impact of social support, family work conflict, family function, and marital satisfaction on the quality of life of working women.

2. Research Methods

2.1 Design and Sample

This study adopted a quantitative approach at Bogor, West Java, Indonesia, from April to June 2022. In-depth interviews were conducted using open-ended questions to gather data. The population under investigation consisted of families in Bogor, where women were employed. The respondents were female workers in Bogor's formal and social sectors who had children and were married. The sample was selected using judgemental sampling, involving 300 working women as respondents.

2.2 Measurement

The variables studied included (1) family characteristics, (2) social support, (3) family functions, (4) work-family conflict, (5) marital satisfaction, and (6) quality of life. The respondents' characteristics included age, length of marriage, education, occupation, income, and family size. The social support consisted of eight questions. The questionnaire was measured using the Guttman scale (0-1), where 0 represents "no," and 1 represents "yes." The reliability of the social support was 0.652.

The family function instrument was adopted from the National Family Planning Coordinating Agency (BKKBN) (2013) and consisted of 20 questions answered using a Likert scale of 1 to 4, with "1=very inappropriate", "2=not suitable", "3=suitable", and "4=very suitable". The reliability of the family function was 0.926. The work-family conflict was measured using the Netemeyer et al. (1996) instrument, which consisted of eight questions and was answered using a Likert scale of 1 to 4, where 1 represents "never," 2 represents "ever," 3 represents "often." Four always represents "always." The reliability of the work-family conflict variable was 0.855.

A marital satisfaction questionnaire consisting of 11 questions was compiled by Fowers and Olson (1993) using the ENRICH method. Responses were rated on a Likert scale from 1 to 4, with "1=strongly disagree", "2=disagree", "3=agree", and "4=strongly agree". The reliability of the marital satisfaction variable is 0.908. The quality of life questionnaire used the WHO-QOL (2004), which consisted of 11 questions answered using a four-point Likert scale of 1 to 4, with "1=strongly disagree", "2=disagree", "3=agree", and "4=strongly agree". The reliability of the quality of life variable was measured using Cronbach's alpha and was found to be 0.920.

2.3 Data Collection and Analysis

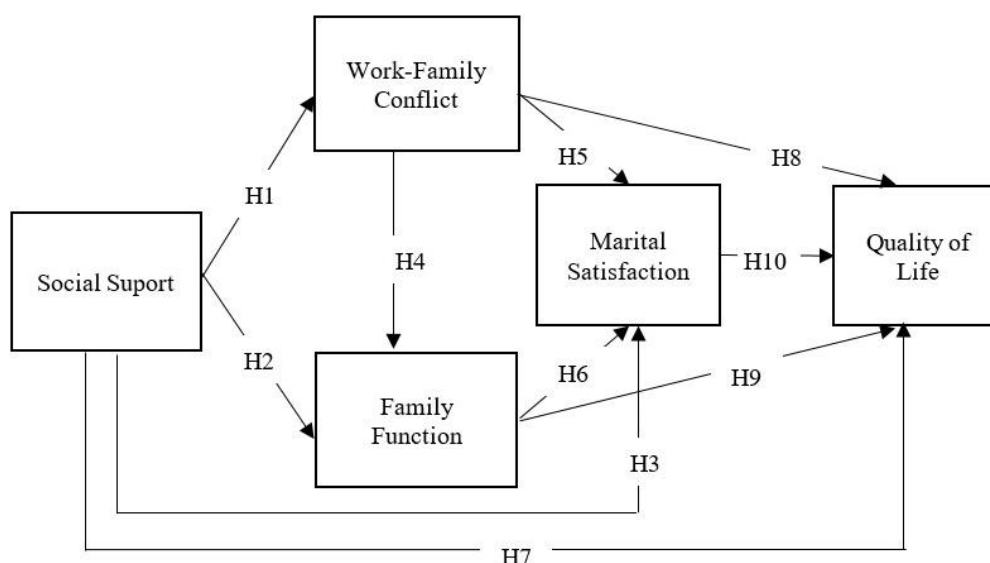
Primary data were collected through in-depth interviews and questionnaires administered to eligible subjects who met the criteria of being women, working in formal and social sectors, having children, and being married. Five percent of the respondents were selected for in-depth interviews.

Data analysis was conducted using Structural Equation Modeling-Linear Structure Relations (SEM-LISREL). Meanwhile, descriptive analysis was used to identify family characteristics, social support, family function, work-family conflict, marital satisfaction, and quality of life. The total score for each variable was transformed into an index score to equalize the units and compare the data categorization for each variable. Scores under 60, 60–70, and 80, respectively, were categorized as low, moderate, and high. The index is calculated using the following formula:

$$\text{Index} = ((\text{achieved score} - \text{lowest score}) / (\text{highest score} - \text{lowest score})) \times 100\%$$

The statistical test was carried out using (1) descriptive analysis of mean, minimum, and maximum scores and percentages, (2) independent t-test to analyze the differences, and (3) SEM-LISREL to analyze the effect. LISREL is software that supports analysis based on existing concepts or theories. However, the purpose is to confirm the theory using a research analysis unit, which requires many data-processing assumptions (Mikulić & Ryan, 2018). Figure 1 presents the framework of the relationship between the quality of life of working women.

Fig 1: Research Framework



Based on the above framework, the hypotheses in this research are:

- H1: Social support significantly affects work-family conflict
- H2: Social support significantly affects family functioning
- H3: Social support significantly affects marital satisfaction
- H4: Work-family conflict significantly affects family functioning
- H5: Work-family conflict significantly affects marital satisfaction
- H6: Family function significantly affects marital satisfaction
- H7: Social support significantly affects the quality of life
- H8: Work-family conflict significantly affects the quality of life
- H9: Family function significantly affects the quality of life
- H10: Marital satisfaction significantly affects the quality of life

3. Results

3.1 Characteristics of Subject

The age of women working in formal and social sectors is classified as middle adulthood, ranging from 41 to 60 years. The duration of marriage for the workers' women ranged from less than ten years to over 20 years, with more than half of the respondents in both sectors having been married for over 20 years and having a family size of fewer than five members. Most women had one to three children. A higher percentage of women in both sectors had a bachelor's degree as the highest level of education. The total

family income of women working in the formal and social sectors mainly falls within the range of IDR 1,000,000 (\$ 67) to IDR 20,000,000 (\$ 1,333), with the majority earning between IDR 1,000,000 (\$ 67) and IDR 5,000,000 (\$ 333) and IDR 10,000,000 (\$ 666) to 20,000,000 (\$ 1,333).

3.2 Descriptive Analysis and Independent t-test based on a group of working women

According to the findings presented in Table 1, a substantial proportion of employed women (85.7%) reported high levels of social support from their surroundings. This support was indicated by caring for individuals in their families, willing friends to offer assistance during difficult times, and supportive neighbors who assisted in addressing problems. The T-test revealed a difference (significant) ($p=0.002$) between the social support of women working in the formal and social sectors. However, families with women working in the formal sector had higher levels of social support. Work in the formal sector pays better and is more secure, although fewer women than men have formal jobs (Mehra, 2021). Consequently, women working in the formal sector are given more support and respect.

Table 1: Descriptive analysis and independent t-test based on a group of working women

Variable/Category	FW (%)	SW (%)	Range		Average $\pm$ SD		T-test (p-value)
			FW	SW	FW	SW	
Social Support	n=150	n=150	37.5-100	12.5-100	94.8 $\pm$ 10.2	90.0 $\pm$ 10.5	0.002**
Low	0.7	5.3					
Moderate	8.7	14.0					
High	90.7	80.7					
Work-Family Conflict	n=150	n=150	0.0-70.8	0.0-87.5	21.6 $\pm$ 14.4	18.9 $\pm$ 17.1	0.142
Low	98.7	97.3					
Moderate	1.3	2.0					
High	0.0	0.7					
Family Function	n=150	n=150	51.6-100	43.3-100	75.9 $\pm$ 11.6	71.3 $\pm$ 10.5	0.000**
Low	2.7	8.0					
Moderate	58.0	71.3					
High	39.3	20.7					
Marital Satisfaction	n=150	n=150	36.4-100	27.2-100	72.9 $\pm$ 13.4	69.7 $\pm$ 11.1	0.021*
Low	8.0	8.7					
Moderate	67.3	74.0					
High	24.7	17.3					
Quality of Life	n=150	n=150	51.5-100	33.9-100	81.4 $\pm$ 13.9	73.6 $\pm$ 12.2	0.000**
Low	4.0	8.0					
Moderate	40.7	64.7					
High	55.3	27.3					

* significant at $p<0.05$; ** significant at $p<0.01$

Work-Family Conflict. The results indicate low levels of family-work conflict between the two groups (Table 1). This is attributed to the fact that many working mothers do not experience a workload overburden. Specifically, they do not perceive that their family responsibilities negatively impact their work activities or cause them to fall behind in completing work tasks. The results of this study are not in line with the research of Zawawi et al. (2020), who show that family conflict is negatively correlated with employee performance. The results of an independent sample t-test revealed no significant differences in work-family

conflicts between the two groups. As such, it can be concluded that women in both the formal and social sectors have comparable levels of work-family conflict, with slight variations when work demands necessitate adjustments to their activity plans.

Family Function. The results indicated a moderate implementation of family functions in both women's working groups, as demonstrated in Table 1. Implementing sociocultural functions, such as love, protection, reproduction, educational socialization, economics, and environmental development, is quite successful. The tests revealed a significant difference ($p=0.000$) between the family functions of women working in the formal and informal sectors. Families where women work in the formal sector also have higher social support and adequate income to meet their needs. According to Azizah and Salam's (2021) research, mothers who work in the formal sector usually receive higher salaries, education and more support, thus increasing their family's resilience.

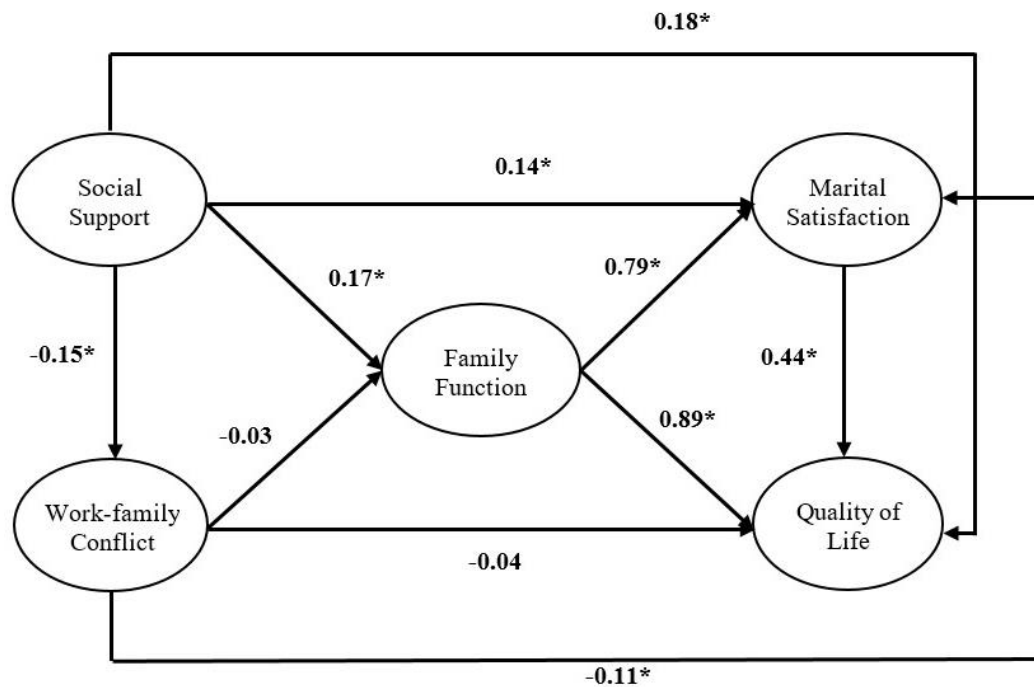
Marital Satisfaction. Table 1 shows the moderate marital satisfaction for both groups of working women. This finding is evident in their mutual understanding with their partner, who is pleased with the division of responsibilities in marriage. Couples understand each other's feelings and emotions and are satisfied with resolving conflicts. There was a significant difference ($p=0.021$) in marital satisfaction between the two groups of working women. Women working in the formal sector have a higher level of happiness with the nature and character of their partners. These results are in line with the research of Chen et al. (2022) in China, which states that informal workers, especially women, have less happiness than formal workers because of individual income, social respect, and unemployment expectations.

