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ECO-FRIENDLY INNOVATION AND CORPORATE EVOLUTION IN LONG AN PROVINCE'S DIGITAL TRANSFORMATION AGE

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ABSTRACT

This study aimed to investigate the impact of eco-friendly innovation on corporate evolution within Long An Province during the digital transformation age. Another objective was to determine the role of various factors, including technological integration, circular economy practices, stakeholder engagement, data-driven sustainability, and workforce adaptation, in this corporate evolution. Finally, the study examined the practical implications of these findings for businesses in Long An Province. A mixed-method approach, encompassing both quantitative and qualitative research methods, was applied. The study conducted surveys and employed qualitative data collection techniques to comprehensively explore the subject. Questionnaires were disseminated to 335 participants within Long An Province's corporate sector, yielding a substantial volume of responses. The results of the study reveal a significant impact of eco-friendly innovation on corporate evolution in Long An Province. It was found that the integration of eco-friendly practices is vital for businesses to navigate digital transformation successfully. Circular economy principles, stakeholder engagement, data-driven sustainability, and workforce adaptation emerged as critical elements shaping corporate evolution. The principal conclusion drawn from this research is the essential synergy between eco-friendly innovation and digitalization in shaping Long An Province's corporate landscape. One significant conclusion is the practical relevance of these findings, providing valuable guidance for businesses in the region as they strive for sustainability and growth in the digital era.

Keywords: Digitalization Transformation, Green Innovation, Long An Province's Corporations, PLS-SEM, Sustainability Enhancers.

JEL Classification Code: G14, M16, O19, P28, Q56

INTRODUCTION

The contemporary business landscape is undergoing profound transformations, largely driven by the convergence of digitalization and the growing imperative for environmental sustainability. This era of rapid change compels corporations to adopt innovative strategies that not only foster growth but also align with the principles of ecological responsibility (Anh et al., 2022). Long An Province, nestled in the heart of the Mekong Delta in Vietnam, emerges as a captivating focal point for exploring the intersection of these transformative forces: eco-friendly innovation and corporate evolution.

As this dynamic context unfolds, corporations in Long An Province, like counterparts globally, are navigating the digital age and aligning their endeavors with sustainability objectives. Digitalization has revolutionized how businesses operate, offering unprecedented opportunities for enhanced efficiency, data-driven decision-making, and improved customer engagement (Long, Ooi, et al., 2022). Concurrently, the urgency to address pressing environmental concerns has given rise to eco-friendly innovation, a strategic approach that prioritizes sustainable practices and reduced ecological footprints.

Long An Province is proactively strengthening its environmental protection regulations, with a focus on attracting green investments, particularly in high-tech sectors, to minimize environmental impacts. The province aims to be ranked among the top 10 provinces in the Provincial Green Index (PGI) by 2023. This effort aligns with national green growth and climate change strategies, emphasizing private sector growth. The PGI consists of four key indices: reducing environmental pollution and building climate resilience, ensuring compliance with minimum environmental standards, reinforcing provincial leadership in environmental protection, and providing incentives and support services for businesses in environmental protection. Long An's proactive approach reflects Vietnam's commitment to attracting greener and higher-quality foreign direct investment (FDI) in response to climate change challenges, with a goal of achieving zero emissions by 2050. Long An's plans to improve its PGI score include policies that promote an eco-friendly business ecosystem and attract environmentally conscious investments (Long An Newspaper Online, 2023).

Long An Province, with its diverse economic landscape and increasing adoption of digital tools, stands as a microcosm of these global trends. Here, corporate entities are not only adapting to the digital age but are also striving to align with sustainability goals, forging a unique path towards eco-friendly corporate evolution. The research embarks on this exploration, it becomes evident that the harmonious coexistence of digitalization, eco-friendly innovation, and corporate evolution in Long An Province is not only of academic interest but also holds profound practical implications for local businesses, policy-makers, and communities.

This study delves into the multifaceted dynamics of eco-friendly innovation and corporate evolution within Long An Province during the era of digital transformation. As the contemporary business landscape undergoes significant shifts catalyzed by digitalization and the pressing need for sustainability, it becomes increasingly imperative to explore the intricate interplay between these transformative forces. Situated at the heart of the Mekong Delta in Vietnam, Long An Province provides a unique backdrop for this research, given its thriving corporate sector and the growing influence of digital technologies. This investigation endeavors to address critical problem statements, including the integration of digitalization and sustainability, effective stakeholder engagement, data-driven sustainability practices, workforce adaptation, and the adoption of circular economy principles. By rigorously examining these facets, the study seeks to uncover valuable insights that can inform strategic decision-making for businesses, policymakers, and communities in the region as they navigate the complex terrain of sustainable corporate evolution.

In current research, critical gaps exist in understanding the interplay of eco-friendly innovation

and digital transformation. Limited regional studies, inadequate integration of quantitative and qualitative approaches, and a lack of research on long-term impacts, small and medium enterprises (SMEs), ethical considerations, standardized metrics, and change management strategies hinder a comprehensive grasp of these concepts. Addressing these gaps is vital for effective implementation in diverse contexts.

