**Title:** **The conductor matters: the impact of purchasing orchestration on organizational performance**

**Keywords:** Purchasing orchestration, Resource orchestration theory, Open innovation, Supply chain enabled innovation, Entrepreneurial orientation, Conditional process analysis, Moderated mediation analysis

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# The Conductor Matters: The Impact of Purchasing Orchestration on Organizational Performance



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# The Conductor Matters: The Impact of Purchasing Orchestration on Organizational Performance


## Structured Abstract

### Purpose
Organizations increasingly manage innovation projects jointly with suppliers to utilize external resources to fill internal competencies. However, little is known about the practices of how companies configure internal and external resources to enhance competitiveness. Drawing on resource orchestration theory, this research proposes a novel approach to explain organizational performance using purchasing orchestration (PO) as an antecedent. The paper then tests an empirical model to assess the impact of PO practices on innovation and financial performance.

### Design/methodology/approach
Cross-sectional survey data from 247 supply chain managers are used to test hypotheses relating PO to performance. SPSS PROCESS is applied to test conditional direct and indirect effects.

### Findings
The positive impact of PO practices on innovation and financial performance is confirmed. Results indicate an organization's entrepreneurial orientation can strengthen the positive relationship between PO and financial performance. Structuring, bundling, and leveraging external resources are introduced as new organizational capabilities.

### Research limitations/implications
This research is based on cross-sectional data, and uni-dimensional constructs are used.

### Practical implications
This research guides managers on the innovation process in light of the growing importance of external resources. The manuscript highlights the role of strategic purchasing in establishing new resource capabilities as a competitive advantage.

### Originality/value
This research provides new insights into the relationship between purchasing practices and organizational performance and helps better understand the implications of orchestrating supply chain resources. A novel construct, purchasing orchestration (PO), is introduced as a theoretical basis for studying supply chain-enabled innovation.



### Keywords
Purchasing Orchestration, Resource Orchestration Theory, Open Innovation, Supply Chain Enabled Innovation, Entrepreneurial Orientation, Conditional Process Analysis, Moderated Mediation Analysis

## Introduction

Innovation remains a strategic imperative for organizations to gain a competitive advantage and exploit growth opportunities in the complex post-crisis environment (Am et al., 2020). Although much is known about the central features of the innovation process, emerging trends require researchers and practitioners to continually update their understanding of how companies find new ways of creating value. One of the most important trends is the emergence of business models whereby companies engage with suppliers to co-create innovation (McGahan et al., 2021).

The collaborative trend has been termed "open innovation" (Chesbrough, 2003; Enkel et al., 2020). This research investigates a specific open innovation context. It employs a new construct, purchasing orchestration (PO) which refers to the managerial practices of acquiring, integrating, and exploiting external resources (Schmelzle and Tate, 2022). PO provides a lens through which to theorize the open innovation process as it applies to engaging with suppliers.

Indeed, it is increasingly evident that achieving innovation success requires external collaboration (Vanpoucke et al., 2014; Hitt et al., 2016; Ardito et al., 2020; Saunila et al., 2021). For instance, using external capabilities can reduce the problem of high product development failure rates (Castellion and Markham, 2013; Savino et al., 2017). Moreover, engaging with suppliers in innovation processes allows organizations to share the risks and costs associated with new developments (Bogers et al., 2018). In short, leveraged alongside internal resources, external resources increase companies' likelihood of developing successful new technologies and products (Emden et al., 2006; Ardito et al., 2020).

Scholars have studied open innovation mainly in the context of value co-creation with customers (Hoyer et al., 2010; McNally et al., 2011; Enkel et al., 2020). Additionally, a few studies have drawn attention to the importance of supply chain management practices in innovation efforts

(Crook and Esper, 2014; Mir et al., 2018). This literature suggests that supply chain partners can share relevant knowledge, collaborate on joint innovation projects (Bogers et al., 2018; Savino et al., 2017), and transfer appropriate technology (Bezuidenhout and Bean, 2022) when guided by common objectives.