Quality of Life. The results showed that over half (52.7%) of both groups of working women had a moderate quality of life, as demonstrated in Table 1. This finding was indicated by satisfaction with family togetherness, enjoyment of life, gratitude for their circumstances, and satisfaction with support from relatives. Women working in the formal sector have a higher quality of life in terms of savings. Women who work in the informal economy frequently have weaker educational and professional backgrounds, which feeds a vicious cycle of low income and, consequently, poorer quality of life (UNDP, 2022). Formal workers have superior living standards because of their higher earnings and levels of education (Azizah & Salam, 2021).

3.3 Structural Model Fit

The structural model fit test is summarized in Figure 2, and a significance test of 0.05 or 95% confidence level was applied in this study. A significance value greater than 0.05 indicates an insignificant relationship or latent variables that do not affect each other.

Fig 2: SEM Measurement Model



3.4 Direct Effect, Indirect Effect, and Total Effect

In the SEM proposed in this research, hypothesis 1 to hypothesis 10 was conducted using path coefficients and t-values. The criterion set is that the path coefficient is less than 0.05, and the t-value equals or exceeds 1.96. Therefore, it can be concluded that the difference was statistically significant. Table 2 shows the results of SEM hypothesis testing.

Table 2: The decomposition effects for latent variables of quality of life of working women

No	Latent Variables	Direct effect	Indirect effect	Total effect
1	Quality of Life			
	Social Support	0.18*	0.15*	0.33*
	Family Function	0.89*	0.000	0.89*
	Work-Family Conflict	-0.04	0.000	-0.04
	Marital Satisfaction	0.44*	0.000	0.44*
2	Family Function			
	Social Support	0.17*	0.000*	0.17*
	Work-Family Conflict	-0.03	0.000	-0.03
3	Work-Family Conflict			
	Social Support	-0.15*	0.000	-0.15*
4	Marital Satisfaction			
	Social Support	0.14*	0.15*	0.29*
	Family Function	0.79*	0.000	0.79*
	Work-family Conflict	-0.11*	0.000	-0.11*

*significant at t-value >1.96

4. Discussion

4.1 Relationship between Social Support Work-Family Conflict, Family Function, and Marital Satisfaction

The results show that social support significantly and negatively affects conflict. The results of previous research support Hypothesis 1, where good social support reduces existing work-family conflicts and excessive work demands and conflict. This finding aligns with Pluut et al. (2018), who found that support from a partner can reduce emotional exhaustion in conflict. Work-family conflict has a relationship with the social support received. Family support affects work-family conflict in working mothers. Work-family conflict is a role conflict that results in an imbalance of participation in one of the work and family domains that arises due to conflicting role pressures between the two domains so that one role is more difficult due to other roles being carried out (Armstrong et al., 2015). Work-family conflict occurs when participation in work and family roles is not balanced. Conflict between work and family is reciprocal (Nohe et al., 2015).

Family support provided by husbands, children, and extended families received by working mothers will reduce work-family conflict when family support from husbands, children, and extended families makes working mothers perceive the relationship between husbands and wives (Soeharto et al., 2021). According to Krishnan et al. (2020), organizational social support influences work-family conflict. Women are often required to fulfill two roles: the role of a worker and the role of a mother to take care of the household. A balancing strategy between work and family is necessary to fulfill the demands of family work roles.

The data show that social support has a significant positive effect on the implementation of family functions. The results of previous research support Hypothesis 2, which states that social support positively affects family functioning. The social support received is directly proportional to the family function. Furthermore, it can affect family functioning, as low income is influenced by poor social support (Wang et al., 2016). Supportive social support relationships, family functioning, and positive coping styles can be important for reducing stress and improving mental well-being (Shao et al., 2020). Social support and family functioning are positively correlated positively (Huang et al., 2021).

In addition, social support significantly affects marital satisfaction in the families of wives who work in the social sector. This finding supports Hypothesis 3, where families and co-workers who provide social support influence the perceived high quality of marriage. Meanwhile, marriage quality improves when the husband and wife receive positive social support because it can reduce stressors. Social support is needed in married life and benefits families because it can give them a sense of calm and confidence. Accepting social support can make the wife feel satisfied, causing an increase in the quality of marriage (Yazdani et al., 2016). Social support significantly affected the marital status. Social support was positively correlated with marital satisfaction. Mental health problems are one of the consequences of a bad marriage and can also contribute to it (Abid et al., 2022).

4.2 Relationship between Work-Family Conflict and Family Functioning, and Marital Satisfaction

The analysis shows that Hypothesis 4 is accepted. However, this does not align with previous research showing that work-family conflict can impact family functioning. Parents report that work-family conflict will make husbands, wives, and children experience mental health problems, poor marital satisfaction, and parenting problems (Dinh et al., 2017). In addition, work-family conflicts experienced by individuals cause problems in balancing their functions and roles in work and tasks. This is due to limited time; hence, they cannot fulfill their duties and responsibilities, and the implementation of family duties and functions is not optimal (Gu et al., 2022). Vahedi et al. (2019) suggested that work-family conflict experienced by parents may influence them and their partner's functioning in inter-parental conflict and parenting irritability.

Dual-earner families encourage wives to have dual responsibilities and roles, working in both public and domestic sectors. The increase in dual-earner families aligns with the decline in traditional families, where the main breadwinner is the husband's responsibility. Women spend most of their time working to

earn a living and care for their families because of the great responsibilities that must be carried out. The high work demands often interfere with the availability of work at home and the lack of time to gather with the family. The role responsibilities of working women encourage the division of time between work and family. Incompatibility and imbalance in meeting the demands of work and family roles will lead to problems and conflicts between work and family, called family-work conflicts.

The analysis showed that Hypothesis 5 was accepted. Prasisti and Rozana's (2022) research shows a negative relationship between work-family conflict and marital satisfaction among elementary school teachers in Bandung City. In addition, work-to-family is significantly negatively correlated with marital satisfaction among husbands and wives (San & Juhari, 2021).

4.3 Relationship between Family Function and Marital Satisfaction

The results showed that family function positively affects marital satisfaction, as shown in Hypothesis 6. Qian et al. (2020) showed that family function affects marital satisfaction and children's emotional regulation. According to Du et al. (2022), a mother's marital satisfaction is positively related to her child's perceived family functioning, indicating that the happier the mother is about her marriage, the better her child's perceived family functioning.

4.4 Relationship between Social Support, Work-Family Conflict, Family Function, Marital Satisfaction, and Quality of Life

Resilience to stress can be increased through positive, high-quality social support, crucial for preserving physical and mental health (Tindle et al., 2022). The results showed that most women engaged in formal and social work received high support from the surrounding environment. High social support is also supported by findings from in-depth interviews, which show, *"My family is very supportive of me, both my husband's and my extended relatives. My relationship with my neighbors is very good. Once a month, there is a gathering. My relationship with my friends at work is very good. We usually help each other with problems in the office. If I am sick or there is an event, they come or send something to me"*. (HM, 25 yo)

The analysis also shows that social support has a significant positive effect on the quality of life for women who work socially, but has no effect on those working formally, as seen in Hypothesis 7. Support from a family can improve the quality of life (Lei & Kantor, 2022) and is important for sharing and solving various problems. Families who provide emotional support, such as attention, trust, and affection, improve their quality of life (Mousavi et al., 2017; Toygar et al., 2020; Utami et al., 2020). Social support improves quality of life and reduces anxiety and depression (Rahayu & Pandin, 2021). Family support improves quality of life, whereas family pressure can reduce it (Gallardo-Peralta, 2018; Schlebusch et al., 2017). Factors contributing to the quality of life include family support, friend support, professional support, and religiosity (Boehm & Carter, 2019).

Conflict results in an imbalance of participation in one of the work and family domains, arising from conflicting role pressures. Therefore, one role becomes more difficult due to the other (Liu et al., 2015), and the results of in-depth interviews also show low work-family conflict: *"Work does not interfere with household activities because there is a time limit. Household activities do not interfere with work. I work from Monday to Friday, and Saturday and Sunday are cleaning time, walking, watching movies, or eating with family"*. (RN, 26 yo)

The analysis also showed that Hypothesis 8 was valid. Stress experienced by working mothers is also one of the strongest predictors of worsening quality of life (Norizan et al., 2023). Work-family conflict negatively affects work and family life (Kirac et al., 2018). There is a significant negative effect of work-family conflict on quality of life during the pandemic, meaning that an increase in work-family conflict during the COVID-19 pandemic can reduce the quality of life of working mothers' families. Work-family conflict has increased during the pandemic, causing it to significantly adversely affect the quality of life only during the pandemic (Ramadhanti et al., 2022).

Family functions complete basic, developmental, and critical tasks (Dai & Wang, 2015). As a result, the implementation of family functions in women working formally and in social work is moderate.

However, family functions that are running well are also supported by the results of in-depth interviews: *"My husband and I share roles in domestic work. It feels tiring doing double activities, but I enjoy it, especially since my child is still small". (YN, 27 yo)*

The results also show that family function significantly and positively affects women's quality of life in the formal and social sectors, as seen in Hypothesis 9. Family functions that run well with high social support can improve the quality of family life (Kimura et al., 2019). Susanti et al. (2022) demonstrated that family function is related to quality of life in the health domain, namely, social relationships and the environment. The relationship between family function and quality of life is mainly found in physical and psychological health domains. Conversely, a decrease in implementation caused by pressure and stress can affect the quality of family life, resulting in decreased communication intensity, parental neglect of children, increased conflict, and low relationships between family members (Sangalang et al., 2017).

The results showed that more than half of the women in formal and social work had a moderate quality of family life, as seen in the following: *"Thank God the family is in good condition. Communication with the husband is smooth because we discuss things when something happens. I am happy with my family because any problem can be discussed together. What makes me happy is a healthy family, husband, and children". (YN, 27 yo).*

Furthermore, marital satisfaction significantly positively affects the quality of life of women working in formal and social sectors (Hypothesis 10). Quality of life is influenced by marital satisfaction (Aggarwal et al., 2017; Hamza et al., 2022; Mehrara et al., 2019; Bookwala, 2011). Ha and Ha's (2019) research showed that quality work significantly correlates with marital satisfaction.

5. Conclusions

Based on the results of this study, contributions to theory include strengthening structural-functional theory, where family functions can strengthen the quality of family life and marital satisfaction. The structural-functional approach emphasizes the balance of social systems in society and stable systems in a family. The results also reinforce the gender theory that one of the triple role models is the productive (public) role, which is the work done by women and men that produces money or goods. The negative effect of work-family conflict on marital satisfaction suggests that there is a functional, structural shift of working wives that results in marital disruption. It cannot be denied that families with working husbands and wives affect the structure and functions of each party.

