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Fostering Operational Excellence Through Business Agility and Lean Practices: Infusing Insights from Manufacturing Small Food Processing Enterprises in Kerala

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Abstract: Surviving with excellence is the aspiration of every enterprise, rooted in continuous improvement, quality, and efficiency. In the manufacturing sector, operational excellence embodies a strategic pursuit to minimize waste, enhance productivity, and maintain quality. However, for small-scale food processing enterprises, especially in regions like Kerala, achieving this remains challenging due to limited resources and financial constraints. This study examines the relationship between business agility, organizational size, and operational excellence, with lean practices acting as a mediating variable. Data were collected from 60 small-scale food processing units in Kerala using a multistage random sampling method. Using Partial Least Squares Structural Equation Modeling (PLS-SEM), the study found that business agility and organizational size significantly enhance lean practices, which in turn drive operational excellence. The mediation effect was found to be significant, highlighting agility as a critical link between lean implementation and performance outcomes. The conclusions change the theoretical emphasis on agility as a means of attaining excellence through lean practices. The study offers practical evidence to support the agile responsiveness and tactical adoption of lean practices in manufacturing small food processing enterprises in Kerala. This study suggests practical insights for policymakers and business leaders to improve competitiveness and ensure long-term sustainability in the food processing sector.

***Keywords*:** *Business Agility, Organizational Size, Lean Practices, Operational Excellence, Food Processing Units in Kerala (FPUs), Manufacturing Small-Scale Enterprises*

1. INTRODUCTION

In this era of quick technological changes and growing customer demands, attaining operational efficiency and adaptive competence has become imperative. This is most important in Kerala's small-scale food processing sector, which is deep-rooted in traditional practices while wrestling with the realities of modern markets. Besides, scarce resources, unstable consumer preferences, and a fragmented supply chain are shared hurdles for these enterprises (Baig et al., 2020). To subsist and prosper in this environment, they must trust disciplined internal processes with a keen strategic anticipation to adapt quickly to external changes.

In spite of these hindrances, business agility and lean practices have emerged as balancing pillars of competitive resilience. Business agility trains firms with the capacity to sense and react to change through dynamic resource allocation, quick decision-making, and frequent reconfiguration of lean practices (Zitkiene & Deksnys, 2018). Lean practices emphasize the organized elimination of waste, optimization of workflows, and entrenching quality at every stage of production (Taher & Bashar, 2024). Business agility supports them to stay quick and flexible, while lean makes organizations robust by keeping things constant.

Amidst food processing enterprises in Kerala, most of them are considering cultural practices with community-centric models. Thus, the combination of agility and lean holds deep strategic significance. Business agility competencies allow these enterprises to pivot in response to governing shifts, supply chain disruptions, or developing customer health preferences. Instantaneously, lean systems like small batch production, quality at source, and identical workflows support establishing a baseline of competence. Together, they suggest a synergetic track towards sustainable perfection. In this study, operational excellence is not limited to cost reduction or productivity enhancement. It is intended as a comprehensive state where organizational arrangements are consciously aligned, processes are continuously advanced, and employees are energetically engaged in driving performance. It involves three interrelated dimensions: cultural enablers that promote shared values and learning mindsets; continuous process improvement that incorporates experimentation and innovation into daily customs; and enterprise alignment, which ensures strategic lucidity between goals and their execution.

Although agile and lean practices patterns have gathered individual attention in management literature, their joint impact on operational excellence, mainly in a resource-constrained area like Kerala's small-scale food processing industry, remains unexplored. This study discloses the gap by investigating how business agility and lean practices play in the achievement of operational excellence. Therefore, the study attempts to deliver practical insights for enterprises, pointing to the transition from reactive existence to proactive excellence in a changing business environment.

2. STATEMENT OF THE PROBLEM

In spite of their crucial role in local economies, small-scale food processing businesses in Kerala face insistent challenges in reaching sustainable operational excellence. A critical factor contributing to this challenge is their incomplete ability to answer quickly and efficiently to hastily changing market conditions, developing customer demands, and unexpected troubles such as environmental disasters and the COVID-19 pandemic. These disasters have further visible structural vulnerabilities and highlighted the necessity for better adaptability in business processes.