However, relatively little is known about open innovation as it applies to engaging with suppliers (West and Bogers, 2014; Bogers et al., 2019). This manuscript relates PO to firm innovation and financial performance and investigates the moderating role of entrepreneurial orientation in these relationships. Specifically, the paper intends to answer the following research questions:

**RQ1: How does purchasing orchestration influence an organization's innovation and financial performance?**

**RQ2: What are the moderating effects of entrepreneurial orientation on organizational performance?**

In answering these questions, this paper responds to calls in the literature for more research on supply management's role within the open innovation framework (Narasimhan and Narayanan, 2013; Bogers et al., 2018) and the process by which companies obtain and manage the flow of innovative resources from suppliers (Hitt, 2011; Schoenherr et al., 2012). This research also provides managers with a framework for orchestrating external resources to improve innovation and financial performance.

## Theoretical Background

Researchers have long emphasized the need for organizations to consider "the wealth of activity outside the firm" (Chesbrough, 2003, p. 52). In the supply chain literature, this "taking into

account" has primarily focused on supply chain integration (SCI) (Vanpoucke et al., 2014; Yuen and Thai, 2017; Liao et al., 2022). However, SCI, characterized mainly by applying process controls and management information systems, rarely extends to supplier-enabled innovation (Mir et al., 2018; Narasimhan and Narayanan, 2013). Open innovation moves well beyond current SCI conceptualization.

Open innovation (OI) refers to a distributed innovation process based on purposively managing inflows and outflows of external resources across organizational boundaries (McGahan et al., 2021). In other words, the open innovation model emphasizes the need to leverage supply chain resources to enhance corporate innovation (Chiaroni et al., 2011). The literature suggests several mechanisms through which companies can engage in open innovation, including scouting, in-licensing IP, partnering with university research programs, funding startup companies in one's industry, and collaborating with intermediaries, suppliers, and customers (West and Bogers, 2014; Enkel et al., 2020). *Open* innovation suggests that organizations can improve innovation outcomes by engaging suppliers but is under-theorized concerning the specific processes through which external resources become internalized and commercialized *by a company* (Bogers et al., 2018, 2019).

Purchasing orchestration (PO), a newly developed construct grounded in resource orchestration theory (ROT), provides a lens through which to theorize the open innovation process when engaging with suppliers. Using the PO process, managers draw on external resources and reconfigure them to generate new value for the organization and customers (Nemeh and Yami, 2019; Kumar et al., 2022; Schmelzle and Tate, 2022).

ROT theoretically describes how managers acquire and combine existing resources to create new resource configurations that can be leveraged in the marketplace (Sirmon et al., 2011;

Hitt et al., 2016). According to ROT, resource orchestration is composed of three managerial processes: structuring (developing an organization's resource portfolio), bundling (reconfiguring resources to shape new capabilities), and leveraging (using capabilities to exploit market opportunities) (Kumar et al., 2022). Managers continuously engage in these processes to match available resources with customer demand. Therefore, the theory emphasizes managerial action and entrepreneurship as crucial explanatory factors for understanding how company resources translate into performance (Sirmon et al., 2011).

Grounded in ROT, PO focuses on the open innovation context of orchestrating external resources to create innovative products and services (Schmelzle and Tate, 2022). The concept of open innovation (OI) addresses the entire spectrum of resource orchestration practices, thus capturing a broader phenomenon. Resource inflow management is complemented by purposeful resource integration and reconfiguration practices to develop innovative products (Vanpoucke et al., 2014; Kumar et al., 2022). In this way, PO contextualizes the processes of resource structuring, bundling, and leveraging within a purchasing and supply management context.

*PO Structuring.* PO structuring implies acquiring resources through the supply chain to update an organization's resource portfolio (Schmelzle and Tate, 2022). Structuring entails acquiring or divesting resources to fine-tune a resource portfolio (Hitt et al., 2011). An organization determines a gap between available in-house resources and the total resource requirements to meet corporate objectives (resource weakness) (Hitt et al., 2016).