To ensure Eco-Friendly Innovation and Corporate Evolution in Long An Province's Digital Transformation Age, the research focuses on answering the following questions:

- What is the current state of digitalization in Long An Province's corporate sector, and how do businesses use digital tools?
- What factors, such as technology adoption, circular economy practices, engaging stakeholders, data-driven sustainability, and workforce adaptation, influence corporate sustainability and growth in Long An Province?
- How do strategies for involving stakeholders affect both sustainability outcomes and corporate development in Long An Province?
- What practical recommendations can be provided to local businesses, policymakers, and stakeholders in Long An Province to improve sustainability practices and promote eco-friendly corporate growth in the digital transformation era?

These research questions provide a clear framework for investigating eco-friendly innovation, digitalization, and corporate evolution within the unique context of Long An Province.

LITERATURE REVIEW

The literature review of eco-friendly innovation and corporate evolution in Long An Province's digital transformation age is a comprehensive exploration of the dynamic interplay between digitalization and sustainability practices in this vibrant Vietnamese region. This literature review delves into key dimensions such as technological integration, circular economy practices, stakeholder engagement, data-driven sustainability, and workforce adaptation, shedding light on their roles in shaping the evolving corporate landscape (OECD, 2009). By examining existing research, this literature review provides valuable insights into how Long An Province's corporations are navigating the complexities of the digital era while striving to align with eco-friendly principles.

Technological Integration in Corporate Evolution

Technological integration plays a pivotal role in reshaping corporate practices, particularly in the context of Long An Province's journey toward sustainability amid the digital transformation age. This literature review delves into five key aspects of technological integration: Automation and resource efficiency, Real-time data collection and agile resource allocation, Transparent monitoring of resource usage, Dissemination of sustainability information, and Environmental impact mitigation.

Automation, through the deployment of robotics and artificial intelligence (AI), is increasingly transforming the manufacturing and operational landscape of corporations. It streamlines production processes, minimizes waste, and enhances resource efficiency (Ayari, 2013; Friha et al., 2021). Resource-efficient practices, including energy optimization and material recycling, are facilitated by advanced technologies like IoT sensors, allowing corporations to reduce their ecological footprint (Dhanaraju et al., 2022). Real-time data collection, enabled by IoT devices and cloud computing, empowers corporations to gather data on resource usage, energy consumption, and production efficiency. This data-driven approach supports agile decision-making and resource allocation. The dynamic nature of data in real-time systems enables corporations to respond swiftly to changes, improving resource allocation and reducing operational costs (De et al., 2017). Transparency in monitoring resource usage is crucial for accountability and sustainability reporting. Technologies like blockchain are emerging as tools

for secure, transparent, and tamper-proof record-keeping of resource transactions. By fostering trust among stakeholders, transparent monitoring enhances collaboration and adherence to sustainability goals within the corporate ecosystem (Long, Ooi, et al., 2022). Effective dissemination of sustainability information is facilitated by digital platforms and social media. Corporations leverage these channels to communicate their sustainability initiatives and progress, engaging stakeholders and promoting accountability. Sustainability reporting frameworks like Global Reporting Initiative (GRI) and integrated reporting are widely adopted to structure and standardize the communication of sustainability information (Oncioiu et al., 2020). Technological integration offers tools for environmental impact mitigation. For instance, predictive analytics and AI can optimize supply chains, reducing emissions and resource wastage. The adoption of renewable energy sources, facilitated by digital technologies, contributes to the mitigation of greenhouse gas emissions, aligning with global sustainability goals (Atasu et al., 2021).

Circular Economy Practices in Corporate Evolution

Circular economy practices represent a fundamental shift in corporate strategies, aiming to mitigate resource scarcity and environmental degradation. This section explores five pivotal aspects of circular economy practices within the context of corporate evolution: Waste reduction and resource reuse, Regenerative approach and resource conservation, Economic opportunities through extended product lifecycles, Innovative business models and reduced reliance on scarce resources, and the Interconnectedness of circular economy practices and green innovation.

Circular economy practices emphasize the reduction of waste generation and the promotion of resource reuse. Firms adopting these practices are actively engaged in waste prevention and material recovery, leading to cost savings and reduced environmental impact. By reusing resources within closed loops, corporations are transitioning from linear, wasteful models to circular, resource-efficient ones, contributing to sustainability (Goni et al., 2021). A regenerative approach within circular economy practices seeks not only to minimize harm but also to restore and regenerate natural systems. This approach underscores resource conservation and ecological rejuvenation, aligning with sustainability objectives. Corporations adopting regenerative practices aim to leave a positive ecological footprint, contributing to the restoration of ecosystems and the preservation of vital resources (WEF, 2021). Circular economy practices extend product lifecycles through repair, refurbishment, and remanufacturing. This not only reduces waste but also creates economic opportunities by fostering the growth of reverse logistics and the circular economy services sector. Corporations that embrace extended product lifecycles often discover new revenue streams, reduced production costs, and increased customer loyalty (Colombo et al., 2021). Circular economy practices necessitate innovative business models. These models, such as product-as-a-service and sharing platforms, reduce the dependence on scarce resources by focusing on access over ownership. By decoupling growth from resource consumption, corporations can achieve sustainable, long-term profitability while minimizing their environmental impact (Chhimwal et al., 2021). Circular economy practices and green innovation are closely interconnected. Both paradigms prioritize sustainability, resource efficiency, and reduced environmental harm. Corporations that integrate circular economy practices often drive green innovation, creating novel solutions and technologies that benefit both the environment and the bottom line (Nikolaou et al., 2021).