In the contemporary fast-paced environment, lean practices are extensively recognized for improving operational performance by waste reduction, efficiency improvement, and restructuring processes (Taher & Bashar, 2024). However, many enterprises struggle to sustain lean initiatives due to limited resources, fragmented implementation, and misalignment with organizational culture. Businesses with greater agility are better positioned to adopt lean practices effectively, integrate them into their systems, and drive continuous process improvements. Until now, in spite of the theoretical importance of this connection, there is limited empirical research discovering how lean practices mediate the relationship between business agility and operational excellence, particularly within the small-scale food processing sector of Kerala. This research focuses on addressing this gap by examining how business agility contributes to achieving operational excellence through the effective adoption of lean practices in an industry where traditional methods interconnect with modern compressions, stressing the need for an inclusive understanding of these dynamics. Exactly, this study intended to achieve the following objectives:

1. To examine the influence of business agility on lean practices in small-scale food processing units in Kerala.
2. To examine the influence of organizational size on lean practices in small-scale food processing units in Kerala.
3. To assess the mediating role of lean practices in the relationship between business agility and operational excellence.
4. To assess the mediating role of lean Practices in the relationship between organizational size and operational excellence.
5. To analyse the effect of lean practices on operational excellence.

To contextualize these objectives, the following section presents the theoretical framework and the development of research hypotheses.

3. THEORETICAL BACKGROUND AND HYPOTHESES

The Small and Medium Enterprise (SME) sector in India plays a pivotal role in the nation's economic development, contributing nearly 30% to the GDP and generating 62% of employment opportunities in India (Government of India Annual report, 2024) Within this national framework, Kerala's SME sector differs from other states due to its connectivity, communication networks, and highly skilled human resources. It contributes 29% of the country's GDP and employs 1.8 lakh people across India (Salwan, 2024). Kerala, being rich in coconut, spices, fruit juices, vegetables, and seafood, has a strong domestic and export-oriented market for food products; as a result, the small-scale industry of Kerala is largely dominated by food processing units (FPUs). In this context, achieving operational excellence is essential to remain competitive and sustain in the global market. Business agility and adopting lean practices are the key drivers of excellence. The following sections explore these factors in detail.

3.1 Business Agility

Business agility is a new concept in the 21st century, and in 1991, it was recognized as the speed of organizations in decision-making (Judge & Miller, 1991) and after it is referred to as flexibility (Bahrami, 1992). (Lu & Ramamurthy, 2011) defined business agility as "the ability of an organization to detect opportunities to create innovation, through which the company will seize competitive market opportunities through the use of the required assets, and the use of its organizational knowledge, in an appropriate manner, in unpredictable market conditions". Business agility is the enterprise's capacity to adapt quickly to changing market conditions, customer demands, and industry guidelines without compromising profitability, cost-effectiveness, and quality (Yusuf et al., 2023). According to the Dynamic Capabilities Theory by Teece et al. (1997), the ability to adapt to organizational changes or agility is essential for the success of enterprises. It empowers the SMEs to be competitive and maintain their level of performance and excellence. In the context of small-scale food processing in Kerala, agility is essential due to seasonal raw material availability, shifting consumer preferences, and stringent food safety regulations. Agility enables firms to reconfigure processes quickly, innovate product lines, and meet customer demands efficiently, thus laying the groundwork for operational excellence.

3.2 Lean Practices

The concept of lean has evolved from the Japanese manufacturer, Toyota Motor Corporation, focusing primarily on the reduction of waste in operations (Herron & Hicks, 2008). Lean is the "set of management principles and techniques geared towards eliminating waste in the manufacturing process and increasing the flow of activities that, from the customers' perspective, add value to the product." (Womack & Jones, 1997). According to the Resource-based theory by Barney (1991), a firm's persistent competitive advantage comes from its valued, scarce, inimitable, and non-substitutable resources (Barney, 1991). The term lean implies the way of utilizing such resources in an ideal way, so lean also facilitates the success and excellence of enterprises. In the context of SMEs, the adoption of lean manufacturing acts as a transformative methodology that helps SMEs to sustain as a dynamic and responsive actor in the business environment. It empowers SMEs to achieve higher productivity without waste and deliver quality products or services at reduced costs. Indian managers have been putting significant efforts into developing a lean strategy over the last 5 years (Panizzolo et al., 2012). Besides, Upadhye et al. (2010) revealed that the first step towards lean manufacturing implementation has already been taken, but the pace is slow due to inadequacy of working capital, poor technology, poor management skills, and lack of training in India.

3.3 Operational Excellence

Excellence can be described as a superior approach to controlling the organization and achieving results (N. Ibrahim et al., 2022). Operational excellence involves the continuous improvement of the efficiency and effectiveness of the business processes (Wahab et al., 2019). It is a situation where an organisation's operations are characterized by incomparable performance, efficiency, and effectiveness (Found et al., 2018; A. R. Ibrahim et al., 2020). Operational excellence is not only about operational performance, such as cost, time, quality, and flexibility metrics, but also about sustainable performance, such as handling people and resources efficiently to support business growth (Wahab et al., 2019). Operational excellence assures both organizational efficiency and

effectiveness through reducing cost without decreasing volume of output and quality, reducing waste of time, raw materials, unnecessary processing, and energy used in transportation, storing, and operating the plant (Booz Allen, 2014). Operational excellence is the design and management to maximize operating profit by continuous operational excellence in the production and delivery system, which can deliver to customers the right value of products and services (Wahab et al., 2019).