Resources not readily available or feasibly developed in-house will be acquired from external entities through strategic knowledge networking and transformation processes (Vanpoucke et al., 2014; Nemeh and Yami, 2019). At the same time, organizations will evaluate the utility of existing internal resources. Superfluous, dispensable resources may be divested

(Sirmon et al., 2011). The acquisition and divesture activities necessitate sufficient transparency among supply chain members (Morgan et al., 2018). Strategic management researchers have investigated the resource structuring phenomenon (Hitt et al., 2011), and this research utilizes the seminal findings as a foundation.

*PO Bundling.* PO bundling involves integrating external resources and blending them with in-house resources to create new, competitive capabilities for the organization (Schmelzle and Tate, 2022). Bundling entails integrating resources from the supply chain to shape new capabilities that help create a competitive advantage (Sirmon et al., 2007). This bundling process entails absorbing and reconfiguring acquired knowledge to form novel capabilities (Andersén and Ljungkvist, 2021). For example, relevant external knowledge or technology is adapted and combined with internal resources, resulting in new competitive resource bundles (Azadegan and Dooley, 2010; Carnes et al., 2017; Nemeh and Yami, 2019).

By rearranging and blending complementary resources, organizations can realize synergies and gain a competitive advantage (Liao et al., 2022). On the one hand, bundling can result in incremental refinement and strengthening of existing capabilities when employing stabilizing or enriching sub-processes (Hitt et al., 2011). On the other hand, bundling activities can also lead to disruptive, radically new capabilities, enhancing an organization's competitiveness (Sirmon et al., 2011; Baert et al., 2016).

*PO Leveraging Support.* PO leveraging support refers to purchasing practices supporting the commercialization processes to create customer value (Schmelzle and Tate, 2022). Resource leveraging denotes exploiting the capabilities based on newly created resource bundles (Vanpoucke et al., 2014; Wowak et al., 2016). The resource reconfiguration process to build new capabilities is the foundation for effective leveraging strategies and leads to customer value in

competitive market environments (Emden et al., 2006). Mobilizing, coordinating, and deploying resources are the three main sub-processes of resource leveraging (Andersén and Ljungkvist, 2021). Resource deployment encompasses utilizing appropriate capability configurations and exploiting market opportunities (Hitt et al., 2011).

Purchasing managers incorporate external resources into internal innovation efforts by applying PO structuring, bundling, and leveraging support practices. The PO concept emphasizes the ingenuity and entrepreneurship of managers engaging in these processes. In particular, PO highlights purchasing managers' unique boundary-spanning role and its importance for developing new strategic capabilities and supporting the commercialization processes to create customer value.

Organizations can help managers be more receptive to ideas generated through their supply chain network and more creative in using those resources by fostering an entrepreneurial orientation (EO) (Covin and Slevin, 1989; Dong et al., 2020; Ferreras-Méndez et al., 2022). EO refers to an organization's inclination "towards new entry and value creation, capturing the entrepreneurial decisions, methods, and actions actors use to create competitive advantage" (Wales et al., 2021, p. 564). EO captures an organization's disposition to be proactive, risk-taking, and open to applying new value-creation approaches (Jin and Cho, 2018). EO can also lead to acquiring and using diversified resources such as knowledge, solutions, technology, and ideas (Dong et al., 2020). EO helps managers engage in innovative ventures (Lumpkin and Dess, 1996). Regarding the PO process, organizations with a solid EO are better positioned to capitalize on new resources made available through open innovation and to structure, bundle, and leverage those resources to create new value (Schmelzle and Tate, 2022).

The literature argues that purchasing orchestration practices, grounded in the open innovation approach, can introduce crucial external resources into the innovation process. Second, managers can structure, bundle, and leverage these supply chain resources in novel ways to create innovative technologies and products. Finally, an entrepreneurial orientation would enhance managers' ability to implement this process successfully. The result should be improved organizational performance. The following section focuses on developing specific hypotheses.

**Hypotheses Development**

Figure 1 presents the PO conceptual model grounded in the theoretical frameworks of ROT and (inbound) open innovation. Purchasing orchestration enables and accelerates innovation activities since the organization is looking beyond its boundaries to acquire relevant external knowledge and ideas to complement its internal capabilities (Nemeh and Yami, 2019; Koerber and Schiele, 2022). The key to success is to find the optimal blend of internal and external resources to shape new capabilities (Emden et al., 2006), which will enhance an organization's competitiveness (Narasimhan and Narayanan, 2013) when considering the available integration capacity (Lamont et al., 2019).