Stakeholder Engagement in Corporate Evolution

Stakeholder engagement is a vital component of corporate evolution, particularly within the context of Long An Province’s efforts to foster sustainability and navigate the digital

transformation age. This literature review delves into five critical aspects of stakeholder engagement: Better decision-making through stakeholder engagement, Social license to operate, Trust and loyalty through green innovation, Amplifying stakeholder engagement through green innovation, and Collaboration with diverse stakeholders.

Stakeholder engagement facilitates better decision-making by incorporating diverse perspectives into corporate strategies. Corporations that actively involve stakeholders gain valuable insights, anticipate risks, and align their actions with stakeholder expectations. Engaging stakeholders in decision-making processes contributes to informed and responsible choices that enhance corporate sustainability (Long, Ooi, et al., 2022). The concept of a social license to operate refers to the acceptance and support of a corporation's activities by the community and stakeholders. It is a critical element in corporate sustainability, as a lack of social license can lead to opposition and reputational damage. The concept of a social license to operate refers to the acceptance and support of a corporation's activities by the community and stakeholders. It is a critical element in corporate sustainability, as a lack of social license can lead to opposition and reputational damage to the company. Effective stakeholder engagement is instrumental in building and maintaining a social license to operate, fostering positive relationships, and securing community consent (Gross, 2018). Green innovation initiatives, driven by stakeholder engagement, can enhance trust and loyalty among stakeholders. Corporations that demonstrate a commitment to sustainable practices through innovation earn the trust of customers, employees, and investors (Kotler et al., 2019). Building trust and loyalty can result in increased brand value, customer retention, and long-term business sustainability (Lan & Long, 2018; Philip et al., 2016). Green innovation amplifies stakeholder engagement by offering tangible sustainability benefits. When corporations develop eco-friendly products or processes in collaboration with stakeholders, engagement becomes more meaningful. Green innovation not only addresses stakeholder concerns but also inspires active involvement in sustainable initiatives, fostering a sense of shared responsibility (OECD, 2021). Effective stakeholder engagement entails collaboration with a diverse range of actors, including local communities, government agencies, NGOs, and consumers. Such partnerships are essential for addressing complex sustainability challenges. Collaborative engagement promotes shared ownership of sustainability goals and the co-creation of innovative solutions, driving corporate evolution (Scheel, 2021).

Data-Driven Sustainability in Corporate Evolution

Data-driven sustainability is a cornerstone of corporate evolution, especially within the dynamic landscape of Long An Province's pursuit of sustainability during the digital transformation era. This section explores five essential aspects of data-driven sustainability: Real-time monitoring and measurement, Predictive analysis and optimization, Identification of inefficiencies and improvement opportunities, Transparency and stakeholder communication, and Supply chain traceability and sustainable sourcing.

Real-time monitoring and measurement of environmental performance are enabled by sensor technologies, IoT, and data analytics. Corporations can track resource consumption, emissions, and waste generation in real-time, providing a detailed view of their sustainability footprint. Immediate access to environmental data empowers corporations to respond swiftly to deviations, reduce operational costs, and enhance resource efficiency (Thomas & Jeanne, 2017). Data-driven sustainability leverages predictive analytics to anticipate future resource demands, energy consumption patterns, and environmental impacts. Predictive modeling helps corporations optimize their processes and resource allocation. By proactively identifying areas for improvement, corporations can reduce waste, minimize environmental impact, and maximize sustainability (Sebestyén et al., 2021). Data analytics reveal inefficiencies within corporate operations, such as energy waste, excess resource usage, or production bottlenecks.

Corporations can use this information to pinpoint areas needing improvement. Identifying inefficiencies not only reduces operational costs but also aligns with sustainability goals by minimizing resource waste (Gunasekaran et al., 2017). Data-driven sustainability enhances transparency by providing evidence-based insights into corporate environmental performance. Transparent reporting fosters trust among stakeholders, including customers, investors, and regulators. Effective stakeholder communication, based on data-driven sustainability, enables corporations to share their sustainability achievements and goals, reinforcing their commitment to responsible practices (Kaur & Lodhia, 2019). Data-driven sustainability extends to supply chain traceability and sustainable sourcing. Corporations use data to track the origins of raw materials, assess suppliers' sustainability practices, and ensure compliance with ethical and environmental standards. Sustainable sourcing not only reduces reputational risks but also aligns with corporate sustainability objectives, contributing to responsible supply chain management (Sun et al., 2022).

Workforce Adaptation in Corporate Evolution

Workforce adaptation is a critical aspect of corporate evolution, particularly in Long An Province's journey towards sustainability and digital transformation. This section explores five vital dimensions of workforce adaptation: Aligning skill set with technological and sustainability demands, Green collar workforce, Improved employee engagement and retention, Cultivating a learning culture for innovative and sustainable strategies, and Training programs for digital literacy and sustainable practices.