3.4 Interrelationship of Agility, Lean, and Operational Excellence in the SMEs Context

The majority of studies recognized business agility as the antecedent of lean practices. Business agility, characterized by an enterprise's capacity to respond rapidly to changes in market demands and uncertainties, plays a pivotal role in shaping operational strategies such as lean implementation (Hallgren & Olhager, 2009). (Yusuf et al., 2023) emphasize that agility promotes flexibility and responsiveness, which are foundational for lean manufacturing, especially in dynamic market environments. Similarly, (Mason-Jones et al., 2000) argue that agile enterprises inherently incorporate lean principles to remain competitive, as both paradigms aim to eliminate waste and enhance customer responsiveness. Furthermore, small-scale FPUs, often constrained by limited resources, benefit from agile capabilities as they enable the strategic prioritization and phased adoption of lean tools, aligning operational excellence with market volatility. Thus, the synergy between agility and lean practices is particularly pronounced in small enterprises where adaptability is crucial for survival and growth (Hallgren & Olhager, 2009; Manfredsson, n.d.; Soltan & Mostafa, 2015). So, researchers formulated the following hypothesis:

H1: Business agility significantly influences the adoption of lean practices of Small-scale FPUs

Business agility, the capacity to quickly sense and respond to ecological changes, directly contributes to key operational excellence results such as quality, flexibility, delivery speed, and reliability (Hallgren & Olhager, 2009). (Hallgren & Olhager, 2009) establish that agile manufacturing approaches are strongly connected to improvements in capacity and product mix flexibility, which are essential dimensions of operational excellence in highly flexible markets. Furthermore, agile enterprises leverage responsiveness and adaptability to reduce process inefficiencies and better align with shifting customer needs, enhancing performance metrics across cost, quality, and delivery dimensions (Manfredsson, n.d.). In small-scale FPUs, market unpredictability, resource constraints, and customer diversity are pronounced; agility fosters continuous improvement and real-time reconfiguration of operations. This dynamic capability not only complements lean practices but also acts as a strategic enabler for achieving and sustaining operational excellence in constrained and competitive environments (Soltan & Mostafa, 2015). So, researchers formulated the second hypothesis, which follows:

H2: Business agility significantly influences the operational excellence of Small-scale FPUs

The relationship between lean practices and operational excellence is strongly supported by empirical studies. Lean manufacturing practices have an important role in improving operational outcomes, together with cost efficiency, quality, flexibility, and delivery performance (Chiarini &, 2021). (Haszainul et al., 2024) initiate that these lean practices positively influence operational excellence and are further supported by the formation of a lean culture that highlights continuous improvement and respect for people. These findings validate that lean practices not only reduce waste but also enhance internal capabilities vital for small-scale FPUs functioning under

resource constraints. Likewise, (A. R. Ibrahim et al., 2020) exhibited a significant correlation between lean production principles and operational performance crossways Malaysian building firms, further confirming the transferability of lean benefits across industries. These understandings highlight that lean adoption improves productivity and resource utilization, making it a crucial enabler of operational excellence in small-scale, resource-limited environments. In this context, researchers framed the following hypothesis:

H3: Lean practices significantly influence the operational excellence of Small-scale FPUs

Furthermore, researchers also proposed the following hypothesis:

H4: *Organizational size significantly influences the lean practices*

H5: Lean Practices mediate the relationship between business agility and operational excellence.

H6: Lean Practices mediate the relationship between organizational size and operational excellence.

4. METHODOLOGY

This study employs a descriptive and analytical research design, integrating both qualitative and contextual understanding and quantitative model testing to examine the dynamic relationship between business agility, lean practices, and operational excellence in small-scale food processing enterprises in Kerala. The dual approach allows the study to capture not only the structural patterns in the data but also the real-world realities that characterize this unique industrial segment.

4.1 Sampling and Data Collection

The target population includes small-scale food processing units registered with the Directorate of Industries and Commerce of Kerala. To ensure geographical representativeness and contextual diversity, a multi-stage random sampling method was employed. In the first stage, a comprehensive list of 2090 registered small enterprises across 14 districts was obtained. From which 519 small-scale food processing units were identified. To ensure distribution across northern, central, and southern Kerala, six districts were selected, two from each region, to ensure balanced representation; the selection considered variations in economic development, infrastructure availability, and local food processing traditions. From these districts, a final sample of 60 enterprises was identified based on random sampling and willingness to participate.

To gain managerial insights while maintaining reliability, data were collected directly from owners and senior managers, as they possess intimate knowledge of both strategic practices and operational realities. The primary data collection instrument was a structured interview schedule, designed to capture the implementation of dimensions of agility, lean practices, indicators of operational excellence, and relevant demographic details.