****Insert Figure 1 Approximately Here****

PO encompasses identifying and integrating external resources and creating new, innovative capabilities and subsequent commercialization, resulting in higher innovation and financial performance. The organizational motivation for purchasing orchestration is based on scarcity of in-house resources, and information asymmetry, especially in complex markets (Ardito et al., 2020). Due to internal resource scarcity, many organizations can only develop new products

or services with external support (Bogers et al., 2018; Enkel et al., 2020). Thus, efficient innovation frequently requires looking beyond organizational boundaries to learn and benefit from others (Vanpoucke et al., 2014; Haque and Islam, 2018).

The second motivation for establishing PO practices, information asymmetry, is based on technological complexity and a dynamic market environment (Ardito et al., 2020; Bejlegaard et al., 2021). Rapid technological change results in uneven knowledge distribution across the supply chain (Vanpoucke et al., 2014; Bogers et al., 2018). An organization might lack expertise in a specific area, so it is motivated to establish PO's necessary structuring and bundling processes to close such a capability gap (Hughes et al., 2018). Furthermore, the market dynamics might lead to a competitive opportunity to commercialize the newly developed capabilities (Jin and Cho, 2018); thus, leveraging might result in more commercial success (Hughes et al., 2018).

By acquiring essential knowledge from supply chain partners, organizations can utilize a fresh and diverse set of ideas, expertise, and technology, thereby innovating more successfully (Narasimhan and Narayanan, 2013) and avoiding duplication of efforts (Haque and Islam, 2018). The structuring process of PO enables the organization to gain faster access to unique knowledge, particularly about critical technology (Carnes et al., 2017; Haque and Islam, 2018). Organizations following a supply chain-enabled innovation approach and establishing effective PO practices are expected to substantially improve their innovation performance (Ardito et al., 2020).

Organizations with effective bundling practices absorb new external resources and recombine them with existing internal resources to create innovative, competitive capabilities (Wowak et al., 2016). This bundling process includes assimilating, adapting, and applying the externally acquired knowledge and technology to shape novel resource recombinations and new marketable solutions for customers (Hughes et al., 2018; Schmelzle and Tate, 2022). Thus,

blending new and heterogeneous external knowledge with internal technology enhances the innovation capability of organizations (Carnes et al., 2017).

By implementing successful leveraging practices, the organization should achieve better financial performance (West and Bogers, 2014). Hence, effectively orchestrating the inflow of fresh ideas will create new competitive capabilities and innovative product and service offerings to be commercialized in the marketplace (Emden et al., 2006). Combining all three processes suggests that PO practices enhance an organization's innovation and financial performance.

Based on the open innovation framework, PO processes will enable the organization to tap into the wealth of externally available knowledge (West and Bogers, 2014). Effective PO practices are an essential organizational capability that would enhance the organization's innovation ability, resulting in better market or technological innovation achievements (Hughes et al., 2018). PO practices also enhance the organization's innovation process concerning speed and quality, leading to accelerated innovation, more marketable capabilities, and more commercial success (Chirico et al., 2011). Accordingly, it is hypothesized:

$H_{1A}$: **PO of external resources through structuring, bundling and leveraging is positively associated with innovation performance.**

$H_{1B}$: **PO of external resources through structuring, bundling, and leveraging is positively associated with financial performance.**

*Innovation (IP) and Financial Performance (FP)*

In this research, innovation performance refers to innovation process efficiency achieved by a new product or service (Chen et al., 2009; Wagner, 2010). Financial performance is understood as the organization's achievement in terms of profitability and asset utilization (Vanpoucke et al., 2014; Lonial and Carter, 2015). The organization's financial performance depends on its innovative

capability and continuously updating its portfolio of successful product and service offerings (Vanpoucke et al., 2014). Superior innovation, an essential competitive priority, drives financial success in many market environments (Wowak et al., 2016).