However, this study has several limitations, including (1) the research location is only in Bogor, West Java, and (2) the respondents were only women with married status. Hence, all variables were measured based on perceived working women, and (3) at the in-depth interview stage, respondents were selected purposively, and the answers tended to be homogeneous in several respects. In future research, respondents for in-depth interviews can be selected by simple random sampling from those who have filled out the questionnaire to obtain more heterogeneous answers.

The results showed significant differences in social support, family function, marital satisfaction, and quality of life between women in the formal and informal sectors. Women employed in the formal sector were found to have higher levels of these factors than those employed in the informal sector. The hypothesis accepted by the family is that social support has a negative effect on work conflict. Social support had a positive effect on family functioning and marital satisfaction. Family function and work conflict positively and negatively affect marital satisfaction. Based on these results, husbands and extended families can provide social support to mothers, such as helping with childcare and household activities. Women can implement balance tactics, such as not bringing work home, to lessen family issues. At home, family functions can be optimized by flexibly sharing roles and tasks among members, and in improving marital satisfaction, couples should maintain good communication and mutual understanding. Future research should examine family typology based on life cycles and areas, such as urban and rural areas, lowland, and highland. A variable that can be further researched is the decision-making process of dual-earner families. Future research could also focus on husbands whose wives work.

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Comparative Analysis of Social Responsibility of Business in Kazakhstan and Developed Countries

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Abstract.

Corporate social responsibility of business is a crucial component both for increasing its competitive advantages and for achieving sustainable development goals. In this regard, the study of the principles of social responsibility among different companies is relevant. Thus, the study aims to investigate the reasons for the current pace of development of corporate social responsibility in Kazakhstan. Sociological analysis, as well as elements of economic analysis, and a comparison of fundamental concepts and modern approaches to the study of corporate social responsibility, was used. The study demonstrated that a prerequisite for the long-term and effective functioning of a business is an understanding of the dependence of financial indicators on the company image quality in front of investors, top management, consumers, and the public, which creates the necessary background of trust in a business that can be achieved by using the theory of reasonable corporate egoism in corporate social responsibility practice, as well as the implementation of integrated reporting. Furthermore, the research analysed statistical data that describes the level of corporate social responsibility in Kazakhstan and other countries. Based on the analysis, factors that influence the formation of corporate social responsibility in the country were identified, and practices that can be used in Kazakhstani business practices to improve the situation in the context of corporate social responsibility were described. The results obtained bring new knowledge for understanding the peculiarities of companies' activities in the context of approaches to corporate social responsibility.

Keywords: social responsibility, business, stakeholders, risk, partnership, transparency, philanthropy.

JEL Codes: M14, P33, O16

1. Introduction

Since the early 2000s, the field of business and entrepreneurship has moved beyond just job creation, wealth creation and income generation. With its development, new goals are emerging as big businesses start to play an increasing role in the development of the social component of the locality, region and country. Society, when assessing the performance of a business, has begun to look beyond operational and financial performance to the business behaviour of the organisation, its commitment to employee welfare and the extent to which its activities are aligned with the interests of other market players, residents and the wider community (Carroll, 2021; Knudsen et al., 2020). Interest in the theory and practice of business social responsibility, corporate social responsibility (CSR), socially responsible business behaviour, corporate

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citizenship, and socially responsible investments in economic theory and sociology of the post-Soviet space appeared only less than two decades ago, while in developed countries the development of theory and generalisation of practice of these phenomena have been carried out since the middle of the 20th century. The subject of social responsibility of business was covered in many publications in the media of the Republic of Kazakhstan (RK). Many publications provided a qualitative increase in knowledge, both from the standpoint of the theory of the question and from the standpoint of the accumulation and analysis of empirical data.

The role of social capital in the development of the country was noted by Darменова and E. Koo (2021). They noted that now social capital plays a huge role in ensuring the sustainable development of Kazakhstan. Researchers pointed out the role of social capital in achieving economic well-being but did not provide recommendations for its preservation. Problems in the sphere of sustainable development in Kazakhstan were, in turn, considered by Yelubayeva et al. (2023). They described the existence of problems in the sphere of education and some other components of the principles of sustainable development. It is worth noting, however, that ensuring social and corporate responsibility should also remain one of the important components of achieving these goals. Therefore, the state authorities, among others, should address this issue. As Sansyzbayeva et al. (2020), a consistently positive relationship between financial indicators, the value of equity capital and the level of disclosure of information about CSR or social performance in general. The focus of the companies' effective activities is shifting from shareholders to the side of stakeholders, while companies dropping out of CSR ratings are experiencing significant financial difficulties and a decline in their competitiveness.

Bulkhairova et al. (2023) addressed the issues of social responsibility in Kazakhstan. The scholars described trends in the development of this component and highlighted the importance of the country adopting a more systematic approach to policy development in this area. However, no statistical data were evaluated in this paper, which may make the findings unreliable. Orazayeva and Arslan (2021), in turn, studied factors that both hinder and facilitate CSR initiatives. They highlighted indicators such as corruption, weak stakeholder engagement and inadequate state control but paid little attention to how the negative effects of these variables on enterprises could be reduced. Moreover, a key aspect of disclosing information about CSR is to reduce the non-diversified risks of uncertainty, as well as the cost of monitoring the company's activities for the potential placement of capital in its assets. However, in Kazakhstan, as in all countries of the post-Soviet space, the understanding and appropriate implementation of the modern concept of CSR has not yet reached the level observed in developed countries. CSR is considered, to a greater extent, as following tradition and implementing the ethical principles of a leader. It is not considered as a source of competitive advantages and creates a positive image for foreign partners and investors. This limits the potential of CSR to strengthen international trust in Kazakh business and, in a broader aspect, increase the competitiveness of Kazakhstan as a country.

Further research is required on the problem of motivation and technologies for implementing CSR, trends in the development of social management and business participation in it, the mechanisms of interaction between the state, business, and civil society institutions in solving social problems and communication between them, as well as the development of joint responsibility of all its subjects. In this regard, the study aims to assess the reasons for the current trends in the development of corporate social responsibility in Kazakhstan.

2. Theoretical Overview

Within the Kazakh context of business and academia, social responsibility is often seen through various lenses, such as charity, patronage, corporate social responsibility, social marketing initiatives, sponsorship, and philanthropy (Maier, 2021; Velte, 2022). The notion of business social responsibility is understood as the influence that business activities have on society. It represents the accountability of business decision-makers to those who are affected, either directly or indirectly, by their decisions (Zaman et al., 2020; Kalna-Dubinyuk et al., 2023). Moreover, businesses are increasingly facing pressures that encourage them to act responsibly, driven not just by legal requirements but also by the expectations of both internal and external stakeholders. These include the authorities, political parties, the media, public organizations, their workers and employees, and shareholders (Zyma et al., 2020). Businesses in Kazakhstan are increasingly using the terms ‘corporate social responsibility’ and “social investments”. Meanwhile, the real social policy of companies is often limited to ordinary charity. Many entrepreneurs engage in charity work, but these actions are fragmented (Rexhepi, 2023). For Kazakh business, the approach of the classic CSR suggested by Friedman (the theory of corporate selfishness) to understanding CSR is more typical: according to this approach, the main task of a business is to “make money” for shareholders and clients within the legal framework while paying all the necessary taxes.

For Kazakhstan to position itself among the world’s effectively developing nations, the establishment of universally high Corporate Social Responsibility standards is crucial. The country is championing the ethical responsibility of businesses, grounded in what could essentially be described as a Kantian “moral obligation”. This perspective, known in CSR discourse as the theory of corporate altruism, stands in stark contrast to Friedman’s theory, which originated from the Committee on Economic Development. The core premise here is that businesses should not solely focus on profit maximization but should also actively contribute to addressing social issues, enhancing the well-being of citizens and communities, and preserving the environment (Rasche et al., 2017). This approach, however, meets with resistance from the business community and leads to avoidance of CSR responsibilities, highlighting that such polarized views do not facilitate the smooth and effective advancement of business social responsibility in Kazakhstan. In contrast, a more balanced and effective approach known as “intelligent self-interest” or “enlightened self-interest” offers a way to reconcile these opposing views. This theory suggests that CSR is a strategic business practice because it mitigates long-term profit risks. Investments in social and charitable initiatives may reduce short-term earnings, but they foster a supportive social atmosphere that leads to sustainable profitability (Haski-Leventhal, 2018).

With the great popularity of the term “corporate social responsibility”, there are ambiguous interpretations and understandings of it. This term is directly related to the term “sustainable development”. In general, corporate social responsibility can be viewed as a concept that supports the principles of sustainable development. As a rule, CSR goes beyond the obligations and responsibilities established by law and involves voluntary initiatives by organisations to take measures that contribute to sustainable development (Morokhova & Boiko, 2022). It is customary to point out the threefold approach when defining the term “sustainable development”. This approach implies the harmonious development of society (also applicable at the scale of an individual organisation) in the following three dimensions: social dimension, environmental dimension, and economic dimension (Yevdokymova et al., 2019). The success and effectiveness of an organisation in these dimensions testify to an effective, sustainable development process. From a practical standpoint, adherence to the principles of CSR and its declaration can serve as a competitive advantage.

3. Materials and Methods

Developing countries, which include Kazakhstan, do not have many indicators that could help assess the situation in terms of the social responsibility of enterprises. This complicates the process of conducting the research, but despite this, it was still possible to find some indicators that can help assess CSR in the country. Thus, the Social Progress Index (SPI) was used, which has been calculated since 2011. It is a comprehensive tool for assessing the level of social and environmental development of countries or regions without relying directly on economic indicators such as gross domestic product per capita but focuses on measuring the well-being of society and the ability of a country to meet the basic human needs of its citizens. It includes components such as access to health care, housing, and security. Although this indicator did not allow for the direct assessment of the level of corporate social responsibility, it was used to conclude the social well-being of citizens, which enterprises also influence.

To assess the level of corporate social responsibility in Kazakhstan, several individual factors were used, most of which were taken from the source of the Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan, which provides large amounts of different kinds of data in the country. The exception is the Social Progress Index (2024), which was used to assess the level of charity in Kazakhstan in comparison with other countries. To better comprehend the general state of the level of development of corporate social responsibility in the country, the author's index was constructed. During its construction, average levels were found for each of the indicators for the selected period (in the framework of the study – from 2010 to 2022); subsequently, the ratio of each indicator in year n compared to the average was found, and its normalisation was carried out by finding the square root of two. The final index value was calculated by finding the geometric mean of these indicators. All of this can be depicted as shown under Formula 1 and 2 below:

$$E_{mn} = \frac{F_{mn}}{F_{mav}}, \quad (1)$$

$$I_n = \sqrt[m]{(E_{n1} * E_{n2} * ... * E_{mn})}, \quad (2)$$

where: F_{mn} – the value of indicator m in year n ; F_{mav} – average value for indicator m in period n ; E_{mn} – the relative value of indicator F_m in period n ; I_n – the value of the index in period n .

Furthermore, the analysis of its yearly dynamics was an important component, namely, how much it has become higher or lower compared to year 1 (2010). For this purpose, for each year except the first (for which the value of the indicator is 0), the difference between this indicator and the level as of year 1 was found.

Among the research methods used in this paper, it is worth mentioning the historical method, which was used to assess past trends in the formation of corporate social responsibility in Kazakhstan, as well as to evaluate statistical data that described the development of this trend. Furthermore, the normalisation method was used, as much statistical data was brought to common denominators for their evaluation. The method of comparison was also used to assess the dynamics of corporate social responsibility development in different countries.