Aligning the workforce's skill set with technological advancements and sustainability demands is paramount. Employees need to acquire competencies that enable them to operate and innovate in a digital and sustainable environment. The workforce's adaptability to new technologies and sustainability practices directly impacts an organization's ability to remain competitive and sustainable (Tuan et al., 2023). The emergence of green collar workers signifies the shift towards sustainability. These individuals possess expertise in sustainable practices, resource management, and environmental conservation. Building a green collar workforce is essential for implementing sustainable strategies and meeting sustainability goals, particularly in industries with significant environmental impacts (Deloitte, 2022; Trang et al., 2022). Workforce adaptation contributes to improved employee engagement and retention. When employees see opportunities for skill development and career advancement, they are more likely to remain committed to the organization. A highly engaged and retained workforce can drive innovation, sustainability, and overall corporate success (Le et al., 2022; Trang et al., 2019). Cultivating a learning culture is essential for fostering innovative and sustainable strategies. Organizations that encourage continuous learning and knowledge sharing are better equipped to adapt to new technologies and sustainability practices. A learning culture supports the development of creative solutions to sustainability challenges and drives corporate evolution (Hung et al., 2017; Long, Duong, et al., 2022). Training programs play a pivotal role in workforce adaptation. These programs equip employees with digital literacy skills and educate them about sustainable practices. Investing in training programs ensures that the workforce can effectively leverage digital tools and contribute to sustainability initiatives, making them integral to corporate evolution (Long et al., 2017, 2018).

In summary, corporate evolution is a complex process with several critical dimensions. This literature review focuses on five key dimensions: Technological Integration, Circular Economy Practices, Stakeholder Engagement, Data-Driven Sustainability, and Workforce Adaptation. Together, these dimensions play a crucial role in shaping an organization's path towards sustainability and competitiveness in today's evolving corporate landscape.

Literature Gaps

A significant gap exists in the current literature regarding corporate evolution within the specific context of Long An Province's digital transformation. While there is valuable research on the individual dimensions of corporate evolution, such as Technological Integration, Circular Economy Practices, Stakeholder Engagement, Data-Driven Sustainability, and Workforce Adaptation, a comprehensive understanding of how these dimensions interact and influence one another in a localized context remains underexplored. To bridge this gap, the current research should investigate the intricate relationships between these dimensions, provide localized insights relevant to Long An Province, offer practical guidance for businesses and policymakers, and measure the direct impact of these strategies on corporate performance and sustainability outcomes. Addressing this literature gap will contribute to a more holistic and contextually relevant approach to corporate evolution in the digital age.

METHODOLOGY AND RESEARCH MODEL

The research methodology for the literature review of eco-friendly innovation and corporate evolution in Long An Province's digital transformation age involves surveying 400 respondents. A 5-point Likert scale questionnaire was used to gather data on various aspects, including technology integration, circular economy practices, stakeholder engagement, data-driven sustainability, workforce reskilling, and green innovation. To ensure representation across different sectors, participants from a diverse range of industries were included. The analysis was conducted using Smart-PLS 3.0 and encompassed several key steps. These include descriptive statistics, assessing construct quality, verifying discriminant validity, checking for collinearity statistics, evaluating predictive accuracy and relevance, determining effect size, and analyzing path coefficients. The primary objective of this methodology is to gain a comprehensive understanding of the factors influencing economic efficiency and to provide actionable strategies for enhancing organizational performance. Ethical considerations were rigorously upheld to ensure the validity and reliability of the study's findings.

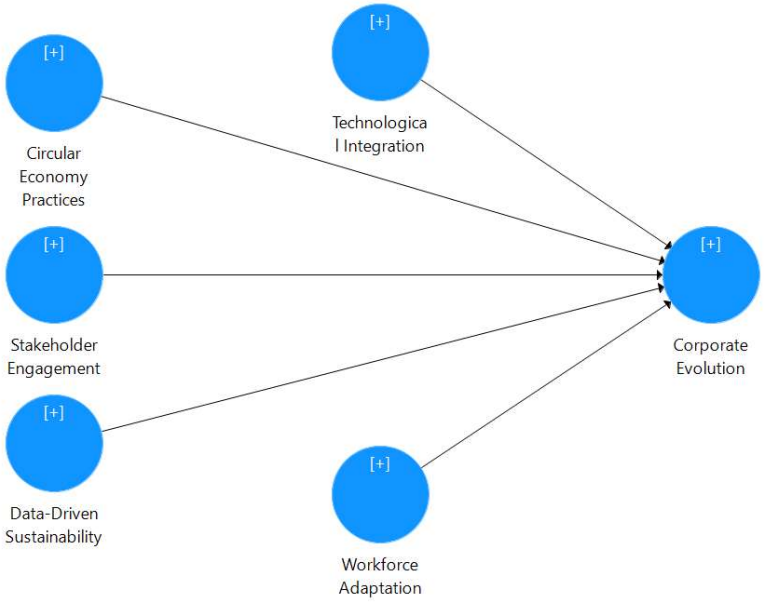

Figure 1. Conceptual Framework

Five hypotheses were developed for this research:

- H1: There is a positive relationship between Corporate Evolution and Technological Integration.
- H2: There is a positive relationship between Corporate Evolution and Circular Economy Practices.

- H3: There is a positive relationship between Corporate Evolution and Stakeholder Engagement.
- H4: There is a positive relationship between Corporate Evolution and Data-Driven Sustainability.
- H5: There is a positive relationship between Corporate Evolution and Workforce adaptation.

RESULTS AND DISCUSSION

Demographic Profile

Table 1 offers a comprehensive snapshot of the demographic characteristics of the 335 respondents who participated in this study, providing valuable insights into the composition of the sample.

