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Is Past Performance a Guarantee for Current Results? The Influence of Learning on Business Performance in Manufacturing

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Abstract

Purpose – This paper investigates the relationship between past performance and the development of operational capabilities in manufacturing firms, focusing on the role of intra- and inter-organisational learning mechanisms.

Design/methodology/approach – This study is based on a survey database collected in 208 manufacturing plants in 15 countries from three industries: electronics, machinery, and transport components. We developed a model and tested our hypotheses using the structural equation modelling technique with two-stage analytical procedures.

Findings – In the analysis of the overall sample, our findings support prior literature by suggesting that firms with successful experiences may become complacent and less motivated to engage in learning, leading to a decline in performance. However, high-performance firms overcome the "success trap" by engaging supply chain partners. In contrast, low-performance firms exhibit limited learning from past poor performance, leading to organisational inertia and further declines in their current performance.

Originality – This study focuses on the little-researched topic of how past performance influences the development of operational capabilities in manufacturing firms. We highlight the path for developing capabilities in high and low-performance firms based on intra- and inter-organisational learning mechanisms.

Practical implications – This research provides practical guidance for managers in developing operational capabilities, highlighting collaboration with suppliers as an essential element for high-performance firms.

Keywords Past performance; Organisational learning; Intra-organisational learning; Inter-organisational learning; Operational capabilities; Business performance.

Paper type Research Paper

Quick Value Overview

Interesting because – This paper delves into a critical question: does past performance guarantee current results for manufacturing firms? What sets this study apart is its focus on the role of intra- and inter-organisational learning mechanisms in shaping the relationship between past performance and operational capabilities. Unlike previous research, which often assumes a linear relationship between past success and present success, this study investigates the complexities involved, such as the "success trap" and the influence of supply chain partners on high-performance firms.

Theoretical value – Academics and researchers will find this study significant for its inquiry into a less-studied aspect of business performance. By extending the concept of the "success trap" and examining how high and low-performance firms develop operational capabilities through learning mechanisms, this paper challenges the current knowledge regarding the dynamics of past performance in manufacturing firms.

Practical value – Practitioners will find guidance in this research for enhancing their manufacturing firms' operational capabilities. The study emphasizes the critical role of collaboration with suppliers as a key element for high-performance firms. Managers can use these insights to shape their strategies and foster a culture of continuous learning within their organisations. For those facing the challenges of low performance, understanding the pitfalls of limited learning from past poor performance is essential in breaking the cycle of decline.

1. Introduction

Past business performance is a valuable source of learning for capable firms, guiding present and future actions (Argote and Hora, 2017; Uhrin *et al.*, 2020). Learning from past performance can lead firms to accommodate resources more efficiently and to create new operational capabilities in rapidly changing environments (Abdelaziz *et al.*, 2023; Aslam *et al.*, 2020; Backstrand and Powell, 2021; Tortorella *et al.*, 2020). *Operational capabilities* refer to a *"firm's actual, or 'realised', competitive strengths relative to primary competitors in its target markets, which differs from its competitive priorities, or planned, or 'intended' strengths*" (Rosenzweig and Roth, 2004, p. 354). Learning can facilitate firms' ability to seize opportunities and develop capabilities (Teece, 2007; Slack and Lewis, 2001; Sansone *et al.*, 2020).

High-performing firms may reinforce past successful strategies. However, they may also fall into a "success trap" (Wang *et al.*, 2015): firms that rely on past success may experience a decline in performance (Audia *et al.*, 2000; Liang *et al.*, 2022; Wang *et al.*, 2015). Being too persistent and complacent can make it difficult for firms to adapt and innovate when circumstances change. Low-performing firms, in contrast, are more likely to embrace and learn from environmental changes, seeking new solutions more actively (Junni *et al.*, 2013). In addition, intra- and inter-organisational learning mechanisms may play a crucial role in firms' capabilities development.

Previous studies indicate that capabilities development is associated with intra- or inter-organisational learning mechanisms (Abdelaziz *et al.*, 2023; Al-Khatib *et al.*, 2023; Aslam *et al.*, 2020; Backstrand and Powell, 2021; Tortorella *et al.*, 2020). Internally, firms must transform past experiences and failures into new solutions to overcome future threats (Grenzfurtner and Gronalt, 2021), establishing intra-organisational learning processes such as continuous improvement. Externally, firms need better alignment between end-customer and suppliers' requirements, aiming at inter-organisational learning processes such as supply chain alignment. Such an alignment integrates processes and establishes common performance priorities in the supply chain (Skipworth *et al.*, 2015). Intra- and inter-organisational learning mechanisms are dealt with separately in the manufacturing literature (Argote and Ophir, 2017).

Differently, this study purports that associating intra- and inter-organisational mechanisms can lead to a better understanding of how operational capabilities develop over time. Hence, the present study addressed this research gap with the following questions: (*RQ1) What is the influence of intra- and inter-organisational learning on the development of operational capabilities? (RQ2)*

Do firms with higher and lower performance deploy their operational capabilities differently? This study analyses the relationship between past performance and the development of operational capabilities in manufacturing firms, focusing on the role of intra- and inter-organisational learning mechanisms. It also explores the impact of current performance on these relationships.

To this end, a structural equation modelling technique with two-stage analytical procedures was employed based on a survey database. The database consists of answers from 330 respondents from 208 manufacturing plants in the electronics, machinery, and transport components industries located in 15 different countries. A six-construct model was used to test our research hypotheses, as described in the following section.

This study contributes to the manufacturing literature by investigating how manufacturing firms learn from past experiences. It also offers insights into the impact of past performance on firms' operational capabilities. This study supports findings from previous literature: as mentioned, firms that have experienced past success may become complacent and less motivated to engage in learning, potentially leading to a drop in performance. However, our findings underscore that high-performance firms may overcome the 'success trap' by engaging supply chain partners. In contrast, low-performance firms exhibit limited learning from past poor performance, leading to organisational inertia and further declines in current performance. These insights provide valuable implications for understanding how organisations learn and evolve.

2. Theoretical Framework

2.1 Learning from past performance

Previous research has highlighted the positive impact of manufacturing initiatives on performance, such as just-in-time and total quality management (Dieste *et al.*, 2021; Haq *et al.*, 2023; Hsu *et al.*, 2023). While these studies have primarily focused on improvements in operational performance (Al-Khatib *et al.*, 2023; Fullerton *et al.*, 2014; Uhrin *et al.*, 2020), business performance should also be taken into account as a more comprehensive indicator of a firm's overall economic performance (Galeazzo and Furlan, 2018). Financial measures, as an integral part of the conventional accounting system (Abdel-Maksoud *et al.*, 2005), are commonly used by firms to demonstrate their ability to generate value over time. Thus, past business performance can serve as a valuable source of learning for capable firms, guiding present and future actions (Argote and

Hora, 2017). In this study, we operationalise past performance as a business performance from 2 years ago based on the sales value of production and gross margin.

Firms rely on learning from past performance to adapt their organisational activities, mainly when their performance is worse than expected. Learning is essential to firms' ability to seize opportunities and develop capabilities (Teece, 2007). Although learning can promote a search for new solutions and ideas, leading firms to develop capabilities over time (March, 1991), it can also result in firms maintaining their current practices and routines with minimal changes. While high-performance firms may reinforce past successful strategies, such a strategy may lead to a "success trap" (Wang *et al.*, 2015). The implication is that firms become complacent regarding their past achievements, constraining their ability to adapt and innovate in response to changing circumstances.

The concept of 'success trap' suggests that firms that have experienced past success tend to exhibit strategic persistence, which may lead to a decline in performance (Audia *et al.*, 2000; Liang *et al.*, 2022; Wang *et al.*, 2015). Conversely, low-performance firms are more likely to search for new solutions actively. In other words, organisational inertia leads firms to employ existing capabilities that were successful in the past while avoiding adapting to further changes. For example, employees in these firms may prefer to maintain familiar routines and practices that have proven successful rather than taking risks by experimenting with entirely new approaches. However, higher past performance may not be a predetermination of success traps. Instead, it may be a precondition for it (Wang *et al.*, 2015). Firms that embrace and actively learn from environmental changes can avoid organisational inertia and the success trap (Junni *et al.*, 2013).