4. Results and Discussions

Research in the field of social reporting as a separate area, which identifies key information about the impact on the internal and external social environment, intensified in the second half of the 1980s. It stood

out from research in accounting and management accounting, where CSR reporting was regarded as complementary to financial information. Modern theory suggests that CSR reporting is part of the information space that forms the basis of social dialogue between the enterprise and the community (Al-Shammari et al., 2022). During the 1980s, there was no systematic understanding of the information that needed to be included in social reporting and the types of activities that needed to be disclosed to obtain public accreditation. In the 1990s, a considerable surge in the disclosing of information on the activities of companies was observed around the world. At the same time, new areas of disclosure of reporting appeared (especially in the field of ecology and employee training), and the tendency to unify reports within certain industries increased. In the post-Soviet space, a similar rise was observed a decade later, that is, in the mid-2000s. For more than a decade, the trend of transformation of the reporting published by companies has continued in developed countries. Meanwhile, from a theoretical standpoint, the complete disclosure of corporate social responsibility information serves as a powerful signal to the external environment and helps reduce information asymmetry between various groups of external and internal stakeholders.

In recent times, Central Asian countries have witnessed a surge in the advancement of Corporate Social Responsibility, with a growing number of organizations publishing annual CSR reports. Yet, this trend of transparency about CSR practices tends to be limited to larger corporations, while many small and medium-sized enterprises remain reticent, often not prioritizing CSR. Additionally, some major companies perceive social responsibility primarily as philanthropy and choose not to publicize their efforts for fear of being targeted by charitable organizations. Despite these challenges, there is an increasing recognition of the importance of business social responsibility in Central Asia. However, the understanding and implementation of CSR vary across countries within the region. Specifically, Kazakhstan stands out for having the most advanced CSR practices among the post-Soviet developing countries, according to some analysts. Kazakhstan is considered a leader in CSR in Central Asia, tracing back to the mid-1990s when foreign companies entering the market began to exhibit their commitment to social responsibility. Although the concept of CSR was new in Kazakhstan just five years ago, there has since been a rapid increase in both public and corporate awareness of social responsibility principles. Nevertheless, a unified perception of CSR has yet to be established in the country.

The first stage can be regarded as the initial stage in the development of the CSR system in Kazakhstan (Orazayeva & Arslan, 2021). It emerged in the context of entrepreneurship development in the late 1980s, when, during perestroika, the first commercial enterprises appeared and started engaging in charity work. These were mostly one-time “promotions”, and the owner determined the choice of the beneficiary according to personal preferences. Initially, CSR was expressed in the simplest forms of charity: gifts timed to coincide with annual holidays, distribution of food packages, financial support to needy employees of the enterprise, and other social events characteristic of this period. Therefore, it is essential that in Kazakhstan, from the very beginning, local authorities played an important role in strengthening and developing the traditions of charity. At the request of akimats (territorial and city authorities), regional businesses allocated funds to maintain social facilities or programs for which there was not enough government funding. As a rule, entrepreneurs met the wishes of the authorities, guided, among other things, by the prospects for obtaining benefits and preferences and reducing the risk of conflicts. The most ambitious type of charity on the part of business was the construction of mosques. Many businessmen built them at their birthplaces. At the time of gaining independence, 68 mosques functioned in Kazakhstan. Now, there are already 2.320 of them, as well as about 1.000 other religious buildings. Only in Almaty during the period under review the number of mosques increased from 2 to 31. The government of the Republic of Kazakhstan even adopted a special decree regulating the process of building mosques (Responsible Business Conduct..., 2014).

According to the practice developed in Soviet times, the maintenance of social infrastructure facilities was often assigned to large city-forming enterprises. The privatisation of Kazakh enterprises in the 1990s led to the transfer of social facilities to the balance of local authorities, which, as a rule, did not have enough budgetary funds for their maintenance. As a result, large enterprises were forced to support social projects, events, sports clubs, and infrastructure as part of corporate philanthropy. Local sports teams in the republic are maintained mainly at the expense of corporate sponsors to this day, often in a semi-coercive manner. The second stage in the development of a modern CSR system in Kazakhstan was the period from 1994 to 2000. The President of the RK, N. Nazarbayev, signed a decree on social partnership in the field of socio-economic and labour relations, which became a regulatory basis for multi-layered social partnership (republic, industry, region) (Smirnova, 2012). The important external stimuli for the development of CSR at this stage include the beginning of the process of accession to the Organisation for Economic Cooperation and Development (OECD). The latter prepared a special report on the prospects for introducing CSR principles in the republic. OECD experts took part in the development of the draft National Concept of Social Responsibility of Business, the first among the Central Asian countries (Responsible Business Conduct..., 2014).

The specific features of Kazakhstan are a high degree of state participation in the development of corporate governance and CSR, with a low activity of republican non-governmental organisations, active development of standards with a focus on the best international practices, relatively high participation of small and medium-sized businesses (compared to other states in Central Asia). There is a demand for CSR projects in the information and Internet environment, and corporate volunteering has been actively developing since 2010. Due to the national policy in the early 2000s, a modern vision of CSR and the corresponding management practice of organising projects, primarily social ones, developed in the business environment of Kazakhstan. This was also facilitated by the emergence of personal and corporate awards, such as the Tarlan personal award for outstanding achievements in the humanitarian fields of human activity. The award has been presented by the Club of Patrons of Kazakhstan since 2000 for outstanding achievements in humanitarian fields.

In his 2006 address, the first president of Kazakhstan highlighted the significance of the social responsibility of national companies, underscoring its value not just for businesses and their employees but also for the nation's interests. He advocated for aligning Kazakhstan's standards with a UN initiative aimed at adopting international social responsibility management standards for businesses. Nazarbayev called for the establishment and implementation of universally recognized norms for business social reporting and the enhancement of corporate social responsibility in addressing national challenges. This effort was to be supported by incentives for socially responsible businesses, focusing on environmental conservation, addressing significant national and regional issues, developing skilled professionals, protecting worker health, and fostering economic growth and citizen welfare (Smirnova, 2012). This move reflects the broader global emphasis on sustainable development and the need for a deeper understanding and regulation of CSR, including its analysis, measurement, and verification. In Kazakhstan, the practice of signing memorandums and agreements regarding corporate social responsibility has become widespread, including significant contributions in East Kazakhstan and the Pavlodar region. These investments by entrepreneurs are notably impacting social development across regions, leading to the construction of new educational, healthcare, rehabilitation, cultural, and sporting facilities, as well as support for the economically disadvantaged. The republic actively engages in social partnership, with an annual national tripartite General Agreement addressing critical social and labour issues such as job creation, unemployment reduction, remuneration improvements, and workplace safety. Additionally, around two hundred regional and nineteen sectoral agreements are currently active, with more than 31 thousand collective agreements signed (Sansyzbayeva et al., 2020).

Considerable gaps in understanding of CSR were noted among government officials and representatives of the civil society. Both groups view the social responsibility of business as mainly charitable. In Kazakhstan, only 57% of companies believe in the necessity for businesses to engage in social responsibility. This belief is primarily held by large corporations, especially those in industries like oil, gas, and mining, which are perceived as having a significant impact on the environment and public health. Small businesses, in contrast, are less inclined or prepared to participate actively in CSR activities compared to their medium and large counterparts. The barriers to CSR implementation cited by companies include financial constraints, a lack of government incentives, insufficient knowledge and skills, regulatory shortcomings, a societal information gap, inadequate public recognition of corporate contributions to society, and challenges in measuring CSR outcomes (Sansyzbayeva et al., 2020; Kalyuzhna et al., 2024). Despite the Code of the Republic of Kazakhstan No. 120-VI “On Taxes and Other Obligatory Payments to the Budget (Tax Code)” (2017) offering a 3% tax deduction for charitable contributions, many companies find this insufficiently motivating due to the low deduction rate and the bureaucratic process involved in claiming it.

The main reasons for the intensive development of corporate social responsibility include the activation of the movement of social groups that criticise the decisions and actions of businesses, the refusal of consumers to purchase goods and use the services of irresponsible companies, as well as the growth of the trade union movement (Teta & Xhafka, 2023; Konstantynovskiy & Zmicerevska, 2023). Therewith, there is a tightening of labour and environmental legislation; there are public initiatives aimed at the development of corporate social responsibility. It is known that social expectations about business have changed over the years, and these changes, in turn, have contributed to society’s perception of the role of business. It is important here to distinguish between legal and social responsibility. On each issue, there are hundreds and thousands of laws and regulations, for example, how many toxic substances can be contained in industrial effluents, how to eliminate discrimination in employment, what are the minimum product safety requirements, and what type of goods can be sold to other countries. An organisation that is subject to all these laws and regulations is behaving in a legally responsible manner, but it will not necessarily be considered socially responsible either. International practice shows that one of the main indicators of the level of CSR development in the country is the adoption of the National Strategy for Corporate Social Responsibility. For example, the European Commission (2020) is responsible for developing and executing a common strategy for the European Union (EU), which member states subsequently modify to their specific socioeconomic conditions. Following the implementation of these policies, EU member nations develop individual action plans outlining responsible organisations, finances, and collaborations. However, without actual corporate participation in the formulation, execution, and continual refinement of Corporate Social Responsibility (CSR) plans, which is based on strong motivation, these national strategies risk becoming mere formalities devoid of content and efficacy. In recent talks, there has been a greater emphasis on Environmental, Social, and Governance (ESG) standards, which are critical for ensuring that CSR activities are not merely theoretical but actually practical and effective in practice.

Research carried out in the Republic of Kazakhstan revealed different understandings of CSR among different groups of stakeholders – business, government bodies, and civil society organisations (Responsible Business Conduct..., 2014). The National Concept on CSR was prepared for a broad discussion of the issues of social responsibility of business and aims to bring stakeholders to a common understanding and comprehension of CSR, as well as to unite disparate efforts in promoting CSR in Kazakhstan. Particular attention to the concept is paid to the most effective use of accumulated experience, ways to encourage innovation in the field of CSR, creating greater transparency and strengthening the reliability of assessment and verification, which plays an important role in conceptualisation processes (Okafor et al., 2021). The document proposes a set of techniques based on expanding partnerships in which all parties play an active

role. However, only the experience accumulated in Kazakhstan itself and, for some reason, in Russia is considered, which the authors of the document, albeit implicitly, refer to as a reference point. Meanwhile, as the results of the studies indicate, there is no complete understanding of CSR among business representatives. Therefore, only some of its areas are widespread. According to the survey results, Kazakh companies most of all implement such areas of CSR as:

- fair business practices (application of the principles of fair competition, respect for property rights, compliance with tax obligations);
- labour relations (observance of labour rights of workers; labour protection; provision of a social package; development and training of personnel);
- observance of human rights (non-discrimination).

The Kazakh CSR model is based on the preferences and interests, most importantly of the government. In this regard, corporate social responsibility is regarded as a joint activity between business and government, and companies are required to use part of the profits to meet social needs. A so-called Kazakh type of closed business society has emerged, where stakeholders such as employees, suppliers, and consumers do not have sufficient influence on the activities of companies, while many Western companies monitor the level of social responsibility even of their suppliers, developing special compliance requirements and refusing to cooperate with suppliers with a low level of CSR.