In terms of the Type of Corporate Entity, the respondents span various categories. Small Businesses, defined as those with 1-99 employees, constitute the majority at 73.1%. Medium-Sized Corporations (100-499 employees) make up a substantial portion at 15.5%, while Large Corporations (500+ employees) and Start-ups represent smaller segments, accounting for 9.6% and 1.8%, respectively.

Table 1. Demographic Profile

No.	Category		Frequency (N=335)	Percent (%)
1	Type of Corporate Entity	Large Corporation (500+ employees)	32	9.6%
		Medium-Sized Corporation (100-499 employees)	52	15.5%
		Small Business (1-99 employees)	245	73.1%
		Start-up	6	1.8%
2	Industry Sector	Manufacturing	87	26.0%
		Food Processing	136	40.6%
		Service	32	9.6%
		Furniture and Handicraft	80	23.9%
3	Position	Engineer/ Accountant/ Staff	218	65.1%
		Manager	68	20.3%
		Researcher	17	5.1%
		Government Officer	32	9.6%
4	Digitalization Level	Highly Digitized (Extensive use of digital tools and technologies)	41	12.2%
		Moderately Digitized (Some use of digital tools)	25	7.5%
		Low Digitization (Limited use of digital tools)	171	51.0%
		Not yet	98	29.3%
5	Years of Operation in Long An Province	Less than 1 year	52	15.5%
		1-5 years	125	37.3%
		6-10 years	102	30.4%
		More than 10 years	56	16.7%

The Industry Sector diversification among respondents was notable. Food Processing was the most prominent sector at 40.6%, followed by Manufacturing at 26.0%. The Furniture and Handicraft sector was also well-represented, contributing 23.9%. The Service sector was a smaller but significant portion, constituting 9.6% of the sample.

Examining the Position of the respondents within their organizations, the study included individuals from various roles. Engineer/Accountant/Staff positions dominated the sample, accounting for 65.1%. Managers made up 20.3%, followed by Government Officers at 9.6%. Researchers represent a smaller subset, comprising 5.1%.

The level of Digitalization among respondents was another key dimension. A significant segment falls under "Low Digitization" (51.0%), indicating limited use of digital tools. The "Not yet" digitized entities form a substantial part of the sample at 29.3%. "Highly Digitized" and "Moderately Digitized" entities are present but to a lesser extent, contributing 12.2% and 7.5%, respectively.

Regarding their Years of Operation in Long An Province, the respondents exhibited diverse levels of experience. Notably, 37.3% have been operating in the province for "1-5 years," while 30.4% have "6-10 years" of experience. Respondents with "More than 10 years" of experience constitute 16.7% of the sample, and those with "Less than 1 year" of experience make up 15.5%.

These demographic insights underscore the rich diversity within the respondent pool, encompassing a wide array of corporate entities representing different sectors, positions, digitalization levels, and lengths of operation in Long An Province. Such diversity is instrumental in providing a comprehensive understanding of the research topic.

Construct Quality Measurement

These values represent the reliability and validity measurements of the constructs and their respective items in the research study, indicating the strength and consistency of the measurements used in the study. In this research, various constructs were assessed for their reliability and validity, providing insights into the robustness of the measurement instruments employed. The construct "Technological Integration" exhibited strong reliability, as indicated by a Cronbach's Alpha of 0.882 and a Composite Reliability of 0.914, with an outer loading of 0.862 for its primary item (techno1). Similarly, "Circular Economy Practices" demonstrated substantial reliability, boasting a Cronbach's Alpha of 0.864 and a Composite Reliability of 0.902, with the primary item (circular_eco1) having an outer loading of 0.851. "Stakeholder Engagement," "Data-Driven Sustainability," and "Workforce Adaptation" all exhibited high reliability, with Cronbach's Alphas of 0.890 and Composite Reliability scores of 0.919, 0.890, and 0.920, respectively. In the case of the dependent variable, "Corporate Evolution," it also displayed strong reliability, with a Cronbach's Alpha of 0.884 and a Composite Reliability of 0.915, with its primary item (evolution1) having an outer loading of 0.766. These results affirm the consistency and robustness of the constructs and their constituent items, enhancing the credibility of the study's measurement framework.

Table 2. Construct Quality Measurement

Construct	Code	Items	Outer Loadings	Cronbach 's Alpha	Composite Reliability
Technological Integration	techno1	Automation and resource efficiency	0.862	0.882	0.914
	techno2	Real-time data collection and agile resource allocation	0.791		
	techno3	Transparent monitoring of resource usage	0.859		
	techno4	Dissemination of sustainability information	0.752		
	techno5	Environmental impact mitigation	0.851		