4.2 Analytical framework

To empirically test the proposed model and validate the hypothesized relationships, the study employed Partial Least Squares Structural Equation Modeling (PLS-SEM), a robust analytical technique suitable for exploratory studies involving complex constructs and smaller sample sizes (Hair et al., 2019). PLS-SEM allows for the simultaneous assessment of both the measurement model (reliability and validity of indicators) and the structural model (causal relationships among constructs).

The structural model incorporates the independent variable, business agility and organizational size, lean practices as a mediating variable, and the dependent variable is operational excellence.

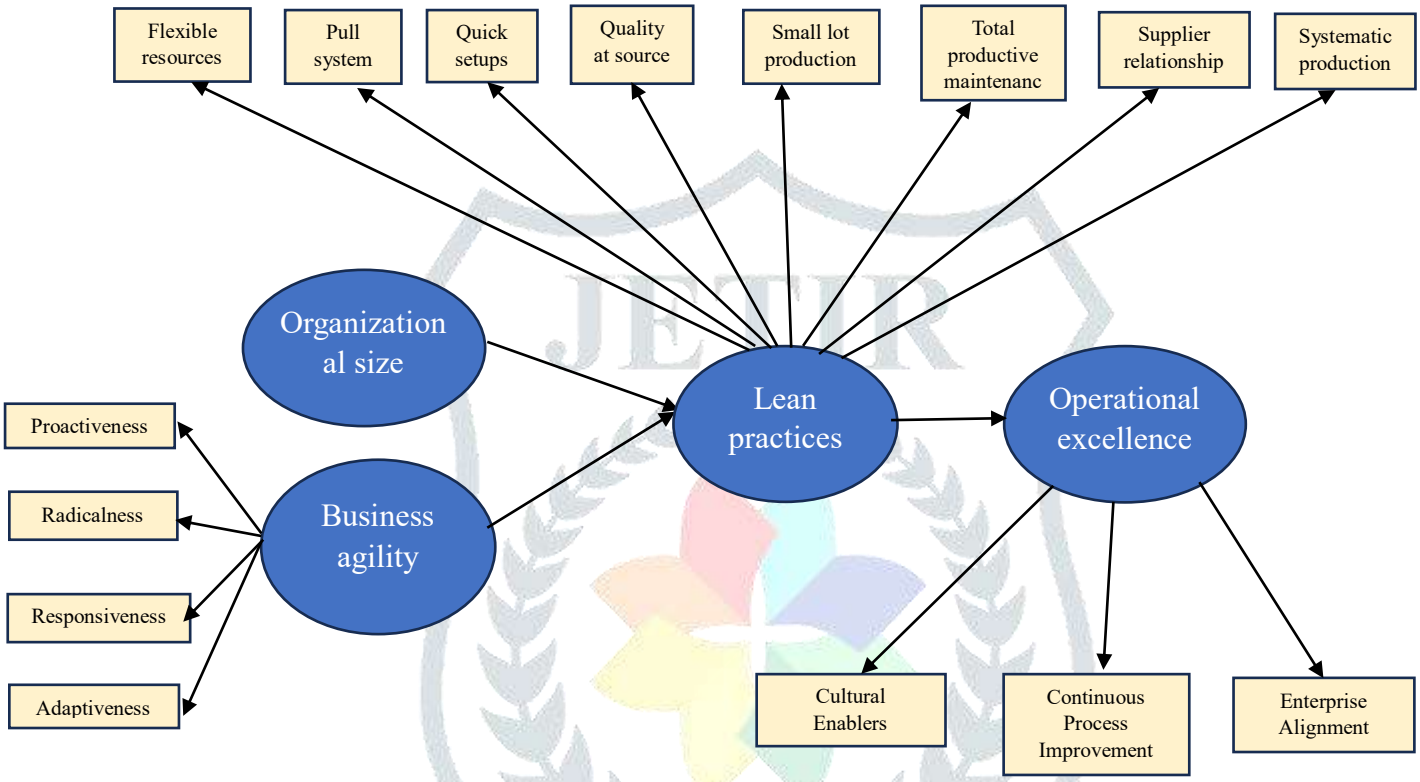

Figure 1. Research framework

5. RESULTS AND DISCUSSIONS

The results of this paper show the tables of descriptives like mean, standard deviation, and results of SEM. Which is detailed below:

Table 1

Demographic Profile and Descriptive Statistics

Demographic	Category	Frequency	Percent
Area	Rural Urban	25 35	42.0 58.0
Designation	Owner Manager	28 32	47.0 53.0
Ownership	Sole proprietorship Partnership Private limited company	16 17 27	27.0 28.0 45.0

Descriptive statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Number of employees	60	8	260	50.07	59.64
Years of experience	60	5	60	19.27	12.24

Source: Sample survey

The demographic analysis reveals that a larger proportion of respondents (58%) are from urban areas, while 42% represent rural regions, indicating that the study sample includes enterprises from diverse geographical contexts. In terms of designation, 53% are managers and 47% are owners, ensuring perspectives from both leadership and ownership levels.