Competent CSR helps increase loyalty and trust from employees, customers, partners, and other stakeholders with whom the company interacts (Fatmawati & Fauzan, 2021; Trofimov et al., 2019). Thus, the establishment and development of mutually beneficial mechanisms of social investment, social partnership, and corporate citizenship should become a key element of a long-term strategy for constructive interaction between government and business structures in modern Kazakhstan. Notably, Kazakh companies that have integrated CSR into corporate (organisational) management have a special budget, a proper management structure at the management board level, a programme monitoring and evaluation system, social responsibility strategies, a CSR board, and even a semblance of social (non-financial) reports. However, since CSR is not integrated into the business strategy and business model in Kazakh companies, such reporting does not provide investors with a complete picture; it is a report for regulators. Meanwhile, the world's largest companies are actively involved in reporting in an integrated format. Currently, integrated reporting is being implemented in more than 25 countries around the world. At the same time, regional networks for integrated reporting are being created, allowing their participants to interact, share experiences, and exchange opinions.

To assess quantitatively the level of development of corporate social responsibility in Kazakhstan, individual indicators characterising the level of corporate social responsibility in the country in one way or another were assessed. These indicators provide critical insights into how corporate practices influence societal well-being and highlight the responsibilities of enterprises in the region. Environmental indicators, such as pollution emissions, are essential for understanding the ecological impact of businesses and assessing trends in corporate environmental responsibility. Labor rights indicators, such as gender wage ratio and occupational injury frequency, reveal how well companies uphold labor standards and protect employee welfare. These metrics are crucial for evaluating the social dimensions of CSR, as they reflect the treatment of employees and the commitment of businesses to fostering a fair work environment. These data are shown in Table 1.

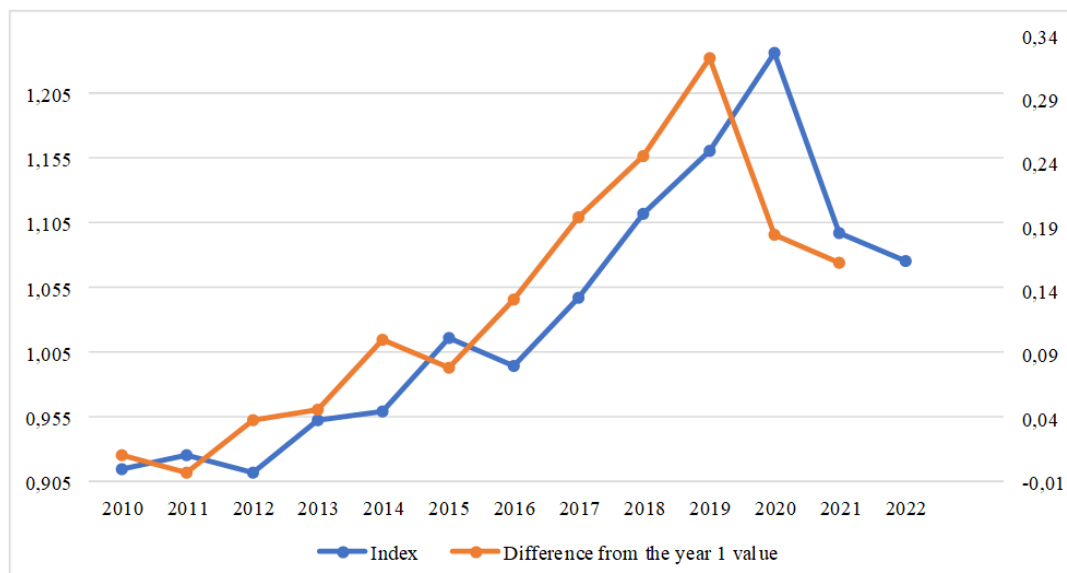
Table 1: Data on selected indicators characterising corporate social responsibility in Kazakhstan

Indicator	2010	2011	2012	2013	2014	2015	2016
Emissions of liquid and gaseous pollutants, thousand tonnes	1587.2	1715.2	1790.5	1731.5	1762.5	1714	1811
Emissions of solid pollutants, thousand tonnes	639.3	631.1	593.8	551.2	494.2	466	460.6
The ratio of average monthly wages of women to men, %	x	32	30.5	32.2	33	34.1	31.4
Share of informally employed in total employment, %	x	x	26	24.3	25.0	22.9	18.6
The ratio of employment in the 15-17 age category to total employment, %	0.9	0.8	0.6	0.5	0.4	0.3	0.2
Frequency of occupational injuries per thousand employees	0.48	0.47	0.45	0.42	0.39	0.33	0.32
Frequency of fatal occupational injuries per thousand employees	0.08	0.07	0.06	0.06	0.06	0.05	0.05
State compliance with labour rights as documented by the International Labour Organization (ILO) and national legislation, %	87.4	88.6	92.2	92.4	92.8	93.1	93.3
Share of waste recycling and utilisation in the total amount of waste produced, %	x	x	17	18	23	23.12	26.8
World Giving Index	121	110	115	66	101	56	96
Commercial organisations that interacted with a public official at least once in the last 12 months and either provided a bribe to a public official or faced a bribe demand from a public official, %	x	x	x	x	x	17.4	36.8
Value	2017	2018	2019	2020	2021	2022	Change, %
Emissions of liquid and gaseous pollutants, thousand tonnes	1882.1	1938.7	1975.4	1940.7	1915.8	1868.5	17.7
Emissions of solid pollutants, thousand tonnes	475.7	508	507.8	500.4	491.7	446.3	-30.2
The ratio of average monthly wages of women to men, %	32.2	34.2	32.2	25.0	21.7	25.2	-21.3
Share of informally employed in total employment, %	16.2	14.9	13.7	14.1	13.6	12.9	-50.6
The ratio of employment in the 15-17 age category to total employment, %	0.2	0.1	0.1	0.1	0.8	0.9	-1.5
Frequency of occupational injuries per thousand employees	0.29	0.25	0.23	0.23	0.22	0.21	-56.3
Frequency of fatal occupational injuries per thousand employees	0.04	0.03	0.03	0.03	0.03	0.03	-62.5

State compliance with labour rights as documented by the International Labour Organization (ILO) and national legislation, %	93.3	94.4	95.5	97.1	98.1	97	11
Share of waste recycling and utilisation in the total amount of waste produced, %	30.86	32.2	34	36.02	38.23	40.03	135.5
World Giving Index	87	96	96	96	98	93	-23.1
Commercial organisations that interacted with a public official at least once in the last 12 months and either provided a bribe to a public official or faced a bribe demand from a public official, %	21.6	16.1	8.5	2.8	6.6	10.8	-37.9

As can be seen, the dynamics of different indicators in Kazakhstan that characterise corporate social responsibility are changing at different rates. Thus, emissions of liquid and gaseous pollutants are gradually increasing, while emissions of solid pollutants are decreasing. At the same time, calculating the sum of pollutant emissions, their amount for the whole period has increased, which may indicate that companies in Kazakhstan are not efficient enough in their efforts to combat environmental pollution. In terms of equality of remuneration for women and men, there are positive trends: the difference in remuneration decreased from 32% to 25.2%. There has also been a decrease in the proportion of informally employed persons, a decrease in the injury rate, and an increase in the level of respect for labour rights: all of these are positive trends. The recycling rate has increased significantly, the number of companies dealing with corruption has decreased, and the World Giving Index, which shows the level of charity in the country, has improved. Negative trends were observed in the indicator of the share of employed people aged 15-17 in the total number of employed people, or, more precisely, this indicator remained unchanged during the assessment period. Considering all the above analyses, the trends in Kazakhstan are generally positive. Nevertheless, to reach an unambiguous conclusion, an index for assessing the level of corporate social responsibility was formed, the values of which are shown in Figure 1.

Figure 1: Author's index of corporate social responsibility in the period from 2010 to 2022



As can be seen from Figure 1, the value of the index is increasing, which indicates the existence of positive trends in this context in Kazakhstan. The only exception is a slight decline below the 2010 level in 2012. It is difficult to state clearly what this increase is primarily due to, as the country is gradually improving in many indicators at about the same time. Thus, it is possible to conclude that the situation in Kazakhstan in terms of corporate social responsibility is gradually improving. As mentioned earlier, there are currently not many opportunities to compare the level of corporate social responsibility between different countries (including because many indices simply do not include Kazakhstan). An essential component in measuring CSR is the SPI, which assesses people's overall social well-being. Although the SPI does not explicitly analyse corporate social responsibility, it does give information on how businesses affect society outcomes. The SPI encompasses several characteristics, including access to healthcare, education, and safety, all of which can be influenced by business actions. For example, a corporation that invests in community health initiatives or educational programs boosts the SPI, improving social well-being. This relationship emphasises the significance of including SPI data in CSR evaluations, as it helps to demonstrate the broader impact of company activities on community welfare. One such option is to assess the SPI, the values of which for the Republic of Kazakhstan and some other countries are shown in Table 2.

Table 2: SPI values for individual countries, including Kazakhstan, from 2011 to 2023

SPI	2011	2012	2013	2014	2015	2016	2017
Germany	86.9	87.12	87.43	87.48	87.37	87.55	87.29
Czech Republic	81.03	81.24	81.57	81.6	82.15	82.61	83.45
United Kingdom	84.88	84.98	83.37	85.06	85.17	85.01	85.04
United States of America	83.09	83.16	83.52	83.32	83.35	83.4	83.25
Poland	78.65	78.68	78.71	78.99	79.75	79.85	80.03
Ukraine	66.16	66.54	66.89	66.75	66.65	67.83	68.75
Kazakhstan	64.17	64.89	66.17	66.16	66.27	66.92	67.36
China	58.28	59.25	59.41	60.03	61.61	62.1	63.21
India	49.75	50.3	51.03	52.04	53.73	54.11	55.31
SPI	2018	2019	2020	2021	2022	2023	Change, %
Germany	87.36	87.63	88.03	87.28	87.73	87.64	0.9

Czech Republic	83.41	83.61	84.08	84.84	84.92	84.82	4.7
United Kingdom	85.15	84.94	85.02	84.73	84.53	84.49	-0.5
United States of America	82.91	83.01	83.25	82.84	82.07	81.7	-1.7
Poland	80.07	80.1	80.27	79.97	79.74	79.53	1.1
Ukraine	69.54	69.86	71.21	71.56	71.51	70.47	6.5
Kazakhstan	67.66	68.49	69.3	70.09	69.93	69.73	8.7
China	83.41	64.8	65.75	66.7	67.57	67.61	16.0
India	56.24	57.28	57.62	58.54	58.98	58.06	16.7

Source: compiled by the authors based on data from Social Progress Index (2024).

As can be seen from Table 2, the index value in Kazakhstan is gradually increasing, and at a higher rate than in other countries (except China and India), which also indicates that the situation with corporate social responsibility in the country is improving, as the author's index analysis in Figure 1 shows. Nevertheless, the country is still lagging behind the highly developed countries in this respect, so the government authorities should still pay more attention to increasing the level of CSR.

Thus, Kazakhstan has a long history of corporate social responsibility development. Initially, CSR in Kazakhstan was characterised by simple charitable actions of enterprises. The government played a significant role in developing a culture of charity, which led to a significant increase in the construction of mosques and other social facilities, and already, the privatisation of the 1990s led to corporate support for social projects. Despite the achievements, the understanding and implementation of CSR varies: large corporations are more transparent about their CSR practices than smaller enterprises. Challenges in the country include viewing CSR primarily as philanthropy and a lack of comprehensive understanding and implementation across sectors. The government of Kazakhstan has taken steps to align with international CSR standards and promote corporate social responsibility through national and regional initiatives. As the analysis of statistical data has shown, there are positive trends in this context. However, gaps in CSR awareness and participation remain, particularly among small businesses and government officials.