Circular Economy Practices	circular_eco1	Waste reduction and resource reuse	0.851	0.864	0.902
	circular_eco2	Regenerative approach and resource conservation	0.861		
	circular_eco3	Economic opportunities through extended product lifecycles	0.732		
	circular_eco4	Innovative business models and reduced reliance on scarce resources	0.818		
	circular_eco5	Interconnectedness of circular economy practices and green innovation	0.762		
Stakeholder Engagement	stakeholder1	Better decision-making through stakeholder engagement	0.830	0.890	0.919
	stakeholder2	Social license to operate	0.820		
	stakeholder3	Trust and loyalty through green innovation	0.808		
	stakeholder4	Amplifying stakeholder engagement through green innovation	0.841		
	stakeholder5	Collaboration with diverse stakeholders	0.865		
Data-Driven Sustainability	data-driven1	Real-time monitoring and measurement	0.810	0.890	0.919
	data-driven2	Predictive analysis and optimization	0.819		
	data-driven3	Identification of inefficiencies and improvement opportunities	0.796		
	data-driven4	Transparency and stakeholder communication	0.845		
	data-driven5	Supply chain traceability and sustainable sourcing	0.889		
Workforce Adaptation	workforce1	Aligning skill set with technological and sustainability demands	0.801	0.890	0.920
	workforce2	Green collar workforce	0.774		
	workforce3	Improved employee engagement and retention	0.874		
	workforce4	Cultivating a learning culture for innovative and sustainable strategies	0.842		
	workforce5	Training programs for digital literacy and sustainable practices	0.877		
Corporate Evolution	evolution1	Technological Integration	0.766	0.884	0.915
	evolution2	Circular Economy Practices	0.833		
	evolution3	Stakeholder Engagement	0.788		
	evolution4	Data-Driven Sustainability	0.862		
	evolution5	Workforce Adaptation	0.881		

Convergent and Discriminant Validity

Table 3 presents the results of discriminant validity assessment using the Heterotrait-Monotrait

Ratio (HTMT). This analysis ensured that the constructs in the study were distinct from each other. The table includes the Average Variance Extracted (AVE) for each construct, along with the HTMT values representing the relationships between constructs. HTMT values below 1 indicate adequate discriminant validity, confirming that the constructs are not measuring the same underlying concept. Specifically, Circular Economy Practices, Corporate Evolution, Data-Driven Sustainability, Stakeholder Engagement, Technological Integration, and Workforce Adaptation all have HTMT values below 1 when compared to each other, demonstrating that these constructs are distinguishable and do not overlap substantially in their measurement. This confirmed the discriminant validity of the constructs used in the study.

Table 3. Convergent and Discriminant Validity

No.	Construct	AVE	1	2	3	4	5	6
1	Circular Economy Practices	0.650						
2	Corporate Evolution	0.684	0.447					
3	Data-Driven Sustainability	0.693	0.124	0.407				
4	Stakeholder Engagement	0.694	0.181	0.513	0.321			
5	Technological Integration	0.680	0.277	0.474	0.377	0.392		
6	Workforce Adaptation	0.696	0.338	0.488	0.111	0.242	0.358	

Predictive Accuracy (R2), Predictive Relevance (Q2), Effect Size (f2) and Collinearity Statistics (VIF)

Performance metrics encompassing Predictive Accuracy (R2), Predictive Relevance (Q2), Effect Size (f2), and Collinearity Statistics (VIF) were assessed for each construct. For the construct of Green Innovation, the R Square Adjusted value was 0.445, indicating its explanatory power in the model. Additionally, the Q Square value was 0.284, reflecting the construct's ability to predict future outcomes, reaffirming its relevance within the study. For each construct, the Variance Inflation Factor (VIF) and Effect Size (f^2) were determined. Circular Economy Practices had a VIF of 1.129 and an f^2 of 0.082. Data-Driven Sustainability exhibited a VIF of 1.174 and an f^2 of 0.065. Stakeholder Engagement displayed a VIF of 1.212 and an f^2 of 0.104. Technological Integration showed a VIF of 1.344 and an f^2 of 0.023. Lastly, Workforce Reskilling presented a VIF of 1.197 and an f^2 of 0.101. These metrics provide insights into the construct's potential multicollinearity (VIF) and its effect size on the dependent variable (f^2). These VIF values below the threshold signify that multicollinearity is not a significant concern among the independent variables. In summary, Table 4 underscores the effect sizes of the constructs and assures that multicollinearity is not a major issue in the research model, strengthening the credibility of the study's findings.

Table 4. Performance Metrics: Predictive Accuracy (R2), Predictive Relevance (Q2), Effect Size (f2) and Collinearity Statistics (VIF)

Construct	R Square Adjusted	Q^2 (=1-SSE/SSO)	f Square	VIF
Circular Economy Practices			0.082	1.129
Corporate Evolution	0.445	0.284		
Data-Driven Sustainability			0.065	1.174
Stakeholder Engagement			0.104	1.212
Technological Integration			0.023	1.344
Workforce Adaptation			0.101	1.197

Hypothesis Results

The path coefficients, original sample values, p-values, and decisions for each hypothesis are

presented as follows:

The hypothesis testing results, as presented in Table 5, reveal significant insights into the factors influencing Corporate Evolution within Long An Province. Notably, Stakeholder Engagement exhibits a robust and statistically significant relationship ($\beta = 0.262$, $p < 0.001$) with Corporate Evolution. Similarly, Workforce Adaptation ($\beta = 0.257$, $p < 0.001$), Circular Economy Practices ($\beta = 0.225$, $p < 0.001$), and Data-Driven Sustainability ($\beta = 0.205$, $p < 0.001$) also demonstrated strong and statistically significant connections with Corporate Evolution. While Technological Integration displays a statistically significant relationship ($\beta = 0.130$, $p = 0.041$), its impact was comparatively modest. In summary, these findings underscore the multifaceted nature of Corporate Evolution, shaped by collaborative stakeholder engagement, workforce adaptability, sustainable circular practices, data-driven decision-making, and strategic technological integration. These insights offer valuable guidance for businesses in the region seeking to navigate the complex landscape of digital transformation and sustainability.