2.2 Intra- and inter-organisational learning

The manufacturing literature highlights the connection between learning and improvements in operational capabilities (e.g., cost, quality, delivery, and flexibility) (Abdelaziz *et al.*, 2023; Aslam *et al.*, 2020; Backstrand and Powell, 2021; Tortorella *et al.*, 2020), which positively impact business performance (Rebelo and Gomes, 2011). Learning organisations inspire individuals to create, retain, and transfer knowledge within and beyond organisational boundaries (Abdelaziz *et al.*, 2023). *Organisational learning* is "*the development of insights, knowledge, and associations between past actions, the effectiveness of those actions, and future actions*" (Fiol and Lyles, 1985,

p. 19). Knowledge serves as the output of the learning process (Argote and Hora, 2017), acquired through intra- or inter-organisational learning mechanisms.

Intra-organisational learning refers to *learning within an organisation (e.g., groups, departments, divisions, and individuals). Such learning comes from a firm's own experiences or the experiences of other units* (Argote and Ophir, 2017). For example, Tortorella *et al.* (2020) found that learning within organisations reinforced total quality management practices, significantly impacting operational performance. In our study, we operationalise firms' ability of intra-organisational learning as continuous improvement. *In continuous improvement, firms learn from failures and develop solutions to overcome future occurrences* (Grenzfurtner and Gronalt, 2021).

On the other hand, *inter-organisational learning* refers to all *learning obtained beyond the firm's walls* (Argote and Ophir, 2017). Capable firms learn from changes in their company environment, transforming learning into organisational knowledge. Manufacturing researchers have argued that inter-organisational learning often arises from collaborations among supply chain partners (Abdelaziz *et al.*, 2023; Aslam *et al.*, 2020; Backstrand and Powell, 2021). For example, Abdelaziz *et al.* (2023) suggest that learning within supply chains is a capability that enables firms to innovate in products and processes. Our study operationalizes inter-organisational learning as supply chain alignment, measured by customer and supplier alignment. *Supply chain alignment* i*ntegrates objectives, structures, and processes through different functions and members in supply chains*, ultimately leading to improved performance for all involved members (Skipworth *et al.*, 2015).

In sum, both intra- and inter-organisational learning are crucial for firms to develop new approaches based on shared experiences and adapt their resources to environmental changes (Singh and Rao, 2016; Tamayo-Torres *et al.*, 2016; Tortorella *et al.*, 2020). These forms of learning play a significant role in capabilities development (Abdelaziz *et al.*, 2023; Aslam *et al.*, 2020; Backstrand and Powell, 2021). This study argues that organisational learning is the foundation for supporting the development of operational capabilities.

2.3 Operational capability

The manufacturing literature has introduced operational capabilities as a crucial concept (Sansone *et al.*, 2020; Slack and Lewis, 2001; Wu *et al.*, 2010). Operational capabilities represent a firm's specific abilities as shaped by the firm's historical development. Capabilities development involves supply chain learning (Abdelaziz *et al.*, 2023; Cheng *et al.*, 2021; Gelei and Kenesei, 2022). Rather than relying solely on internal learning, the current literature emphasizes the importance of an external search for complementary resources to overcome internal limitations (Abdelaziz *et al.*, 2023; Cheng *et al.*, 2021). Operational capabilities can be developed by effectively engaging internal and external resources within supply chain networks (Cheng *et al.*, 2021), transforming them into organisational knowledge.

Forming operational capabilities requires collaborative efforts between internal and external actors to develop firms' routines and resources (Abdelaziz *et al.*, 2023). To develop these capabilities, firms need to explore new and existing sources of knowledge (Wang *et al.*, 2015). For example, Tamayo-Torres *et al.* (2015) suggest that processes contribute to enhanced capabilities, which can be measured in quality, speed, flexibility, and costs. Similarly, Powell and Coughlan (2020) propose that firms and their partners can strengthen capabilities and achieve higher performance levels by cultivating a learning-to-learn capability within their supply chain networks during lean transformation. These authors argue that capabilities development is a cumulative process involving individuals, intra-organisational teams, and inter-organisational networks, as presented in Figure 1.

Insert Figure 1 here.

Prior studies have referred to capabilities regarding cost reductions, on-time delivery, quality, and flexibility (Flaeschner *et al.*, 2020; Slack and Lewis, 2001). Due to the intangible nature of operational capabilities (Wu *et al.*, 2010), some manufacturing studies have utilized different variables (Sansone *et al.*, 2020). In our research, we adopted the definition of operational capabilities grounded in influential manufacturing papers, focusing on cost, quality, delivery, and flexibility. The cost dimension encompassed the initiatives to achieve "the lowest possible production, raw material, and labour costs" (Sansone *et al.*, 2020, p. 4). The second dimension, quality, reflects firms' ability to provide reliable products. The third dimension, delivery, measures how a firm can provide fast delivery products to customers. Lastly, flexibility allows firms to adjust their production to abnormal circumstances with little impact on their operations. Thus, we operationalise operational capabilities based on cost, quality, delivery, and flexibility.

2.4 Hypothesis development

The existing manufacturing literature has acknowledged the significance of learning in operational capabilities development (Abdelaziz *et al.*, 2023; Aslam *et al.*, 2020; Backstrand and Powell, 2021; Tortorella *et al.*, 2020). Learning can occur within intra- and inter-organisational boundaries, which involve interaction between organisational groups, departments, suppliers, and customers. While previous studies have examined intra- and inter-organisational learning separately (Abdelaziz *et al.*, 2023; Tortorella *et al.*, 2020), how these mechanisms collectively interact and contribute to capabilities development remains unclear. Furthermore, learning can generate different outcomes based on firms' experience in prior endeavours (Wang *et al.*, 2015), suggesting that past performance can influence a firm's tendency to maintain or adapt its routines, practices, and capabilities.

Prior literature also suggests that firms with poor past performance are more likely to adapt their practices and routines to the changing environment (March, 1991; Wang *et al.*, 2015), leading to improvements in their capabilities over time through enhanced intra- and inter-organisational learning. In contrast, high-performance firms may exhibit greater confidence in their existing capabilities, which have proven successful. We hypothesise that firms with lower past performance engage more actively in learning, which improves intra- (continuous improvement) and inter-organisational learning (suppliers and customers alignment). Thus, we established the following hypotheses:

H1a – The lower the past business performance, the higher the continuous improvement.

H1b – The lower the past business performance, the higher the customer alignment.

H1c – The lower the past business performance, the higher the supplier alignment.

To overcome the challenges of lower past performance, firms must strengthen intra- and inter-organisational learning mechanisms to develop their operational capabilities. Within the organisational boundaries, continuous improvement efforts have positively impacted a firm's business performance (Backstrand and Powell, 2021; Grenzfurtner and Gronalt, 2021). Moreover, supply chain partners are essential in enhancing firms' business performance and capabilities development (Abdelaziz *et al.*, 2023; Aslam *et al.*, 2020; Backstrand and Powell, 2021). This alignment with supply chain partners can lead to the development of a broader set of capabilities by creating a "learning-to-learn" capability (Powell and Coughlan, 2020), which improves quality (Prim *et al.*, 2021), innovation (Kumar *et al.*, 2020), and business performance. Externally, to meet customers' requirements, firms need to increase the level of integration and collaboration with their suppliers (Skipworth *et al.*, 2015). This increased integration allows firms to access the necessary resources from their partners, enabling them to respond to customers' demands effectively (Kumar *et al.*, 2020). Thus, firms prioritizing continuous improvement efforts are more likely to achieve greater alignment within their supply chain, as measured by customer and supplier alignment. This alignment fosters collaboration and integration among customers and suppliers, leading to enhanced capabilities within the supply chain. We therefore propose the following hypotheses:

H2a – The greater the continuous improvement, the greater the customer alignment.