Regarding ownership structure, the sample comprises a mix of business types. 45% of the sample are Private limited companies, followed by partnership firms (28%) and sole proprietorships (27%), suggesting that various forms of organizational ownership were represented in the sky. The number of employees in the surveyed enterprises ranges from 8 to 260, with an average of 50.07 employees and a standard deviation of 59.64, indicating substantial differences in workforce size across the sample. Similarly, years of business experience range from 5 to 60 years, with an average of 19.27 years and a standard deviation of 12.24, reflecting a wide distribution of experience levels among the enterprises.

Table 2

Construct-wise Descriptive Statistics

Item	Mean	SD
Business Agility		
Proactiveness	3.75	.780
Radicalness	3.01	.976
Responsiveness:	4.32	.621
Adaptiveness	3.35	.983
Operational Excellence		
Cultural Enablers	4.40	.310
Continuous Process Improvement	4.06	.488
Enterprise Alignment	4.02	.587
Lean Practices		
Flexible resources	4.28	.509
Pull system	2.72	.417
Small lot production	3.86	.733
Quick setups	4.06	.495
Systematic production	3.28	.860
Quality at source	3.68	.438
Total productive maintenance	3.63	.776
Supplier relationships	3.31	.457

Source: Sample survey

The Construct-wise descriptive statistics provide insights into the respondents' perceptions of business agility, lean practices, and operational excellence. For business agility, the responsiveness dimension has the highest mean (mean=4.32, SD=0.621), indicating that organizations are perceived as highly responsive to market changes

and customer needs. Followed by proactiveness with a mean of 3.75 with a standard deviation of 0.780. Radicalness and adaptiveness recorded lower mean (M = 3.01 and M = 3.35, respectively), suggesting relatively moderate engagement in radical innovations and adaptive processes.

In the case of lean practices, the highest rated dimensions were flexible resources (M = 4.28, SD = 0.509) and Quick Setups (M = 4.06, SD = 0.495), suggesting that firms effectively ensure resource flexibility and minimize setup times. Small Lot Production (M = 3.86, SD = 0.733), Quality at Source (M = 3.68, SD = 0.438), and Total Productive Maintenance (M = 3.63, SD = 0.776) reflected moderate adoption. However, Pull System (M = 2.72, SD = 0.417), Systematic Production (M = 3.28, SD = 0.860), and Supplier Relationships (M = 3.31, SD = 0.457) were lower, suggesting that these lean dimensions are still underdeveloped in the study's enterprises.

For operational excellence, among its three dimensions, cultural enablers scored the highest mean (M = 4.40, SD = 0.310). Continues process improvement (M = 4.06, SD = 0.488) and Enterprise Alignment (M = 4.02, SD = 0.587) also demonstrated positive perceptions, indicating a focus on systematic process enhancements and aligning strategies with customer needs.

5.1 SMART PLS SEM RESULT

Insights from PLS-SEM present the empirical findings of the study examining the influence of Business Agility and organizational size on Operational Excellence, mediated by Lean Practices in small-scale food processing units in Kerala. The analysis was conducted using Partial Least Squares Structural Equation Modeling (PLS-SEM) via Smart PLS 4.0.