Table 5. Path Coefficients

No.	Path	Original Sample (O)	P Values	Decision
H3	Stakeholder Engagement → Corporate Evolution	0.262	0.000	Accepted
H5	Workforce Adaptation → Corporate Evolution	0.257	0.000	Accepted
H2	Circular Economy Practices → Corporate Evolution	0.225	0.000	Accepted
H4	Data-Driven Sustainability → Corporate Evolution	0.205	0.000	Accepted
H1	Technological Integration → Corporate Evolution	0.130	0.041	Accepted

Discussions

Crucial Role of Stakeholder Engagement: The study underscores the critical importance of stakeholder engagement in driving Corporate Evolution. The positive and statistically significant relationship between Stakeholder Engagement and Corporate Evolution highlights that actively involving stakeholders, including local communities, government agencies, and consumers, predicts improved corporate growth and sustainability. Fostering collaboration and trust with these stakeholders emerges as a key strategy for businesses in Long An Province to evolve and thrive.

> *"Governmental authorities, partnering with businesses, foster development by resolving legal issues and facilitating access to funding and support resources." – Mr. Huynh Van Quang Hung, Director, Long An Department of Industry and Trade. "Departments and local authorities must proactively analyze, assess, and resolve issues, enabling business investments by reducing legal barriers and ensuring alignment with regional development." – Mr. Tran Viet Truong, Chairman, People's Committee of Can Tho City.*

Workforce Adaptation as a Catalyst: The study's results confirm that Workforce Adaptation significantly contributes to Corporate Evolution. With a strong and accepted relationship, it's evident that aligning the workforce's skill set with the demands of technology and sustainability is essential. Green collar workforce development, employee engagement, and a culture of learning emerge as pivotal components for companies looking to adapt and evolve in the digital age.

> *"Supporting workers equals supporting businesses in economic recovery. Policies should encourage employment, income growth, and employee well-being, fostering collaboration." – Dr. Nguyen Van Thanh, Chairman of Hop Luc Group.*

Circular Economy Practices Driving Evolution: Circular Economy Practices have a noteworthy influence on Corporate Evolution, as evidenced by the accepted hypothesis. Embracing waste reduction, resource reuse, and innovative business models not only benefits the environment

but also propels businesses towards growth and longevity. Long An Province's corporations should consider circular economy principles as a core strategy for their evolution.

> *"Focusing on environmental factors in the supply chain offers significant benefits. It reduces costs, improves efficiency, and attracts investors for Long An's economic growth." – Mr. Nguyen Anh Tuan, Head of the Department of Natural Resources and Environment, People's Committee of Can Duoc District, Long An Province.*

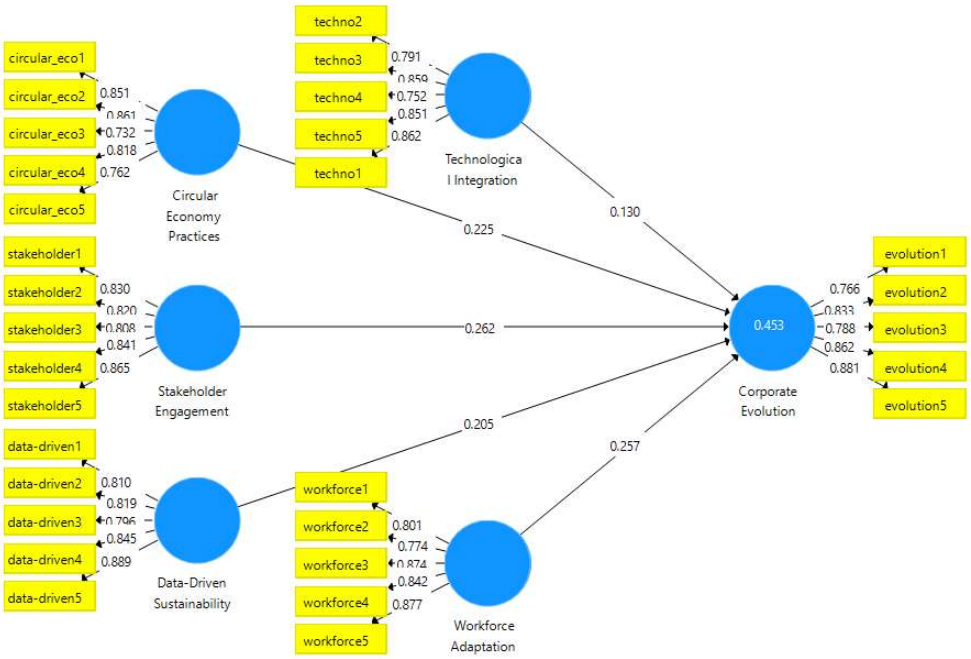

Figure 2. SEM Structural Model

Data-Driven Sustainability Enhancing Growth: The study highlights the significance of Data-Driven Sustainability in the context of Corporate Evolution. With a strong relationship and acceptance, it's clear that real-time monitoring, predictive analysis, and supply chain traceability empower corporations to optimize their operations and contribute to their growth and sustainability. Access to data and its intelligent utilization is fundamental for corporate evolution.