H2b – The greater the continuous improvement, the greater the supplier alignment.

H2c – The greater the customer alignment, the greater the supplier alignment.

Based on the understanding that a firm's capabilities stem from its engagement in both intra- and inter-organisational learning mechanisms (Raddats *et al.*, 2017; Yang *et al.*, 2019), we propose that significant continuous improvement and supply chain alignment play crucial roles in the development of operational capabilities. The alignment among suppliers and customers empowers firms to enhance their learning capabilities in rapidly changing environments (Singh and Rao, 2016), enabling them to access complementary information, knowledge, and resources from their partners (Kumar *et al.*, 2020; Prim *et al.*, 2021; Yang *et al.*, 2019). We hypothesize that greater levels of continuous improvement and supply chain alignment, as measured by customer and supplier alignments, are associated with the development of higher operational capabilities. Therefore, we propose the following hypotheses:

H3a – The greater the customer alignment, the greater the operational capabilities.

H3b – The greater the continuous improvement, the greater the operational capabilities.

H3c – The greater the supplier alignment, the greater the operational capabilities.

The development of operational capabilities is significantly influenced by a firm's past endeavours (Flaeschner *et al*., 2020; Powell and Coughlan, 2020; Raddats *et al*., 2017; Tamayo-Torres *et al*., 2015). Firms that have performed well may adhere to established procedures and practices tested and proven effective (March, 1991; Wang *et al.*, 2015). However, these firms may face a "success trap" wherein high-performance firms become overly reliant on their past successes and are less inclined to explore new and untested routines. As a result, such firms may continue to pursue existing strategies even as the business environment rapidly changes, leading to potentially diminished outcomes. We hypothesise that low-performance firms are more inclined to learn from their experiences when compared to high-performance firms. Both intra-organisational aspects, such as continuous improvement efforts, and inter-organisational factors, such as alignment with customers and suppliers, drive this learning. Thus, we established the following hypothesis:

H4a – The better the past business performance, the worse the continuous improvement and customer and supplier alignment of low-performance firms.

H4b – The worse the past business performance, the better the continuous improvement and customer and supplier alignment of high-performance firms.

Our framework analyses the process of developing operational capabilities by considering intra- and inter-organisational learning mechanisms. We propose that past performance catalyzes new managerial actions, as managers can draw lessons from previous experiences and implement action plans internally with customers and suppliers. These action plans represent a response to the learning process, which can be facilitated by either intra- or inter-organisational mechanisms. When these actions align with business strategy, they contribute to the development of operational capabilities. Figure 2 presents the constructs and relationships from the literature review and the hypotheses of this study.

Insert Figure 2 here.

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3. Research Methods

3.1 Sample and data collection

This study employed a database from the fourth round of the High-Performance Manufacturing Project (Schroeder and Flynn, 2001), using data from a survey of firms in three industries: electronics, machinery, and transport components. The data include 330 respondents from fifteen countries: Brazil, China, Finland, Germany, Israel, Italy, Japan, South Korea, Spain, Sweden, Switzerland, Taiwan, United Kingdom, United States, and Vietnam. These countries were selected because of their global representation and distinct characteristics – economic development, institutional, cultural, and industrial policies. Data were collected from multiple respondents: plant supervisors, plant managers, upstream supply chain managers, downstream supply chain managers, and account managers.

3.2 Measures

The survey design was supported by validated scales based on previous literature (Agostini and Filippini, 2019). Six latent variables and twenty-three items were used to reproduce the analytical framework (see measurement items in Appendix). As the first step in data analysis, we checked missing values (up to 20.63% of the 330 respondents). These missing values were mainly perceived in the current business performance items. Since these values were fundamental to our analysis, we removed incomplete responses, which resulted in 208 respondents. We proceeded with mean replacement in these remaining missing values in line with the most appropriate treatment (Hair Jr. *et al.*, 2014).

Six constructs were used to operationalise this study: continuous improvement (Agostini and Filippini, 2019), customer alignment (Min *et al.*, 2007), supplier alignment, operational capabilities (Wu *et al.,* 2010), past business performance, and business performance (current). Continuous improvement measures the propensity of firms to learn and improve their products and processes continually (Agostini and Filippini, 2019). Customer and supplier alignments measure firms' predisposition to interact with external players collaboratively (Min *et al.*, 2007). Operational capability measures the ability of firms to perform their manufacturing tasks adequately (Wu *et al.*, 2010). Past business performance measures firms' performance two years previously, such as sales volume and gross profit. Current business performance measures the same indicators but considers the latest period.

While most constructs were measured using a 5-point Likert scale, current and past business performance used continuous scales. Since current and past financial performance constructs are continuous scales, we converted these numbers to lower ones using a Log10 calculation to interpret the outputs correctly. We also included 'industry' as a control variable and 'country' as a measure to check invariance in the model – both are related to external validity.

3.3 Common method variance

We used procedural and statistical remedies regarding common method bias (MacKenzie and Podsakoff, 2012). First, we obtained data from five respondents for the dependent and independent variables (see Appendix). Second, we anonymized the personal identity of the respondents. Third, respondents answered self-administered questionnaires without any external influence. Fourth, Harman's one-factor revealed no emergence of a single factor with the variables used in this study, in which the first factor represented just 18.69% of the total variance. These results suggest no concern with common method bias in the study.

3.4 Analysis strategy

With the Amos software, we used a covariance-based structural equation modelling (CB-SEM) method to analyse measurement and structural models. The structural equation modelling (SEM) technique focuses on estimating a model with parameters and comparing the theoretical covariance matrix with the empirical covariance matrix observed by estimating maximum likelihood (ML) (Reinartz *et al.*, 2009). We chose the CB-SEM technique for its strong robustness for testing and confirming theories. The path analysis technique was adopted to satisfy the ratio of five respondents per parameter, as suggested by the literature (Hair Jr. *et al.*, 2014).

Regarding the data analysis, we followed the rigorous two-stage analytical procedures of SEM to analyse the data plus endogeneity concerns to reach a satisfactory model fit (Table 1).

When performing the data purification phase, we noticed some variance within the data. A critical step then was to explore the data in more detail, aiming to find additional information. From this point, we decided to split the sample into groups and run a multigroup analysis to identify nuances in our data – two groups were better regarding data distribution (Table 2). This decision led us to find compelling divergences in the data and move the analysis forward.

3.5 Descriptive statistics

There is a reasonable division of firms per industry coming from different countries. These plants belong to exemplary manufacturing firms with established operational activities and high-capacity utilisation. However, their operational activities are complex because the firms manufacture an extensive range of products. Furthermore, most of the plants are part of established multinational corporations with an average market share of more than 22% and annual revenues exceeding USD 2.5 billion. Supplementary materials show further details about the firms' profiles.

4. Findings

4.1 The measurement model and measure validation

Following the two-stage analytical procedures of SEM, we treated the measurement model (reliability and validity tests) and then the structural model to test the hypotheses of this study. Table 1a provides descriptive information about the latent variables, such as the mean, standard deviation, correlation, and square roots of AVE at the diagonal (data remaining after purification of the model).

Insert Table 1 here.

We initially ran the measurement model to refine the latent variables of this study. Standardised indicator loadings and p-values were used as criteria to remove items with low loadings. Previous literature suggests cut-off items with a standardised loading below the .70 rate to improve the structural model. Even so, factor loadings higher than .50 are accepted in the case of complex models (Hair Jr. *et al.,* 2014). We removed any standardised loading items with values lower than .50. We also removed the lowest items as supported by previous literature. We maintained at least three items per latent variable to exempt both past and current business performance constructs composed of two items. Three items were removed from the model, as presented in Appendix – measurement items.