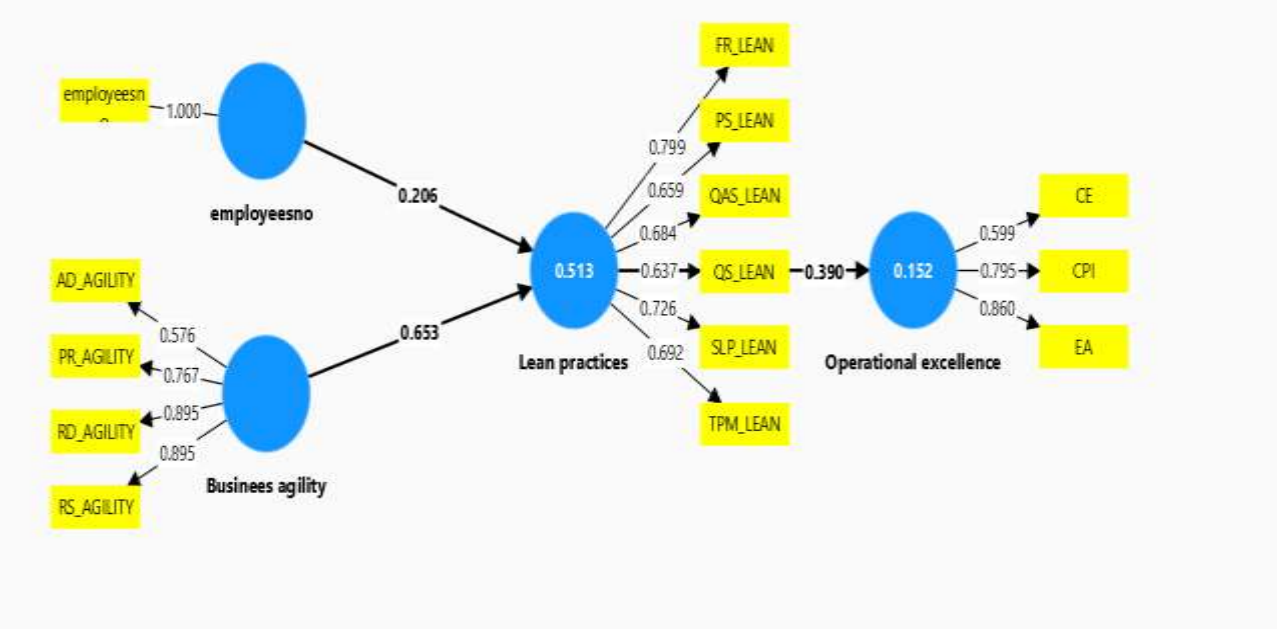

Figure 2. Evaluation of measurement and structural model using the PLS algorithm

Measurement Model Evaluation

Table 3

Construct Reliability and Validity

Construct	Cronbach's Alpha	Composite Reliability (rho_a)	AVE
Business agility	**0.795**	**0.850**	**0.630**
Lean practices	**0.797**	**0.810**	**0.510**
Operational excellence	**0.666**	**0.702**	**0.577**

Source: Sample survey

The measurement model demonstrates satisfactory reliability and validity across the constructs. As shown in Table 3, business agility exhibits strong internal consistency, with Cronbach's Alpha (0.795), Rho_A (0.850), and an AVE of 0.630, exceeding recommended thresholds ($\alpha > 0.7$, AVE > 0.5). Lean practices, though reliable (α = 0.797, Rho_A = 0.810), present a slightly low AVE (0.492), suggesting marginal convergent validity. Operational excellence, with an Alpha of 0.666 and AVE of 0.577, meets acceptable reliability and validity criteria. Initially, the lean practices construct included eight dimensions as identified from prior literature (Panigrahi et al., 2023)

During the model refinement process using PLS SEM, 2 dimensions of lean practices (SP and SR) with low loadings and weak contributions to Average Variance Extracted (AVE) were removed. This refinement enhanced the AVE of the lean practices construct. The final model retained 6 dimensions, ensuring construct reliability and validity.

Table 4

Discriminant Validity

Construct	Business agility	Lean practices	Operational excellence	Organizational size
Business agility	-			
Lean practices	0.796	-		
Operational excellence	0.504	0.476	-	
Employees no	0.182	0.300	0.202	-

Source: Sample survey

Discriminant validity assessed using the HTMT criterion is confirmed as all correlations remain well below the 0.85 benchmark (Hair et al., 2019). This indicates that the constructs are empirically distinct.

Table 5

Collinearity Statistics

AD_AGILITY	1.264
CE	1.502
CPI	1.189
EA	1.696
FR_LEAN	2.113
PR_AGILITY	1.760
PS_LEAN	1.559
QAS_LEAN	1.687
QS_LEAN	1.510
RD_AGILITY	2.488
RS_AGILITY	2.365
SLP_LEAN	1.917
TPM_LEAN	1.348
Organization size	1.000

Source: Sample survey

All VIF values are below the commonly recommended threshold of 5, indicating the absence of multicollinearity among the reflective indicators.

5.1.1 Structural Model Evaluation

Table 6

Coefficient of Determination (R^2 Values)

Construct	R^2	R^2 Adjusted
Lean practices	0.513	0.496
Operational excellence	0.152	0.137

Source: Sample survey

Table 7

Effect Size (f^2 Values)

Predictor → Outcome	f^2
Business agility → Lean practices	0.850
Lean practices → Operational excellence	0.179
Organizational size → Lean practices	0.085

Source: Sample survey

The coefficient of determination (R^2) values indicate that the structural model explains a moderate proportion of variance in lean practices ($R^2 = 0.513$), suggesting substantial explanatory power. In contrast, the explained variance for operational excellence ($R^2 = 0.152$)

It is relatively low, reflecting weak to moderate predictive power, which is acceptable in exploratory research but indicates the potential for improvement by incorporating additional variables.

The effect size (f^2) analysis further clarifies the practical relevance of the predictors. Business agility demonstrates a large effect ($f^2 = 0.850$) on lean practices, highlighting its critical role in fostering lean initiatives. Lean practices, in turn, exert a moderate effect ($f^2 = 0.179$) on operational excellence, underlying its mediation function. Additionally, the organizational size has a small yet meaningful effect ($f^2 = 0.085$) on lean practices, suggesting that organizational size modestly contributes to the adoption of lean practices.