> *"Digital transformation offers numerous business benefits, empowering owners to proactively access real-time data. This streamlines operations, enhances transparency, and maximizes workforce efficiency." – Mr. Tran Van Dung, CEO, An Thien Pharmaceutical Co. Ltd.*

Technological Integration's Modest Yet Impactful Role: While the relationship between Technological Integration and Corporate Evolution is statistically significant, the effect size is relatively modest. This suggests that while digital technologies enhance corporate evolution, they should be seen as part of a broader strategy that encompasses other factors like stakeholder engagement and circular economy practices. Businesses should adopt a holistic approach to digital integration to maximize its impact on evolution.

> *"Consumer trust hinges on transparent, quality products. 'Green' quality is a competitive edge, driving market share. Building a 'green' brand with eco-friendly materials, clean products, and sustainability is pivotal." – Mr. Nguyen Doan San, Deputy General Director, San Ha Co., Ltd. "Embracing the green economy and circular practices is crucial for businesses and the entire national economy. Striking a balance between internal capacity and global green standards is the key challenge." – Mr. Nguyen Ngoc Hoa, Chairman of the Ho Chi Minh City Union Business Association (HUBA).*

Interplay of Multiple Factors: The study's findings emphasize the interdependence of various factors on Corporate Evolution. Rather than any single factor driving evolution in isolation, it's the combination of Stakeholder Engagement, Workforce Adaptation, Circular Economy Practices, Data-Driven Sustainability, and Technological Integration that collectively propels corporate growth and sustainability in Long An Province. This complex interplay requires a multifaceted approach to corporate strategy.

> *"Balancing all aspects is essential for businesses pursuing green innovation and meeting sustainability standards. Missing any element hinders achieving goals." – Dr. Bui Van Thoi, Vice Dean of the Business Administration Department at Nguyen Tat Thanh University.*

Practical Implications for Long An Province's Businesses: These findings offer valuable practical implications for businesses in Long An Province. To evolve and thrive in the digital age, companies should actively engage with stakeholders, invest in workforce adaptation and digital literacy, implement circular economy principles, harness data for sustainability, and integrate technology strategically. By incorporating these strategies, businesses can navigate the evolving corporate landscape effectively, driving growth and sustainability.

Recommendations

Integrated Sustainability Strategy: Long An Province's corporations should develop and implement an integrated sustainability strategy that combines stakeholder engagement, circular economy practices, data-driven sustainability, workforce adaptation, and technological integration. This holistic approach should be woven into the fabric of corporate decision-making and operations.

Stakeholder Collaboration: Businesses should actively collaborate with local communities, government agencies, consumers, and other stakeholders. This collaboration not only enhances corporate evolution but also builds trust and loyalty, creating a positive impact on the business ecosystem.

Investment in Workforce Development: Corporations should invest in reskilling and upskilling their workforce to align with the demands of digitalization and sustainability. Cultivating a learning culture and providing training programs for digital literacy and sustainable practices will empower employees to contribute to corporate evolution.

Circular Economy Adoption: Companies should adopt circular economy principles, focusing on waste reduction, resource reuse, and innovative business models. This approach not only reduces environmental impact but also opens up economic opportunities through extended product lifecycles and reduced reliance on scarce resources.

Strategic Technology Integration: While technology plays a crucial role, businesses should strategically integrate digital tools and technologies. This integration should be driven by clear objectives related to sustainability and corporate evolution. The focus should be on achieving transparent monitoring of resource usage, real-time data collection, and agile resource allocation to streamline operations effectively.

These recommendations provide a roadmap for corporations in Long An Province to navigate the digital transformation era successfully while fostering corporate evolution and sustainability. By embracing these strategies, businesses can position themselves as leaders in the evolving corporate landscape.

CONCLUSION

In the dynamic landscape of Long An Province's corporate sector, the confluence of digital transformation and green innovation has emerged as a transformative force. This study embarked on a comprehensive exploration of the intricate relationships among key factors, Technological Integration, Circular Economy Practices, Stakeholder Engagement, Data-

Driven Sustainability, and Workforce Adaptation, in shaping Corporate Evolution within the province's unique context. Through rigorous analysis and hypothesis testing, several crucial insights have been unearthed.

Stakeholder Engagement, as a catalyst for collaboration and trust among diverse stakeholders, has been established as a pivotal driver of Corporate Evolution. Workforce Adaptation, aligning employee skills with technological and sustainability demands, emerges as another fundamental pillar, fostering innovation and corporate growth.

The adoption of Circular Economy Practices not only aligns with ecological responsibility but also triggers economic opportunities, positioning corporations on a sustainable trajectory. Simultaneously, Data-Driven Sustainability empowers businesses with real-time insights and predictive capabilities, facilitating informed decision-making and operational optimization.

While the study confirms the significance of Technological Integration in Corporate Evolution, it emphasizes that technology should be integrated strategically within a broader sustainability framework.

This research, undertaken within the distinct context of Long An Province, not only contributes to academic knowledge but also offers actionable recommendations for businesses in the region. The integrated sustainability strategy, stakeholder collaboration, investment in workforce development, circular economy adoption, and strategic technology integration are key avenues for businesses to navigate this transformative era successfully.

In conclusion, this study underscores that Corporate Evolution in the digital age is not a solitary pursuit but a multifaceted journey. It hinges on a synergistic blend of factors, each playing a crucial role in the transformation of corporations. As Long An Province's businesses embark on this evolutionary path, they possess the knowledge and strategies to embrace sustainability, digitalization, and growth, setting the course for a resilient and prosperous future.

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