The composite reliability of the remaining items was satisfactory, as shown by the convergent (see table headlines of Appendix) and discriminant validity tests (see bold numbers in the diagonal of Table Ia). First, the values of composite reliability range from 0.700 to 0.970 – higher than suggested by the literature (>0.7) (Nunnally and Bernstein, 1994). Second, Cronbach's alpha also indicates satisfactory data consistency in the data with higher values than suggested by the literature (>0.7), ranging from 0.680 to 0.969; the exception was the customer alignment construct (α=.680), which showed a slightly lower value than expected by the literature. This result suggests different managerial perceptions of alignment with customers as a management practice, which is not a concern since the composite reliability values were satisfactory, as shown above (Hair Jr. *et al.,* 2014). Third, convergent validity was measured for the average variance extracted (AVE), which ranged from 0.372 to 0.942. At the same time, continuous improvement (.414), customer alignment (.372), and supplier alignment (.402) were less than we expected (<0.5) (Fornell and Larcker, 1981). As mentioned above, these constructs may vary among managers regarding the managers' distinct strategic decisions related to capabilities and supply chain orientation. Methodologically, this is not a concern since other treatment procedures were satisfactory (Hair Jr. *et al.,* 2014). Third, discriminant validity suggests how much one construct differs from another, but this is not a concern in this study since Table 1a provides higher scores of the square root of AVE than the correlation of the latent variables (Hair Jr. *et al.,* 2014). Overall, these results suggest satisfactory internal data consistency.

In cross-country studies, it is essential to conduct a measurement invariance test to assess the consistency of measures between different countries. We performed a three-group invariance test – a sample from the Americas, Europe, and Asia. As suggested in previous literature (Steenkamp and Baumgartner, 1998), three forms of measurement invariance were assessed – configural, metric, and scalar (see Table Ib). First, the configural invariance form represents the baseline model without the adoption of any constraints; results suggest a good model fit (χ^2=16.545; p-value <0.05; CFI=0.988; RMSEA=0.072), which supports configural invariance. Second, we tested metric invariance by constraining factor loadings across groups; results also suggest a good model fit

(χ^2=28.944; p-value <0.05; CFI=0.980; RMSEA=0.055). These results did not change in the configural invariance form ($\Delta\chi^2$=12.399; p-value=0.716), indicating support for the metric invariance test. Third, we assessed the scalar invariance form by constraining paths between latent variables across groups; results also indicate a good model (χ^2= 63.247; p-value >0.05; CFI=0.980; RMSEA=0.039). Thus, these results did not change at the baseline ($\Delta\chi^2$=46.702; p-value=0.216), indicating support for the scalar invariance test. Therefore, since the results were satisfactory, no treatment was required in the model concerning invariance issues (Steenkamp and Baumgartner, 1998). We proceed with the data analysis of endogeneity and model fit issues.

4.2 Endogeneity treatment and model fit

Endogeneity treatment ensures consistency in estimating the parameters by assessing the cause-and-effect measures. As the error term is unobserved, it is impossible to eliminate endogeneity (Antonakis *et al.*, 2010). Therefore, to reduce measurement error, we follow the current literature to guide cause and effect in our model. Furthermore, as Antonakis *et al.* (2010) suggest, we adopted the Hausmann test to analyse the consistency of the estimators. The Hausmann test checks consistency in the model using random- to fixed-effect estimators. If there are significant differences between indirectly related estimators, the fixed effects must be retained to take unobserved errors.

We ran the endogeneity treatment in a set of procedures using the Amos software. First, we checked the chi-square of the model randomly; then, we tested the consistency of the parameters when introducing a covariance between direct relationship errors. When chi-square differences exceeded 3.84 between the random-effect model and the fixed model, covariance was retained (Cameron and Trivedi, 2005). Table 1b shows that the unique indirect relationship (2YBP to CAP) exceeded error terms, so covariance was maintained. According to Table 1c, the indices for the goodness-of-fit of the structural model are satisfactory and exceed the reference rates (Hair Jr. *et al.,* 2014). Therefore, we moved on to the hypothesis test, as shown in the next section.

4.3 Structural model and hypothesis testing

The results of the data analysis show that six out of 11 hypotheses are supported, and one is partially supported (Table 2). Results from the structural model indicate that past business performance (two years ago) is positively related to customer alignment (H1a, loading=.058, p-value=.390) and supplier alignment (H1c, loading=.048, p-value=.482). In contrast, past business performance is negatively associated with continuous improvement (H1b, loading= -.144, p-value=.037). Regarding the limited effect of past business performance on customer and supplier alignment, Hypotheses H1a and H1c were not statistically supported. In turn, we found support to confirm Hypothesis H1b, where past business performance appears negatively related to continuous improvement.

Insert Table 2 here.

The second block of hypotheses assesses the relationship between continuous improvement and supply chain alignment. Continuous improvement correlates positively with customer alignment (H2a, loading=.291, p-value<.001) but does not correlate with supplier alignment (H2c, loading=.022, p-value=.760). Moreover, customer alignment positively relates to supplier alignment (H2b, loading=.255, p-value<.001). Therefore, we found statistical support to confirm Hypotheses H2a and H2b.

The third block of hypotheses analyses the influence of supply chain alignment and continuous improvement on operational capabilities. We found a positive effect of customer alignment (H3a, loading=.148, p-value=.032), continuous improvement (H3b, loading=.192, p-value=.004) and supplier alignment (H3c, loading=.232, p-value<.001) on operational capabilities. Therefore, Hypotheses H3a, H3b, and H3c were supported. Finally, no significant difference emerged in the model when comparing industries (electronics, machinery, and transport components). The following subsection discusses the comparative analysis of low- and high-performance firms.

4.4 Multigroup analysis

In this step, we compared low and high business performers (current performance), which allows an understanding of the critical antecedents for capabilities development. To this end, we split the sample into two groups according to the current business performance variables: low- and high-performance firms. Table 3 visually presents the analysis.

Insert Table 3 here.

According to the results, low- and high-performance firms react differently regarding the development of operational capabilities. We found no statistical support to confirm that low-performance firms learn from past performance (H4a – The better the past business performance, the worse the continuous improvement and customer and supplier alignment of low-performance firms). Instead, results suggest that they follow their prior direction of continuous improvement to align with customers and then develop operational capabilities.

On the other hand, high-performance firms learn from past performances to align with customers and suppliers. Thus, better past performance is positively associated with customer and supplier alignment. Alignment with customers provides the 'fuel' needed for adjusting upstream processes to serve the customers' wishes. Continuous improvement and supplier alignment also appear to be directly related to the development of capabilities by better performers. Since these results provide partial support for Hypothesis H4b (The worse the past business performance, the better the continuous improvement and customer and supplier alignment of high-performance firms), our findings suggest that high-performance firms keep on learning when they achieve satisfactory results in the past.

5. Discussion

5.1 Findings

This research examined the relationship between past performance and the development of operational capabilities in manufacturing firms, focusing on the role of intra- and inter-organisational learning mechanisms. Additionally, we explored the impact of current performance on these relationships. Our findings in the analysis of the overall sample highlight that past performance significantly negatively impacts intra-organisational learning, specifically in continuous improvement. However, we did not find a significant impact of past performance on inter-organisational learning, measured by the supplier and customer alignment. This suggests that firms that have experienced success in the past may be less motivated to learn from their failures or invest effort in improving their internal processes. Additionally, these firms may be less determined to collaborate and learn from external partners within their supply chains. Thus, our findings support the existing literature (Audia *et al.*, 2000; Wang *et al.*, 2015) by showing that manufacturing firms fall into a success trap when they have employed successful strategies in the past, reinforcing these strategies in the present with minimal changes.

We also found that customer alignment is central in the interplay of intra- and inter-organisational learning mechanisms in supply chains. Customer alignment has a positive and significant impact on continuous improvement and supplier alignment, which suggests that suppliers are involved in the supply chain alignment according to customers' wishes. Because continuous improvement and supplier alignment are not correlated, suppliers may have a limited influence on firms' intra-organisational learning. The existing manufacturing literature advocates that intra- and inter-organisational learning are essential in operational capabilities development (Abdelaziz *et al.*, 2023; Aslam *et al.*, 2020; Backstrand and Powell, 2021), enabling firms to adapt their resources to environmental changes (Singh and Rao, 2016; Tamayo-Torres *et al.*, 2016; Tortorella *et al.*, 2020). Consequently, firms have room for learning from suppliers, not only with their customers.