5.1.2 Bootstrapping result of SMART PLS SEM

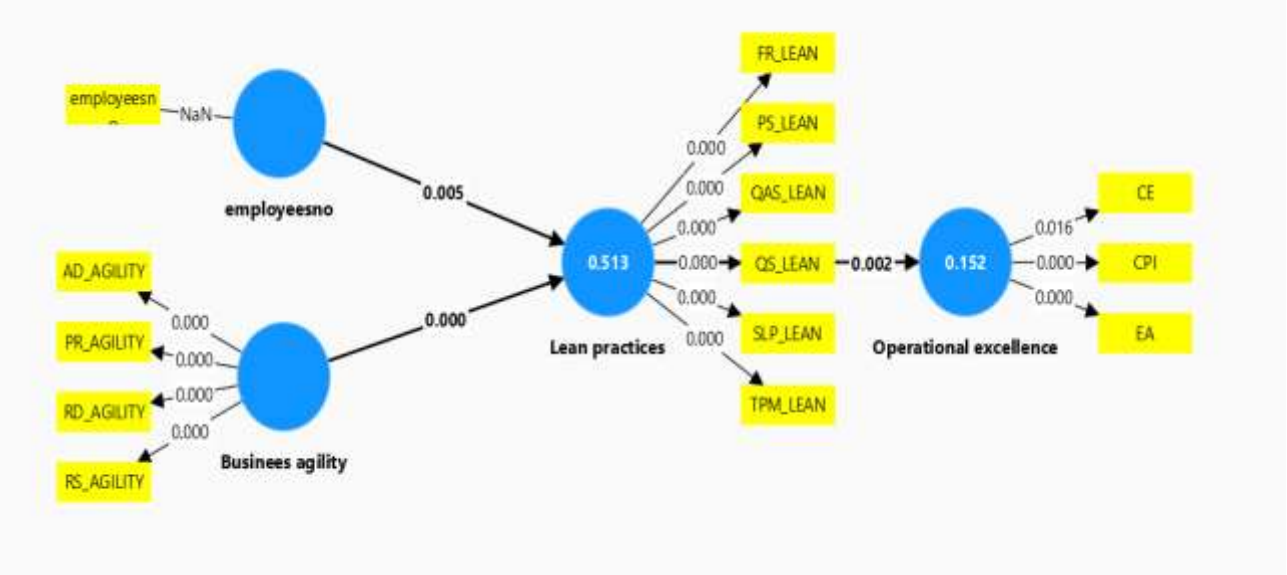

Figure 3. Evaluation of measurement and structural model using the PLS algorithm

Table 8

Path coefficients (Direct effects)

Hypothesis	Original Sample (β)	t-value	p-value	Significance
Business Agility → Lean Practices	0.653	10.019	0.000	Significant
Lean Practices → Operational Excellence	0.390	3.105	0.002	Significant
Employees Number → Lean Practices	0.206	2.807	0.005	Significant

Source: Sample survey

The path coefficient of business agility to lean practices is 0.653, with a t-value of 10.019 and p-value of 0.000, indicating a highly significant and strong positive effect. This suggests that higher levels of business agility substantially enhance the adoption of lean practices within the enterprise. The relationship between lean practices and operational excellence shows a positive and significant impact, with a path coefficient of 0.390, a t-value of 3.105, and a p-value of 0.002. This indicates that lean practices positively contribute to operational excellence. Interestingly, the number of employees demonstrates a significant positive influence on lean practices ($\beta = 0.206$, $t = 2.807$, $p = 0.005$). This implies that large employee strength may facilitate the implementation of lean practices, perhaps by providing a broader workforce for process improvements.

Table 9

Specific Indirect Effects

Hypothesis	Original Sample (β)	t-value	p-value	Significance
Business Agility → Lean Practices → Operational Excellence	0.254	2.913	0.004	Significant
Employees Number → Lean Practices → Operational Excellence	0.080	2.175	0.030	Significant

The analysis of specific indirect effects highlights the crucial mediating role of lean practices in enhancing operational excellence. Specifically, business agility exerts a significant indirect influence on operational excellence through lean practices ($\beta = 0.254$, $t = 2.913$, $p = 0.004$). This suggests that agile business capabilities facilitate the adoption of lean practices, which in turn drive improvements in operational excellence. Likewise, the organizational size also demonstrates a significant indirect effect on operational excellence via lean practices ($\beta = 0.080$, $t = 2.175$, $p = 0.030$). These findings imply that as employee strength increases, it positively contributes to the adoption of lean practices, ultimately fostering operational excellence. Collectively, these results emphasize that lean practices act as a key mechanism through which both business agility and workforce size translate into superior operational performance.