Business social responsibility encompasses four primary categories. The foundational responsibility, economic, involves job creation and tax payments to support governmental functions (Penkovsky et al., 2022). Legal responsibility mandates adherence to both local and international regulations. Ethical responsibility calls for both individual employees and the organization to follow universally accepted moral standards in dealings with peers, competitors, the state, and the broader society. The pinnacle of social responsibility is the voluntary category, which includes investments in societal projects that may not yield immediate financial returns but significantly benefit the community, such as environmental conservation, public health initiatives, literacy programs, infrastructure development, and poverty reduction efforts (Yatsiv et al., 2024). American and European corporations are often praised for their practical approach to fulfilling economic and legal responsibilities. Furthermore, companies committed to CSR tend to attract and retain highly motivated, loyal employees who align with the company's values. Lastly, CSR can significantly enhance a company's investment appeal and overall value through the cultivation of goodwill. The concept of enlightened self-interest, which encapsulates these CSR benefits, could significantly promote CSR advancement within the Kazakhstani business sector. This approach posits CSR as a flexible set of commitments, tailored to a company's specific needs and growth stage, developed through stakeholder engagement, and primarily funded by the company itself. It aims to support internal and external social programs that foster company growth, enhance reputation and brand identity, and strengthen partnerships with government bodies, business allies, local communities, and civil organizations.

Integrated reporting, paying great attention to CSR and its results, focuses on the fact that during product value creation, not only material goods are involved, but also intangible assets that come to the fore (for

example, the company's reputation, product brand, reporting transparency confidence of interested users in its quality and integrity). As mentioned in Yevdokymova et al. (2019) work, the new integrated reporting model is considered an opportunity to obtain a complete picture of the company's activities, which reflects the risks and opportunities while more logically linking "Environmental, Social, and Governance" (ESG) factors and the financial results of the company. For stakeholders, information about social responsibility as a separate function that accompanies business is not enough – they want to see systemic impact. International research indicates a direct correlation between a company's socially significant initiatives and its profitability. Such initiatives increase the company's brand value by up to 11%. Strategic CSR projects attract talented professionals to enterprises who strive for meaningful work. As a result, companies receive an increase in employee performance by up to 13% and a decrease in staff turnover by up to 50%; at the same time, the cost reduction per retained employee is, on average, 90% to 200% of the annual salary (Zhang et al., 2017). Thus, corporate social responsibility must be embedded in the very foundation of the business model. The study also noted that corporate social responsibility brings significant benefits to enterprises, society, and the state itself (as noted above, to all stakeholder groups). Nevertheless, it is not sufficiently emphasised in Kazakhstan now, which suggests the role of paying more attention to this component in the country.

A decade ago, scientists at the Harvard Business School conducted a large-scale study, which revealed that companies that implement socially significant programs in their activities have higher company indicators than those not using them. The study by Kolk and Van Tulder (2010) reveals that investments in corporate social responsibility (CSR) have significant financial returns, with \$1 invested in social activities in 1993, yielding \$7 by 2010, compared to only \$4 for companies without social programs. This underscores the critical role of CSR in a company's development and long-term sustainability. Internationally, CSR is seen as a business's voluntary effort to contribute to societal development across social, economic, and environmental domains, extending beyond mere legal compliance and closely linked to the company's core operations. Globally, CSR initiatives are viewed as strategic business practices that enhance a company's reputation, increase its capitalization, and foster strong, balanced relationships with various stakeholders, including the state, shareholders, consumers, employees, partners, and local communities (Matala, 2022). This study also noted, in general, that corporate social responsibility is an important component for companies that have a desire to develop more rapidly and qualitatively. This is attributed to the fact that such enterprises are treated more favourably by both the state and the population, which leads to better economic results, among other things. In addition, well-developed corporate social responsibility leads to a better quality of work for the personnel at the enterprise, which also increases the efficiency of the enterprise. In this regard, paying more attention to this component in Kazakhstan, among others, is relevant.

The importance of corporate social responsibility was noted among others by Carrera (2022), Fatima and Elbanna (2022). The former study considered CSR as an essential criterion for social and economic planning, with profound implications for territorial cohesion and social well-being. The scholars emphasised the role of rethinking the concept to enhance its subsequent implementation in countries' economic processes. They also emphasised the need for a more homogeneous legal framework in the context of corporate social responsibility principles. Another study also focused on how to apply and understand the principles of corporate social responsibility. Researchers suggested that this could be done through individual practices, which would be aimed at more active implementation and application of the concept. The current study also focused on the role of corporate social responsibility but with an emphasis on the current conditions in Kazakhstan. The conclusion was made about the role of this concept, as well as the need for its more active introduction and use in the future to more effectively achieve the principles of sustainable development. It is worth noting that the methods discussed above will also be relevant in this context.

Cezarino et al. (2022) explored the role of corporate social responsibility. The scholars affirmed that the concept of CSR is the main component for achieving sustainable development goals. They also described the challenges faced by businesses in emerging markets, with special emphasis on corruption, social inequality and political instability. Researchers believed that a deeper implementation of the CSR concept would better combat these negative effects and achieve sustainable development goals faster. This study also mentioned the role of corporate social responsibility in the development of the country. It is worth noting that this component is one of the most important for achieving sustainable development goals. Therefore, Kazakhstan needs to create conditions for conducting its activities in a socially responsible manner. For these purposes, it is worth pursuing an appropriate policy that should be aimed at stimulating such enterprises' activities, both through the infusion of public funds and the formation of an appropriate legislative framework.

5. Conclusions

The study analysed the history of corporate social responsibility development at enterprises in Kazakhstan. It was shown that the concept began to be formed in the 1980s but is still in the active phase of its development. The country still has problems in this area, especially in terms of the impact of corporate social responsibility beyond large corporations on small and medium-sized companies. There are also differences in companies' understanding of corporate social responsibility, for which the concept is often limited to beneficence, although it is more profound in its essence. Nevertheless, based on statistical data, positive trends in the development of corporate social responsibility have been identified, as well as prospects for its future formation.

In this regard, its most important duty is to remain effective for employees, shareholders, and customers, making a tangible contribution to the economy, the well-being, and competitiveness of the country and society. The study revealed that the use of CSR principles is an element of development that needs to be introduced into the practice of Kazakh businesses to increase the investment attractiveness of enterprises in the long term. CSR is one of the most important levers for managing the reputation component of a company's investment attractiveness.

The disclosure of information on social policy in integrated reporting can indirectly influence the decisions of investors and other third parties, reducing information asymmetry between decision-makers. Thanks to the disclosed information, potential investors can judge the quality of internal business processes without additional costs for internal monitoring of business processes. Further research should focus on finding effective methods for the development of corporate social policy in Kazakhstan.

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Simultaneous Use of Social Networks in Buenos Aires: The Importance of a Multi-Platform Approach

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Abstract. *Purpose: In an environment full of immediate obligations and instant distractions, many believe that multitasking may be advantageous, if not essential, for people. In this setting, mobile phone applications allow users to access the latest technology at the touch of their fingertips. The main goal of this research was to describe the use habits of social networking sites whenever used simultaneously in Buenos Aires. Methodology: Fieldwork was fulfilled through a non-probability sampling method, and it was applied to a population who lives, works or studies in the Metropolitan Area of Buenos Aires, Argentina. Data collection was accomplished through an online self-administered questionnaire, which led to collecting a sample of 563 valid cases. Findings: The main findings of this research show significant differences between different groups of people. For example, respondents who use social networks while eating present higher simultaneous use than those who do not. Originality: This research is the first one to investigate the simultaneous use of social networking sites among the population of Buenos Aires, and its findings provide valuable insights into the use habits of social networking sites.*

Keywords: Social Networks, Simultaneous Use, Multitasking, Social Networks at Work, Social Media.

JEL Codes: M30; M31

1. Introduction.

An increasingly complex setting leads many to believe that multitasking is advantageous, if not essential (Kenyon, 2008). Mobile phone applications play a big role in nowadays' context as they allow users to access the latest technology at the touch of their fingertips (Aguado *et al.*, 2015). Moreover, online social networks seem to have shaped a mandatory spectrum in which individuals must identify themselves (Ellison *et al.*, 2007). These three aspects of today's modern society blend together, and the outcome is rather unexplored.

In an ever-evolving digital landscape, adopting a multi-platform approach in marketing strategies has become crucial for maximizing the reach and effectiveness of campaigns. This study investigates how various digital platforms can be used together to enhance consumer engagement and conversion. The main aim of this article is to identify variations of simultaneous online social network use patterns. To enrich the findings, it is paramount to highlight the varied situations in which users find themselves logging in.

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1.1. Introducing Social Networks.

To begin with, it seems natural to set a common ground and define the meaning of a social networking site. According to Ellison *et al.* (2007), social network sites are considered online tools that allow individuals – also referred to as 'users' – to present themselves in multiple contexts according to the purpose of the platform on which they log in. The main purpose of social networking sites is to allow users to shape their own online connections, whether they are work-related, oriented to share interests in common, or so on. Participants interact with 'offline' contacts, as well as with other fellow members of these online communities, whom they may not know personally (Ellison *et al.*, 2007; Yassine *et al.*, 2022).

So as to track social networking origins, the nineteenth century involved many inventions -such as roads and railways- which background concept was pure networking. Towards the end of the millennium and during the aftermath of Internet's growth crisis, the first seeds of the social networks' phenomenon appeared (Freire, 2008).

Throughout these last years, ever since the worldwide outburst of the Internet and online social networks, the latter has led many to argue that people's medium to interact may change abruptly - if it has not already changed (Kumar *et al.*, 2010). The newest technologies seem to pave the way for individuals and their way of communicating. Contrastingly, authors like Gandasegui (2011) state that social networking sites involve a modern setting of social mechanisms for information exchange. In other words, these platforms simply imitate the communication patterns of contemporary societies. Therefore, it is still argued whether the latest technological developments have an influence on societies or if it is the other way around.

In recent years, the appearance of the COVID-19 pandemic intensified the consumption of social media by users (Cavus *et al.*, 2021). Moreover, studies such as those of Mishra (2020), Samad *et al.* (2019), and Cavus *et al.* (2021) show the use of social networks in university environments in times of pandemic.

1.2. Social Network Users.

Besides this arguable connection, social networking sites provide its users with a modern way of connecting and learning information about other people, allowing them to reconnect with old acquaintances as well as approaching potential key contacts (Carpenter *et al.*, 2010). This lastly mentioned approach is not limited to the interpersonal field, but also considered by many enterprises. Furthermore, several startup companies sustain that their online position in various social networks is considered a key asset to be nurtured (Kumar *et al.*, 2010).

According to Kumar *et al.* (2010), members of a social network can be classified into three groups. Firstly, the 'singletons' are users who have joined the platform but do not interact actively with other users. In second place is a large group of users -referred to as the 'giant component'- who are connected directly or indirectly

to a large fraction of the rest of the network. Lastly, the 'middle region' involves isolated communities that interact within themselves.

According to Hootsuite (2022), the global social network trend is growing. In their Global State of Digital 2022 report, they reckon that social network users grew by 227 million in the last year, reaching 4.7 billion at the beginning of July 2022. Additionally, they conclude that two-thirds of the total world population will be online by July 2023, and the number of social media users will be the equivalent of 60% of the world population. These trends are in line with the conclusions of Shodiyev (2022), who states that social networks are used in teaching to facilitate student learning since they are used to working with them. Hootsuite's (2022) report also states that people are 2.5 times more likely to go to social media for news than to go to print newspapers and magazines.