Last, our findings suggest that intra- and inter-organisational learning mechanisms significantly impact the development of operational capabilities. Our findings support prior literature that points to the need for collaboration between firms and their supply chain when developing firms' routines and resources (Abdelaziz *et al.*, 2023). However, our findings also suggest that capabilities development diverges between low- and high-performance firms.

In analysing different levels of current business performance, we found that low- and high-performance firms have a different impact on past business performance in their intra- and inter-organisational learning mechanisms in developing capabilities. In contrast with prior literature that suggests firms enhance learning to overcome poor lower performance (Audia *et al.*, 2000; Wang *et al.*, 2015), we found no statistical support to confirm the association of lower past business performance with higher intra- and inter-organisational learning in low-performance firms. This finding implies that low-performance firms do not learn from poor experiences but keep employing existing practices and strategies. These firms also use continuous improvement and customer alignment to develop operational capabilities. Thus, low-performance firms adapt their internal learning to better cope with customers' requirements, identifying the best routes for providing products and services.

On the other hand, our results suggest a positive correlation between past business performance and inter-organisational learning (e.g., customer and supplier alignment) in higher-performance firms. These firms seem to learn from customers and suppliers, improving their supply chains to meet customers' requirements more efficiently. This finding differs from the literature on success trap (Audia *et al.*, 2000; Wang *et al.*, 2015) because high-performance firms seem to maintain superior performance over time. High-performance firms also enhance continuous improvement, customer alignment, and supplier alignment to develop their operational capabilities. Thus, high-performance firms develop capabilities by better aligning intra- and inter-organisational learning mechanisms.

5.2 Theoretical contributions

This study contributes to the manufacturing literature by improving our understanding of the influence of learning in operational capabilities development. Like prior studies on operational capabilities development (Backstrand and Powell, 2021; Tortorella *et al.*, 2020), our study points to the importance of intra- and inter-organisational learning mechanisms in manufacturing firms. However, unlike prior research on learning (Abdelaziz *et al.*, 2023; Cheng *et al.*, 2021; Gelei and Kenesei, 2022), our study shows how learning differs according to firms' level of business performance. While high-performance firms engage their supply chains in developing capabilities, low-performance firms align with customers only. In the analysis of the overall sample, our findings also point to the lack of alignment between firms and suppliers to develop capabilities. Powell and Coughlan (2020) argue that supply chain partners should develop learning-to-learn capabilities to achieve higher performance. Therefore, collaboration with suppliers in developing capabilities seems essential for better sustainable performance.

Additionally, this study contributes to understanding how manufacturing firms learn from their experience in past business endeavours over time. Prior studies argue that firms with successful experiences become overconfident in the effectiveness of their existing strategies, avoiding innovation and, consequently, declining current performance (Liang *et al.*, 2022; Wang *et al.*, 2015). In the analysis of the overall sample, our findings support the existing literature by showing that firms that have experienced success are less motivated to engage in intra- and inter-organisational learning, falling into a success trap. However, our study also points out the opposite when we compared groups of firms with different levels of current business performance.

High-performance firms overcome the success trap by turning past experiences into organisational knowledge that guides present and future actions (Argote and Hora, 2017; Kumar *et al.*, 2020). These firms seem to employ learning to actively search for new solutions and develop or reinforce their capabilities based on their engagement with the supply chain. Contrariwise, low-performance firms seem less capable of learning from poor performance in the past, which limits them from overcoming their lower past performances. Such behaviour seems to lead these firms to organisational inertia. Unlike the success trap suggests (Audia *et al.*, 2000; Wang *et al.*, 2015), current business performance decline even more in low-performance firms over time. This finding has implications for understanding how organisations learn over time.

In sum, this study contributes to the manufacturing literature by showing the distinct paths followed by low- and high-performance firms. These paths follow intra- and inter-organisational learning mechanisms that affect each group of firms' (high and low-performance) capabilities development over time.

5.2 Implications for managers

This study has valuable implications for managers. Practitioners should be concerned with operational capabilities development over time. First, managers should reflect and learn new skills, processes, and routines from past experiences to improve their business. Our findings have shown how critical learning from past performance is for capabilities development in high-performance firms, especially when firms engage supply chain partners. This result is even more applicable for organisations to build resilient operation and supply chain practices by learning and retaining the best manufacturing practices for a dynamic and uncertain world.

Second, our findings suggest that supply chain orientation is a way of achieving complementary resources for improving internal processes. Thus, managers should be aware that high-performance firms employ higher efforts to align suppliers and customers in capabilities development. Low-performance firms can also increase alignment with suppliers and clients and achieve better performance. Therefore, this result indicates that alignment along the supply chain is not a luxury but a clear path for capability creation.

5.3 Limitations and future research

This study employed secondary data collected in 15 countries, a highly demanding resource. However, this database has some limitations that need to be observed in future research. First, our database has not explored the components of operational capabilities proposed by Wu *et al.* (2010): skills, processes, and routines. Such an exploration could reveal exciting information about capabilities development. Second, our performance measures were collected at two points: past business performance and current business performance. Measuring business performance at three different points in time (before, during, and after the learning process) would be interesting. Third, only first-tier customer and supplier alignment has been used as an inter-organisational learning mechanism. Other external players might also be considered in the same framework, such as second-tier supply chain actors, competitors, consumers, government, and institutions. Similarly, future studies could analyse the effect of additional external players in the framework and how these actors impact internal resource upgrades and operational capabilities development.

6. Conclusions

This paper investigated the development of capabilities highlighting the role of intra- and inter-organisational learning mechanisms through a retrospective analysis of data collected over a longitudinal period. Although the manufacturing literature underlines the proficiency of firms that manage interrelated routines, few studies have shown the mechanisms required for developing these capabilities while integrating intra- and inter-organisational learning mechanisms in the same framework. The present study argues for the role of intra- and inter-organisational learning mechanisms in developing operational capabilities. However, our results apply distinctly to low- and high-performance firms. While low-performance firms appear to explore their processes based on old strategies, high-performance firms keep learning from past performance and continuous improvement efforts while exploring new opportunities with their supply chain partners. Therefore, this study provides valuable insights for guiding managers to develop operational capabilities in the supply chain.

References

Abdel-Maksoud, A., Dugdale, D. and Luther, R. (2005), "*Non-financial performance measurement in manufacturing companies*", The British Accounting Review, Elsevier, Vol. 37 No. 3, pp. 261-297.

Abdelaziz, M.A.A., Wu, J., Yuan, C. and Ghonim, M.A. (2023), "Unlocking supply chain product and process innovation through the development of supply chain learning capabilities under technological turbulence: Evidence from Egyptian SMEs", *Journal of Manufacturing Technology Management*, Vol. ahead-of-print No. ahead-of-print.

Agostini, L. and Filippini, R. (2019), "Organisational and managerial challenges in the path toward Industry 4.0", *European Journal of Innovation Management,* Vol. 22 No. 3, pp. 406-421.

Al-Khatib, A.W. (2023), "Internet of things, big data analytics and operational performance: the mediating effect of supply chain visibility", *Journal of Manufacturing Technology Management*, Vol. 34 No. 1, pp. 1-24.

Antonakis, J., Bendahan, S., Jacquart, P. and Lalive, R. (2010), "On making causal claims: A review and recommendations", *Leadership Quarterly*, Vol. 21 No. 6, pp 1086-1120.

Argote, L. and Hora, M. (2017), "Organisational Learning and Management of Technology", *Production and Operations Management*, Vol. 26 No. 4, pp. 579-590.