6. CONCLUSION

The study emphasizes the role of business agility and lean practices in achieving operational excellence within Kerala's small-scale food processing enterprises. Conceptualized as a dynamic organizational capability, agility empowers firms to proactively sense, adapt to, and respond to changing market conditions. Specifically, the dimensions of proactiveness, radicalness, responsiveness, and adaptiveness enable an organization to anticipate market needs, proactively engage with innovations, swiftly respond to customer demands, and realign processes with evolving industry standards.

However, the findings reveal that business agility alone is insufficient to deliver operational excellence. Its influence becomes truly effective when channelled through lean practices, which translate agile capabilities into

operational performance. Lean practices are a systematic approach to waste elimination and value maximisation, serving as the operational platform where agility manifests as measurable results. Through lean practices such as flexible resources, pull systems, small-lot production, quick setups, systematic production, quality at source, and total productive maintenance, firms optimize resources, improve process stability, and maintain a continuous flow of value-added activities. Operational excellence as an outcome is not limited to process efficiency but reflects a broader organizational success. The dimensions of operational excellence signify that excellence is both operational and cultural, requiring alignment between people, processes, and strategic goals.

Another significant insight from the study is the role of employee strength. Employee strength has a limited direct impact on operational excellence, but it indirectly influences operational outcomes through lean practices. This indicates that a capable workforce is essential to support the adoption of lean initiatives in small enterprises. Overall, the findings affirm that business agility and lean practices are the key drivers of operational excellence. Agility enhances firms with strategic foresight and adaptability, whereas lean practices ensure that these capabilities are translated into efficient and value-driven operations. The synergy between these factors fosters stronger operational outcomes, builds greater organizational resilience and sustainable competitiveness, especially vital for small enterprises navigating resource constraints and market uncertainties.

7. IMPLICATIONS OF THE STUDY

The findings of the study offer valuable practical and theoretical insights for small-scale enterprises, policymakers, and researchers. In the context of small food processing enterprises in Kerala, the results highlight the importance of pursuing a balanced strategy that integrates both business agility and lean practices. Agility equips organizations with the ability to anticipate market changes and respond to dynamic market conditions, while the application of lean practices translates this flexibility into tangible operational improvements. Therefore, managers should focus on fostering a work environment that encourages proactiveness, responsiveness, and adaptability, while simultaneously embedding lean practices such as flexible resource management, pull-based production, quick setups, and quality-focused processes. This synergistic strategy can help streamline operations, reduce waste, and ultimately enhance productivity.

Furthermore, the findings underscore the supportive role of workflow strength, indicating that employee involvement plays a crucial role in sustaining lean practices. Small enterprises should engage their workforce in continuous improvement efforts, training them to adopt lean practices and empowering them to contribute to operational goals.

The findings also hold important implications for policymakers and industry governing bodies, emphasizing the need to create enabling environments for small enterprises can flourish. Government agencies and industry associations can play a critical role by offering training programs, capacity-building workshops, and lean agility frameworks tailored to the needs of small businesses. moreover, encouraging lean adoption through financial incentives or knowledge-sharing platforms will further strengthen the sector's competitiveness.

From the theoretical perspective, this study enriches the existing literature by confirming that lean practices serve as a critical mediator between business agility and operational excellence. It affirms that achieving excellence is

not solely about strategic foresight but also about disciplined execution through process improvement and organizational alignment. By integrating these constructs, the study extends our understanding of how the effective integration of agility and lean practices can transform small enterprises into resilient, high-performing enterprises.

8. FUTURE RESEARCH DIRECTIONS

While this study provides valuable insights, certain limitations open pathways for future research. Firstly, as a cross-sectional study, it captures relationships at a single point in time. Future research should adopt longitudinal approaches to explore how business agility and lean practices influence operational excellence across different periods.

Secondly, the study focused only on small-scale food processing enterprises in Kerala, which may constrain the generalizability of its findings. Extending the research to other sectors or industries would help validate the model across broader contexts.

Additionally, the current model does not consider factors like leadership, technological capabilities, or innovation culture, which could further shape operational outcomes. Integrating these factors in future models may offer deeper insights.

Finally, the current model demonstrated only a moderate explanatory power for operational excellence, suggesting that other unexplored factors contribute to operational excellence. Future research should consider incorporating external variables such as market dynamics or policy changes. Qualitative research, like case studies, will also enrich the understanding by revealing practical challenges and success factors.

In summary, future research should aim to refine and expand the present model by incorporating additional variables, exploring different industries, and adopting longitudinal and qualitative methods. Such a comprehensive exploration will contribute to a deeper understanding of how small enterprises can sustain excellence in an increasingly dynamic and uncertain business environment.

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