1.3. Simultaneous Use of Social Networks.

Despite individuals' classification in terms of social networking activity, most of them find themselves unavoidably and deeply involved in 'media multitasking'. This term is referred to as the act of using multiple media devices simultaneously or switching rapidly between them (Van der Schuur, Baumgartner, Sumter and Valkenburg, 2018). Such a behaviour pattern is nothing new under the sun as it seems to show its first roots from a young age. According to Rideout *et al.* (2010), 8-to-18-year-olds spend an average of 29% of their time multitasking while using media throughout different mediums.

It is highly believed life pace has gone under an unprecedented change throughout these last decades, leading many to acquire a notion of timelessness. Kenyon (2008) states that there is not an unique reason for multitasking, as some research suggest that this may be the outcome of time pressure on individuals with multiple task and limited time. Therefore, the use of technology stands out as the main resource for many to avoid being influenced by this contemporary effect.

According to Jeong & Hwang (2016), multitasking can trigger both positive and negative outcomes, as an individual may underperform in terms of attention or comprehension but may exceed expectations when it comes to attitude change. Furthermore, both the quantity and quality of demanding tasks have been proven to interfere with information processing. Whenever involved tasks overlap, multitasking situations become more challenging, and the goals are not achieved properly.

Research carried out by Lui & Wong (2012) demonstrated that an average undergraduate receives information from almost four media sources at the same time, and as a result of this, their focusing ability is weakened. Despite the researcher's original belief of a relationship between media multitasking as a cause of a better multisensory integration performance, their finding did not imply any direct correlation.

This behavioural phenomenon is a direct result of technology development. Among innovations involved in such process, ‘apps’ stand out as a key element of the current information era. According to Allen (2003), mobile applications –commonly-known as ‘apps’– are software pieces designed to be installed and used in mobile devices. These are thought to adapt to devices’ limitations and solve specific needs.

Social media multitasking has also been studied from a mental health and well-being perspective. A recent study carried out by Xu *et al.* (2022) concludes that although social media multitasking is a phenomenon present in the daily life of most individuals, it is relevant to take into account the effects on well-being, indicating that there is a negative relationship between social media multitasking and well-being variables. In line with this, Zamanzadeh and Rice (2021) propose two primary influences regarding the impact of social media multitasking on well-being: executive functioning and self-regulation, as well as one primary outcome: general stress.

1.4. Mobile Devices and Multitasking.

It is believed by many that mobile apps are nowadays’ prevalent interface for content access (Aguado *et al.*, 2015). The background of this phenomenon is widely discussed. According to Scolari *et al.* (2012), the vertiginous establishment of applications can be directly linked to functional economic reasons since they contribute to the time-effectiveness relation, which seems particularly relevant these days. This tendency to prefer these modern tools has gradually evolved throughout recent years. For instance, in 2014, only 14% of Internet use involved traditional browsers, whereas 86% was through applications (Khalaf, 2014). According to Anderson & Wolff (2010), this transition in the main platform for Internet use leads to a major ability to interfere with the content of the user.

Mobile device popularity is thought to be one of the main reasons for the increasing app development that has taken place throughout these last decades. New versions of these gadgets lead to more convenient and affordable use. Hence, massiveness is consequent. Many users now even consider apps as learning tools (Zydney & Warner, 2016).

As a result of increasing Internet accessibility, its use has gradually ‘infected’ many social spheres, including the workplace. Research carried out by the Mobile Marketing Association (2018) stated that Argentina is the Latin American nation with the most smartphones per inhabitant. Research dated from 2013 by the same organization showed that 43% of survey respondents had a smartphone. Later, in 2016, this figure increased to 82%, and it reached a new peak of 91% in 2018. Furthermore, 11% of individuals stated that they use their personal devices more than 200 times a day.

Consequently, it seems natural that personal Internet use is featured in multiple situations. The popular press used to define this behaviour pattern at work as a problematic behaviour wrongly associated with lower-

status employees. This so-called 'work-avoidance strategy' –often referred to as 'cyberslacking'– has been considered a trigger for a negative impact on workers' productivity (Garret & Danzinger, 2008). Non-work-related activities -the most popular being online shopping, blogging or instant messaging- are thought to cause not only a financial loss from reduced employees' capacity but may also result in a threat to organizational security (Vitak *et al.*, 2011).

Nevertheless, studies have stated that far from being a bad influence, Internet use may be key for workers whose tasks demand creative and flexible thinking. Other findings suggest that Internet use is significantly more frequent among male employees, as well as among high workplace-status individuals (Garret & Danzinger, 2008).

Block (2001) states that supposing that "slacking" necessarily leads to poorer results is a great fallacy. The author's example supposes that two employees could achieve the same results: one working at an average pace and the other taking time off but later working twice as hard.

The use of technology, such as mobile devices, has intensified in recent times after the COVID-19 pandemic (Hootsuite, 2022). A review carried out by Vargo *et al.* (2021) suggests that, during the pandemic, technology has been an important facilitator, ranging from the use of computers to working with artificial intelligence, for the realization of different activities (including communicating, providing health services remotely, and analyzing data). The authors mention that the main effects of the use of technology during the pandemic have been the continuity of education at different levels, improved patient outcomes, and decreased outbreak impact. Multitasking also made it possible to adapt to the use of technologies during the pandemic. For example, a study conducted by Mella-Norambuena *et al.* (2021) on a sample of students during the pandemic showed that students spent more time simultaneously connected to learning management systems from their mobile devices and computers than using a single device.

2. Method.

2.1. Objective.

The main aim of this research was to describe the use habits of social networking sites whenever used simultaneously in the Metropolitan Area of Buenos Aires (AMBA), Argentina.

Specific objectives stated for this study were:

1. Understand the simultaneous use of social media applications based on people's occupations.
2. Recognize differences in the number of applications used simultaneously depending on the situations of use of social networks (i.e., at work or in class, during break time, before going to sleep, just after waking up, or while eating).

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3. Identify the existence of differences in the simultaneous use of apps based on the consumer's need to use them for work purposes.

2.2. Methodology and Sample.

A descriptive research of cross-sectional design was implemented. This approach allowed us to carry out a diagnosis about the use of different social networking sites according to the groups analyzed. Regarding data analysis, cross-tabulations were used to visually understand the distribution of the data, and inferential statistics and procedures, such as Chi-Square to evaluate relationships between variables, and T-tests and ANOVAs to evaluate group differences were implemented.

A non-probability sample of 563 adults who live, work or study in the Metropolitan Area of Buenos Aires (AMBA), Argentina (females: 61.6%) participated in this study. Data collection was carried out in February 2023. Subjects' ages ranged from 18 to 45 ($M=23.78$; $SD=8.04$). Data collection was accomplished through an online self-administered survey using Google Forms.

2.3. Informed Consent.

Participants had to answer a filter question by which they agreed on giving their consent to take part in this research. Those who accepted would continue with the questionnaire and those who did not would not carry on with it. Moreover, research objectives were listed at the beginning of the survey so as the participants would be conscious about them.

3. Results and Discussion.

3.1. Results.

The number of social network applications that people use simultaneously was analyzed. Figure 1 shows that the majority of people surveyed use two or three applications simultaneously, representing 32.3% and 31.8%, respectively. Those who usually use only one app at a time reach 20.8%, while only 15.1% use four simultaneously.

Regarding the **situation of use of social media apps**, group differences were found regarding the independent variables “Use of social media at work or in class”, “Use of social media just after waking up”, and “Use of social media while eating”. No differences were found regarding the variables “Use of social media just before going to sleep” and “Use of social media during breaktime”. Differences are explained below.

Use of social media at work or in class. Depending on the main occupation of the participants, they were asked whether they used social media apps in their work environment/class or not. The Levene equality test of variances (0.326, $p=.568$) indicates that the error variance of the dependent variable is homogenous between groups. Thanks to the T-Test implemented, it was possible to find evidence about the existence of significant differences between the means of the groups of people who use social media in the work environment or in class ($M=2.55$; $SD=0.96$) and those who do not ($M=2.35$; $SD=0.99$), depending on the values of the dependent variable, $T_{(1,561)}=2.232$, $p=.026$, $\eta^2=.009$.

Use of social media just after waking up. The Levene equality test of variances (0.217, $p=.642$) suggests that the error variance of the dependent variable is homogenous between groups. The T-Test allows declaring the existence of significant differences between the means of the groups of people who use social networks just after they wake up ($M=2.53$; $SD=0.96$) and those who do not ($M=2.35$; $SD=0.99$), depending on the number of applications used simultaneously, $T_{(1,561)}=4.110$, $p=.043$, $\eta^2=.007$.

Use of social media while eating. In order to analyse this independent variable and its effect on the number of apps used simultaneously, a T-Test was implemented. The Levene equality test of variances (0.053, $p=.817$) indicates that the error variance of the dependent variable is homogenous between groups. Thanks to the analysis, we were able to assess the direct effect, recognizing the existence of significant differences between the factors of the independent variable regarding the dependent variable, concluding that those who use social networks while eating ($M=2.64$; $SD=1$) present higher simultaneous use than those who do not ($M=2.37$; $SD=0.97$): $T_{(1,561)}=2.406$, $p=.016$, $\eta^2=.010$.

Group differences were found in the **occupations** of the participants. The Levene equality test of variances (1.474, $p=.221$) suggests that the error variance of the dependent variable is homogenous between groups. The analysis of the variance allows us to confirm the existence of significant differences between the factors of the independent variable regarding the dependent variable, $F_{(3,559)}=3.699$, $p=.012$, $\eta^2=.019$. Bonferroni's Post Hoc test ($p=.009$) allows to conclude that there is a significant difference between the means of the groups of people who are students ($M=2.51$; $SD=0.98$), and those who both work and study ($M=2.20$; $SD=1.03$).

Regarding the **use of social media apps for work purposes**, group differences were also found. The Levene equality test of variances (0.310, $p=.734$) reveals that the error variance of the dependent variable is homogenous between groups. The ANOVA allows us to confirm the existence of significant differences between the factors of the independent variable as a function of the dependent variable, $F_{(2,560)}=7.991$, $p<.001$, $\eta^2=.028$. The Post Hoc test of Bonferroni ($p<.001$) concludes that there is a significant difference between the means of the groups of people who do not use social networks to work ($M=2.34$; $SD=0.97$) and

those who reckon totally using social media for work purposes ($M=2.86$; $SD=0.95$). In addition, there is a significant difference between people who partially use social networks to work ($M=2.38$; $SD=0.97$) and those who totally use them for work purposes ($M=2.86$; $SD=0.95$), according to Bonferroni's test ($p=.004$).

For a better understanding of the relationship between the variables analyzed in the latter ANOVA, the following multivariate analysis shown in Figure 2 was conducted to evaluate the number of apps used simultaneously by individuals about the use of social media for work purposes. Those who do not use social networks to work, along with those who do but sporadically, represent a tendency to use two or three apps at the same time. On the other hand, those who constantly use social networks in their work environment demonstrate a tendency to use, firstly, three apps simultaneously (32.3%) and, secondly, four (30.8%).

As a noticeable trend, the more an individual uses social networks for work purposes, the more apps he or she would use at the same time. That being said, only 7.7% of the people who indicated that they fully use social networks for work purposes use only one app at a time, while this percentage increases to 23.2% for those who do not use social media as a working tool. The asymptotic (bilateral) significance value arising from the Chi-square tests for this analysis was .003.