Argote, L. and Ophir, R. (2017), "Intraorganizational Learning", Baum, J.C., *The Blackwell Companion to Organisations*, Wiley-Blackwell, United States, 992.

Aslam, H., Khan, A.Q., Rashid, K. and Rehman, S.-u. (2020), "Achieving supply chain resilience: the role of supply chain ambidexterity and supply chain agility", *Journal of Manufacturing Technology Management*, Vol. 31 No. 6, pp. 1185-1204.

Audia, P.G., Locke, E.A. and Smith, K.G. (2000), "The paradox of success: An archival and a laboratory study of strategic persistence following radical environmental change", *Academy of Management Journal*, Vol. 43 No. 5, pp. 837-853.

Backstrand, J. and Powell, D.J. (2021), "Enhancing Supply Chain Capabilities in an ETO Context Through "Lean and Learn"", *Operations and Supply Chain Management*, Vol. 14, No. 3, 2021, pp. 360-367.

Cameron, A.C. and Trivedi, P.K. (2005), *Microeconometrics: methods and applications*, Cambridge University Press, Cambridge, UK.

Cheng, Y., Farooq, S. and Jajja, M.S.S. (2021), "Does plant role moderate relationship between internal manufacturing network integration, external supply chain integration, operational performance in manufacturing network?", *Journal of Manufacturing Technology Management*, Vol. 32 No. 6, pp. 1267-1289.

Dieste, M., Panizzolo, R. and Garza-Reyes, J.A. (2021), "A systematic literature review regarding the influence of lean manufacturing on firms' financial performance", *Journal of Manufacturing Technology Management*, Vol. 32 No. 9, pp. 101-121.

Fiol, C.M. and Lyles, M.A. (1985), "Organizational Learning", *The Academy of Management Review*, Vol. 10 No. 4, pp. 803-813.

Flaeschner, O., Wenking, M., Netland, T.H. and Friedli, T. (2020), "When should global manufacturers invest in production network upgrades? An empirical investigation", *International Journal of Operations and Production Management*, Vol. 41 No. 1, pp. 21-53.

Fornell, C. and Larcker, D.F. (1981), "Evaluating Structural Equation Models with Unobservable Variables and Measurement Error", *Journal of Marketing Research*, Vol. 18 No. 1, pp. 39-50.

Fullerton, R.R., Kennedy, F. and Widener, S. (2014), "Lean manufacturing and firm performance: The incremental contribution of lean management accounting practices", *Journal of Operations Management*, Vol. 32 No. 7, pp. 414-428.

Galeazzo, A. and Furlan, A. (2018), "Lean bundles and configurations: a fsQCA approach", *International Journal of Operations and Production Management*, Vol. 38 No. 2, pp. 513-533.

Gelei, A. and Kenesei, Z. (2022), "Leveraging the potential of a technologically heterogeneous suppliers – a dynamic approach", *Journal of Manufacturing Technology Management*, Vol. 33 No. 7, pp. 1256-1276.

Grenzfurtner, W. and Gronalt, M. (2021), "Continuous improvement of the industrialised housebuilding order fulfilment process", *Construction Innovation*, Vol. 21 No. 1, pp. 22-39.

Hair Jr., J.F., Hult, G.T.M., Ringle, C.M. and Sarstedt, M. (2014), *Handbook of Market Research*, Sage Publications, Los Angeles, USA.

Haq, M.Z.U. and Aslam, H. (2023), "Impact of entrepreneurial leadership on supply chain performance: the mediating role of supply chain resilience", *Journal of Manufacturing Technology Management*, Vol. ahead-of-print No. ahead-of-print.

Hsu, C.-C., Tan, K.C., Hathaway, B.A. and Zailani, S. (2023), "Business networking orientation, green operations practices and firm performance", *Journal of Manufacturing Technology Management*, Vol. 34 No. 3, pp. 455-475.

Junni, P., Sarala, R., Taras, V. and Tarba, S. (2013), "Organizational ambidexterity and performance: a meta-analysis", *Academy of Management Review*, Vol. 27 No. 1, pp. 299-312.

Kumar, V., Jabarzadeh, Y., Jeihouni, P. and Garza-Reyes, J.A. (2020), "Learning orientation and innovation performance: the mediating role of operations strategy and supply chain integration", *Supply Chain Management*, Vol. 25 No. 4, pp. 457-474.

Liang, X., Li, G., Zhang, H., Nolan, E. and Chen, F. (2022), "Firm performance and marketing analytics in the Chinese context: A contingency model", *Journal of Business Research*, Vol. 141 No. 1, pp. 589-599.

MacKenzie, S.B. and Podsakoff, P.M. (2012), "Common Method Bias in Marketing: Causes, Mechanisms, and Procedural Remedies", *Journal of Retailing*, Vol. 88 No. 4, pp. 542-555.

March, J. (1991), "Exploration and exploitation in organizational learning", *Organization Science*, Vol. 2 No. 1, pp. 71-87.

Nunnally, J.C. and Bernstein, I.H. (1994), *The Assessment of Reliability*. *Psychometric Theory* (3rd ed.), McGraw-Hill, New York, NY.

Powell, D.J. and Coughlan, P. (2020), "Rethinking lean supplier development as a learning system", *International Journal of Operations and Production Management*, Vol. 40 No. 7–8, pp. 921-943.

Prim, A.L., Sarma, V. and Sá, M.M. (2021), "The role of collaboration in reducing quality variability in Brazilian breweries", *Production Planning & Control*, Ahead-of-print.

Raddats, C., Zolkiewski, J., Story, V. M., Burton, J., Baines, T. and Ziaee Bigdeli, A. (2017), "Interactively developed capabilities: evidence from dyadic servitisation relationships", *International Journal of Operations and Production Management*, Vol. 37 No. 3, pp. 382-400.

Rebelo, T. and Gomes, A. (2011), "Conditioning factors of an organizational learning culture", *Journal of Workplace Learning*, Vol. 23 No. 3, pp. 173-194.

Reinartz, W., Haenlein, M. and Henseler, J. (2009), "An empirical comparison of the efficacy of covariance-based and variance-based SEM", *International Journal of Research in Marketing*,

Vol. 26 No. 4, pp. 332-344.
Rosenzweig, E.D. and Roth, A.V. (2004), "Towards a theory of competitive progression: evidence from high-tech manufacturing", *Production & Operations Management*, Vol. 13 No. 4, pp. 354-368.
Sansone, C., Hilletofth, P. and Eriksson, D. (2017), "Critical operations capabilities for competitive manufacturing: a systematic review", *Industrial Management & Data Systems*, Vol. 117 No. 5, pp. 801-837.
Schroeder, R.G. and Flynn, B.B. (2001), *High Performance Manufacturing: Global Perspectives*, Wiley: New York.
Singh, B. and Rao, M.K. (2016), "Effect of intellectual capital on dynamic capabilities", *Journal of Organizational Change Management*, Vol. 29 No. 2, pp. 129-149.
Skipworth, H., Godsell, J., Wong, C.Y., Saghiri, S. and Julien, D. (2015), "Supply chain alignment for improved business performance: an empirical study", *Supply Chain Management*, Vol. 20 No. 5, pp. 511-533.
Slack, N. and Lewis, M., *Operations Strategy*, New York: Prentice Hall, 2001.
Steenkamp, J.B. and Baumgartner, H. (1998), "Assessing measurement invariance in cross-national consumer research", *Journal of Consumer Research*. Vol. 25 No. 1, pp. 78-90.
Tamayo-Torres, J., Roehrich, K.J. and Lewis, M.A. (2015), "Ambidexterity, performance and environmental dynamism", *International Journal of Operations & Production Management*, Vol. 37 No 3, 2821-299.
Teece, D.J. (2007), "Explicating dynamic capabilities: the nature and microfoundations of (sustainable) enterprise performance", *Strategic Management Journal*, Vol. 28 No. 13, pp. 1319-1350.
Tortorella, G.L., Cawley Vergara, A. Mac, Garza-Reyes, J.A. and Sawhney, R. (2020), "Organisational learning paths based upon industry 4.0 adoption: An empirical study with Brazilian manufacturers", *International Journal of Production Economics*, Vol. 219, pp. 284-294.
Uhrin, Á., Moyano-Fuentes, J. and Cámara, S.B. (2020), "Firm risk and self-reference on past performance as main drivers of lean production implementation", *Journal of Manufacturing Technology Management*, Vol. 31 No. 3, pp. 458-478.
Wang, C.L., Senaratne, C., and Rafiq, M. (2015), "Success traps, dynamic capabilities and firm performance", *British Journal of Management*, Vol. 26 No. 1, 26-44.
Wu, S.J., Melnyk, S.A., and Flynn, B.B. (2010), "Operational Capabilities: The Secret Ingredient", *Decision Sciences*, Vol. 41 No. 4, pp. 721-754.
Yang, Y., Jia, F. and Xu, Z. (2019), "Towards an integrated conceptual model of supply chain learning: an extended resource-based view", *Supply Chain Management*, Vol. 24 No. 2, pp. 189-214.

Appendix

Insert Table A1 here.

Table I. Data analysis(a), endogeneity treatment(b), and model fit(c)

Table Ia. Descriptive analysis and correlation

Construct	Mean	SD	1	2	3	4	5	6
2YBP	5.026	1.244	**.971**					
SUPP	4.179	.728	.049	**.634**				
CUST	4.097	.798	.016	.262**	**.610**			
CIML	4.230	.736	-.144*	.087	.282**	**.644**		
OCAP	3.800	.805	.086	.285**	.260**	.253**	**.715**	
BP	5.013	1.270	.939**	.040	.012	-.138**	.112	**.968**

Legend: 2YBP – Past business performance (2 years ago); SUPP – Supplier alignment; CUST – Customer alignment; CIML – Continuous improvement and learning; OCAP – Operational capabilities; BP – Current business performance.

Note: **p-value< 0.01, *p-value<0.05

Note: Bold numbers in the diagonal refer to the square roots of AVE

Table Ib. Measurement invariance tests and endogeneity treatment

Test	Type	$\chi 2$	Df	p-value	X²/Df	CFI	TLI	RMSEA	$\Delta\chi 2$
Invariance Test	**Configural**	16.545	8	.035	2.068	.988	.969	.072	-
	Metric	28.944	24	.028	1.623	.980	.948	.055	12.399 (.716)
	Scalar	63.247	48	.069	1.318	.980	.974	.039	46.702 (.216)
Endogeneity Test - Error term of latent variable	**Uncorrelated**	27.85	15	N/A	1.86	N/A	N/A	N/A	-
	2YBP - OCAP**	21.61	12	N/A	1.80	N/A	N/A	N/A	6.24

Legend: 2YBP – Past business performance (2 years ago); OCAP – Operational capabilities.

Note: P-values are shown in parentheses

**Retained covariance

Table Ic: Goodness fit of the structural model

Stand-alone indices	Model values	Reference rate[1]
Chi-square (X²)	21,613	NA
Degrees of freedom (df)	12	NA
X² / df	1.801	< 3.00
Probability level	0.042	< 0.05
Goodness-of-fit (GFI)	.983	> .90
Adjusted goodness-of-fit (AGFI)	.912	> .90
RMSEA	.044	< .08
Incremental indices		
Normed fit index (NFI)	.882	> .90
Incremental fit index (IFI)	.944	> .90
Comparative fit index (CFI)	.930	> .90
Tucker–Lewis coefficient (TLI)	.935	> .90

[1] According to Hair *et al.* (2014) and Kline (2015).

Source(s): Created by authors.

Table II. Direct effect values and results

#	Hypothesis	Result	Standardized regression weights	p-value
H1a	2YBP → CUST	Rejected	.058	.390
H1b	2YBP → CIML	Supported	-.144	.037
H1c	2YBP → SUPP	Rejected	.048	.482
H2a	CIML → CUST	Supported	.291	<.001
H2b	CUST → SUPP	Supported	.255	<.001
H2c	CIML → SUPP	Rejected	.022	.760
H3a	CUST → OCAP	Supported	.148	.032
H3b	CIML → OCAP	Supported	.192	.004
H3c	SUPP → OCAP	Supported	.232	<.001
H4a	(Better)2YBP → (Worse)CIML	Rejected	-	-.121
	(Better)2YBP → (Worse)CUST	Rejected	-	-.005
	(Better)2YBP → (Worse)SUPP	Rejected	-	-.145
H4b	(Worse)2YBP → (Better)CIML	Rejected	-	-.098
	(Worse)2YBP → (Better)CUST	Supported	-	.194
	(Worse)2YBP → (Better)SUPP	Supported	-	.196
-	INDUSTRY > OCAP	N/A	-	-

Legend: 2YBP – Past business performance (2 years ago); SUPP – Supplier alignment; CUST – Customer alignment; CIML – Continuous improvement; OCAP – Operational capabilities.

Note: **p-value< 0.01, *p-value<0.05, $^{+}$p-value<0.10.

Source(s): Created by authors.

Table III. Multigroup analysis

#	Hypothesis	Low-Perf (n=103)	High-Perf (n=105)
H1a	2YBP → CUST	-.005	.194*
H1b	2YBP → CIML	-.121	-.098
H1c	2YBP → SUPP	-.145	.196*
H2a	CIML → CUST	.338**	.219*
H2b	CUST → SUPP	.290**	.180⁺
H2c	CIML → SUPP	.014	.011
H3a	CUST → OCAP	.287**	-.004
H3b	CIML → OCAP	.157⁺	.240**
H3c	SUPP → OCAP	.151	.262**
H4a	(Better)2YBP → (Worse)CIML	-	-
	(Better)2YBP → (Worse)CUST	-	-
	(Better)2YBP → (Worse)SUPP	-	-
H4b	(Worse)2YBP → (Better)CIML	-	-
	(Worse)2YBP → (Better)CUST	-	-
	(Worse)2YBP → (Better)SUPP	-	-
-	INDUSTRY > OCAP	.040	-.029

Legend: 2YBP – Past business performance (2 years ago); SUPP – Supplier alignment; CUST – Customer alignment; CIML – Continuous improvement; OCAP – Operational capabilities.

Note: **p-value< 0.01, *p-value<0.05, ⁺p-value<0.10.

Source(s): Created by authors.

Table AI. Measurement items

Continuous improvement[1] [AVE=.414; CR= .738; α= .719]	
Please, indicate the extent to which you agree or disagree with each of these statements about this plant and the organisation: 1: strongly disagree, 3: neutral, 5: strongly agree	
We strive to continually improve all aspects of our products and processes, rather than taking a static approach (CI1)	.626
If we are not constantly improving and learning, our performance will suffer in the long term (CI2)	.716
Continuous improvement makes our performance a moving target, which is difficult for competitors to attack (CI3)	.491 *(excluded)*
We believe that the improvement of a process is never complete; there is always room for more incremental improvement (CI4)	.621
Our organisation is not a static entity, but engages in dynamically changing itself to better serve its customers (CI5)	.607
Customer alignment[2] [AVE=.372; CR= .700; α= .680]	
Please, indicate the extent to which you agree or disagree with each of these statements about this plant and the organisation: 1: strongly disagree, 3: neutral, 5: strongly agree	
We are comfortable sharing problems with our customers (CAL1)	.554
In dealing with our customers, we are willing to exchange assumptions, in order to find more effective solutions (CAL2)	.581
Cooperating with our customers is beneficial to us (CAL3)	.538