As an additional research finding, it was possible to identify significant differences based on the **activity performed when an application takes too long to load or works slowly**. The Levene equality test of variances (0.255, $p=.907$) suggests that the error variance of the dependent variable is homogenous between groups. The analysis of variance indicates the existence of significant differences between the factors of the independent variable regarding the dependent variable, $F_{(4,557)}=7,611$, $p<.001$, $\eta^2=.052$. The Post Hoc test of Bonferroni ($p<.001$) allows to conclude that there is a significant difference between the means of the groups of people who close the app and stop using it ($M=1.96$; $SD=1.05$) and those that close it and reopen it waiting for the lag to stop ($M=2.51$; $SD=0.93$). In addition, there is a significant difference between the people who close the app and stop using it ($M=1.96$; $SD=1.05$) and those who use another app while they wait for the affected one to load ($M=2.65$; $SD=0.96$), according to Bonferroni's ($p<.001$) Post Hoc test. Finally, significant differences were found between the means of the groups of people who wait for the application to load ($M=2.21$; $SD=0.98$) and those using another application while waiting for the lag to stop ($M=2.65$; $SD=0.96$; $p_{Bonferroni}=.032$).

4. Discussion and Conclusions.

The main findings of this research show that participants who exclusively use only one app at a time reach about 20%, while a vast majority of respondents use two or more applications simultaneously. The largest portions of this result are in harmony with the findings of Lui and Wong (2012). It was stated that an average

undergraduate received information from almost four media sources simultaneously. Consequently, such group is likely to be part of the participants who use more than two apps at the same time.

Respondents who use social networks while eating present higher simultaneous use than those who do not. Whenever an application takes too long to load or works slowly, some survey participants close such app, while others reopen it. Moreover, other respondents decide to use another app while they wait for the affected one to load. These findings back up Keyon's (2008) ideas, which claimed that multitasking is believed to be the outcome of time pressure on individuals and a timeless notion. Therefore, it seems natural for mobile phone users to react impatiently to devices' underperformance. Technology has developed to unprecedented limits, and, as a result, any kind of flaw is unacceptable.

In terms of the use of social media at work, some participants have claimed that their use is solely work-related, while others have recognized partially using social networks for work purposes. When it comes to usage frequency, participants who constantly use social networks at work demonstrate a tendency to use three or four apps simultaneously. Additionally, participants who do not use social networks to work, along with those who do but sporadically, represent a tendency to use two or three apps at the same time. It has been proved that the more an individual uses social networks for work purposes, the more apps he or she would use at the same time. These results can be compared to Jeong and Hwang's statements (2016). According to these authors, an average employee is likely to underperform in terms of attention when multitasking but may as well show a positive attitude change. That being said, this feeling of well-being may be the reason why survey participants have started using social networks in the workplace. These results also support Block's (2001), Garret's and Danzinger's (2008) ideas. These authors agreed that these alleged misconducts were far from leading to underperformance, but actually vital for meeting the company's expectations.

Results of this research allow to recognize that a large majority of consumers use two or more applications simultaneously, finding differences regarding the use of applications by distinct demographic segments. In turn, consumers have different habits regarding the moments in which they use social networks and the frequency with which they do so. Lastly, it was possible to discover that the need to use social networks for work purposes is related to a greater simultaneous use of these apps.

Our study's findings indicate that digital marketing strategies incorporating a multi-platform approach achieve greater resonance with consumers compared to those limited to a single platform. This observation underscores the need for an integrated approach that leverages the strengths of each digital platform. The ability to reach consumers through diverse channels allows for more effective and personalized communication, which is critical for the success of marketing campaigns in the digital age. Based on these results, we recommend implementing multi-platform strategies to maximize the impact of digital marketing initiatives and adapt to the changing preferences of consumers.

Consequently, the topics addressed and the results obtained provide valuable insights into the social media habits of Argentine consumers, which is crucial for companies involved in digital marketing. To enhance the applicability of these insights, future research should explore social media usage in other countries, focusing on markets with significant cultural diversity, economic relevance, and high levels of social media engagement (e.g., Brazil and Spain). Investigating such markets could offer a comparative analysis that highlights how cultural and economic factors influence digital marketing strategies and consumer behaviour, providing a more comprehensive view of global practices.

4.1. Managerial Implications.

The findings of this study have extensive implications for managers and companies concerned with virtual advertising and marketing activities. Understanding the habits and choices of social media use amongst Argentine consumers can provide valuable steering for strategic decision-making and optimize marketing efforts. The following implications may be drawn from the results and conclusions of this study, emphasizing their importance for managers.

Multi-platform approach: The study exhibits that a majority of customers use two or more social media applications concurrently. This highlights the importance of adopting a multi-platform approach in digital marketing strategies. Organizations can maximize their reach and engage with a broader audience by setting up a presence on multiple social media platforms. Managers ought to allocate resources to create and preserve active profiles on popular social media platforms that align with their audience, making sure to maintain consistent messaging across platforms. This approach permits businesses to enhance brand exposure, growth client engagement and, in the long run, power conversion rates.

Timing and Context: The study highlights the impact of timing and context on social media utilization patterns. Managers need to bear in mind these factors when establishing the strategic plan for their advertising and marketing campaigns. For example, leveraging the usage of social media apps just after waking up or during meal times provides an opportunity to capture the attention of clients throughout precise moments of the day. By tailoring advertising messages and promotions to align with those contexts, managers can enhance the relevance and effectiveness of their campaigns. Comprehending the specific moments when customers are more likely to use social media allows companies to optimize the timing of their content distribution and increase the chance of consumer engagement.

User experience Optimization: The research exhibits that people tend to close or transfer to other apps when faced with sluggish loading times or overall performance issues. To ensure a positive consumer experience, managers must prioritize optimizing their mobile apps to reduce loading times and maximize performance. Making an investment in user-friendly interfaces, effective backend systems, and regular

updates can considerably boost user satisfaction and retention. Managers ought to continuously monitor the app's overall performance, cope with technical problems rapidly, and actively monitor user feedback to continuously improve the consumer experience. By presenting a seamless and enjoyable app experience, companies can support brand loyalty, increase consumer engagement, and drive high-quality word-of-mouth recommendations.

Work-related use: The research shows that people who use social networks for work purposes have a tendency to engage in more simultaneous app usage. This finding shows that businesses can leverage social media platforms as powerful tools for work-associated communication and collaboration. Managers need to encourage employees to make use of social networks for work-related duties, fostering a culture of productivity and knowledge sharing. Presenting suitable training and guidelines on the use of social media for work purposes can enhance teamwork, facilitate information exchange, and enhance average organizational overall performance. By integrating social media into the place of the job, managers can tap into the benefits of digital communication, enabling personnel to stay connected, share insights, and collaborate successfully.

In conclusion, the findings of this research underscore the importance of adopting a multi-platform approach, considering timing and context, leveraging social media for work-related functions, and optimizing consumer experience. With the aid of incorporating those implications into their digital advertising techniques, managers can successfully gain consumer engagement and maximize results.

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Figures:

Figure 1: Number of social media apps used simultaneously.

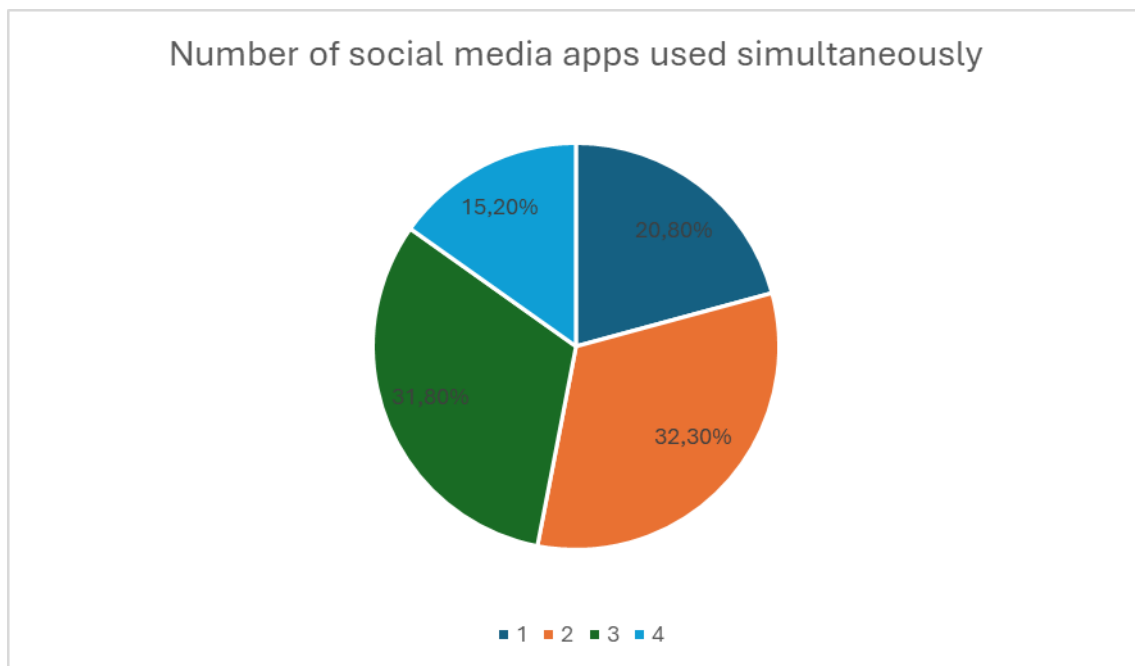
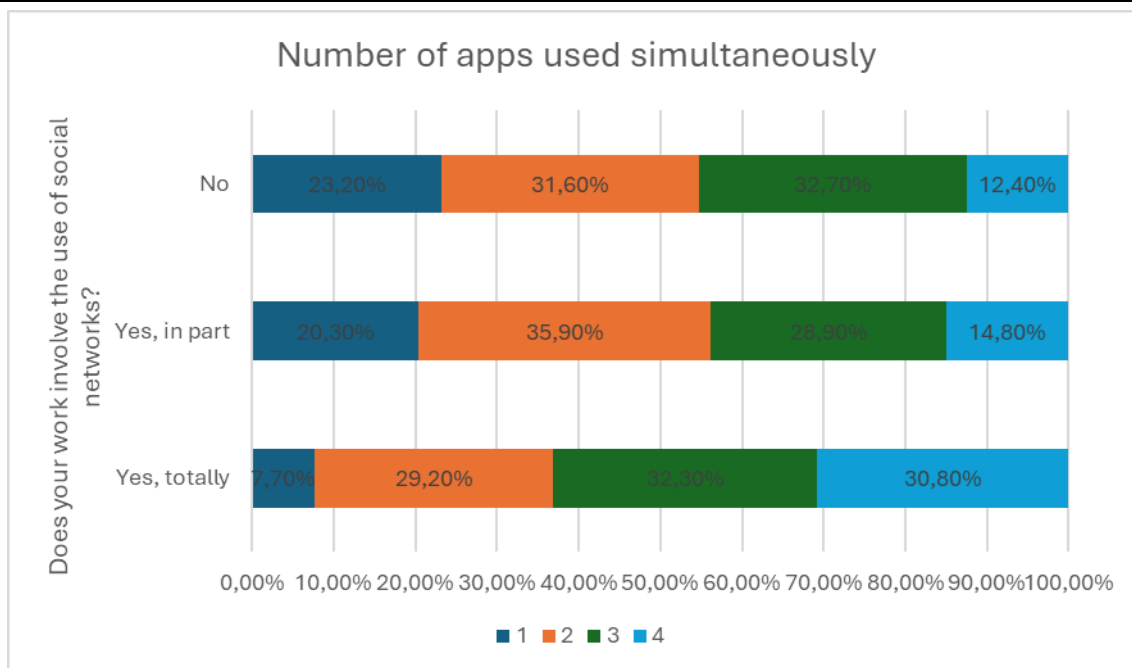


Figure 2: Number of apps used simultaneously in relation to work use of social media.



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