We emphasise openness of communication in collaborating with our customers (CAL4)	.743
Supplier alignment[3] [AVE=.402; CR= .782; α= .724]	
Please, indicate the extent to which you agree or disagree with each of these statements about this plant and the organisation: 1: strongly disagree, 3: neutral, 5: strongly agree	
We are comfortable sharing problems with our suppliers (SAL1)	.692
In dealing with our suppliers, we are willing to exchange assumptions, in order to find more effective solutions (SAL2)	.623
Cooperating with our suppliers is beneficial to us (SAL3)	.628
We emphasise openness of communication in collaborating with our suppliers (SAL4)	.590
Operational capability[4] [AVE=.511; CR= .806; α= .809]	
Please, circle the number that indicates your opinion about how your plant compares to its competitors in its industry on a global basis: 1: poor, much worse than global competitors, 3: average, 5: superior, much better than global competitors).	
Unit cost of manufacturing (CAP1)	.385 *(excluded)*
Conformance with product specifications (CAP2)	.438 *(excluded)*
On-time delivery performance (CAP3)	.683
Fast delivery (CAP4)	.773
Flexibility to change product mix (CAP5)	.687
Flexibility to change volume (CAP6)	.698

Past business performance (2 years ago)[5] [AVE=.942; CR= .970; α= .969]	
Please indicate the appropriated amount per period of the following statements:	
Sales value of production (2YBP1)	1.004
Gross Margin (2YBP2)	.936
Current business performance[5] [AVE=.938; CR= .968; α= .965]	
Please indicate the appropriated amount per period of the following statements:	
Sales value of production (BP1)	1.007
Gross Margin (BP2)	.928

[1]*Respondent: Plant Supervisor*

[2]*Respondent: Downstream Supply Chain Manager*

[3]*Respondent: Upstream Supply Chain Manager*

[4]*Respondent: Plant Manager*

[5]*Respondent: Account Manager*

Source(s): Created by authors based on Schroeder and Flynn (2001).

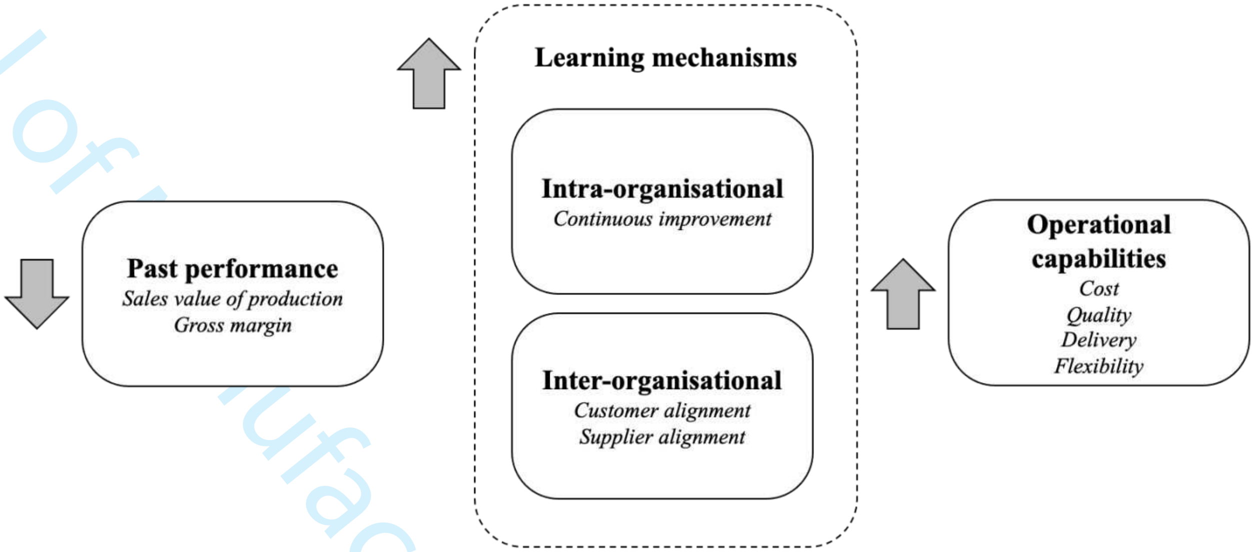

Figure 1. Conceptual model

Source(s): Created by authors.

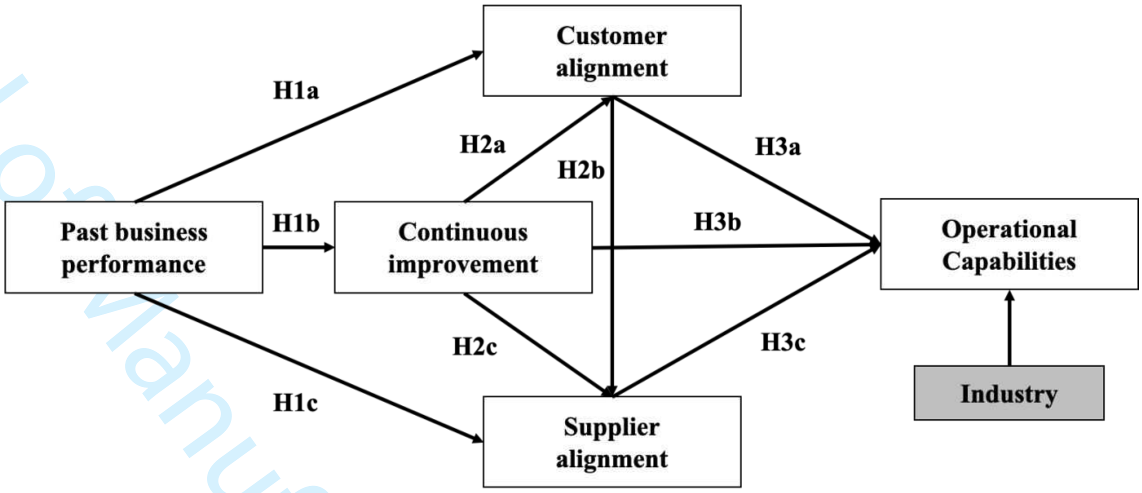

Figure 2a. Analytical framework

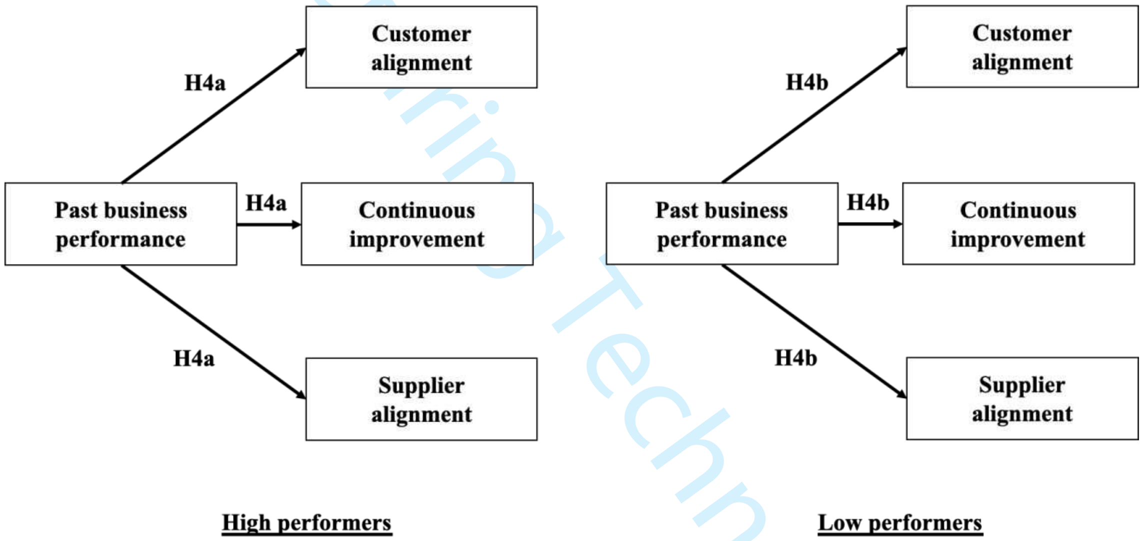

Figure 2b. Multigroup analysis

Figure 2. Analytical framework (a) and multigroup analysis (b)

Source(s): Created by authors.