Highly innovative organizations can differentiate themselves from the competition, achieve better margins, and enhance their financial performance (Hartmann et al., 2012; Saunila et al., 2021). Specifically, successful innovation will enable organizations to grow their value propositions in breadth and depth, increasing market share and profitability (Emden et al., 2006). An organization's innovativeness will become the foundation for competitiveness and long-term market success (Narasimhan and Narayanan, 2013). Following the innovation management literature, it is hypothesized that successful innovations with value to the customers will result in higher financial performance for the organization (Narasimhan and Narayanan, 2013; Hartmann et al., 2012). Accordingly:

$H_2$: **Innovation performance is positively associated with financial performance.**

*Entrepreneurial Orientation (EO)*

The PO framework includes the construct of entrepreneurial orientation (EO), which refers to an organization's strategic posture toward entrepreneurship (Anderson et al., 2015) and is defined primarily as innovativeness, proactiveness, and risk-taking propensity (Jin and Cho, 2018). From the perspective of OI literature, EO should enhance PO's impact on both innovation and financial performance. Organizations with high EO are expected to be receptive to the inflow of new knowledge and more efficient in orchestrating the external resource inflow and the subsequent integration and exploitation activities (Chirico et al., 2011). Such organizations with a robust EO could successfully initiate essential PO practices such as proactive market scanning, collaboration

with external partners, seizing opportunities for joint commercialization, etc., and thus enhance innovation and financial performance (Chen et al., 2011; Vanpoucke et al., 2014; Andersen et al., 2019).

Researchers have highlighted that an organization's innovation orientation influences the success of innovation activities (Chiaroni et al., 2009; Chen et al., 2011; Ferreras-Méndez et al., 2022). Precisely, the willingness to absorb the inflow of new knowledge from suppliers, and the eagerness to share relevant information, will determine the success of collaborative efforts with supply chain partners and within the organization (Haque and Islam, 2018; Whitehead et al., 2019). Organizations fostering an open atmosphere with a strong stance toward innovation and change will be more capable of identifying, absorbing, and integrating innovative ideas and solutions from external partners (Rosenbusch et al., 2013; Enkel et al., 2020).

Consequently, PO practices are expected to be more successful when the organization fully believes in the usefulness of the open innovation approach (Chen et al., 2011). The expected performance impact of PO practices will be more negligible in organizations suffering from a 'not-invented-here' syndrome and inward-focused than in organizations embracing openness and a positive stance toward innovation and emerging customer market requirements (Enkel et al., 2020). In organizations with an 'open innovation spirit,' employees will be more receptive to new ideas (Ferreras-Méndez et al., 2022). Consequently, the specific PO practices will be implemented more effectively and efficiently when acquiring and integrating external knowledge (Rosenbusch et al., 2013). In such an innovation-enhancing environment, PO-related decision-making is expected to be more purposeful and determined, resulting in better outcomes. Specifically, organizations embracing risk-taking and proactiveness, for instance, will find it easier to identify

and appreciate additional benefits from external ideas or solutions (Chen et al., 2011; Rosenbusch et al., 2013; Jin and Cho, 2018).

In contrast, high PO efforts might be less fruitful when employees are not fully committed to the open innovation approach (Enkel et al., 2020). Organizations might neglect promising opportunities based on external ideas when employees are not buying into the PO concept. External technologies' potential usefulness might need to be recognized more quickly ahead of the competition (Rosenbusch et al., 2013). Such organizations with an inward-looking closed innovation approach are also risk-averse and change-avoiding and tend to constrain the external knowledge inflow, thereby limiting innovation opportunities (Chen et al., 2011).

In summary, EO should enhance the performance implications of PO regarding both innovation and financial performance (Rosenbusch et al., 2013; Carnes et al., 2017). However, a weak EO should dampen the performance impact of PO concerning both innovation and financial performance (Yun et al., 2016). The moderation effects of EO are hypothesized as follows:

$H_{3A}$: **Entrepreneurial Orientation has a positive moderating effect on the relationship between PO and innovation performance.**

$H_{3B}$: **Entrepreneurial Orientation has a positive moderating effect on the relationship between PO and financial performance.**

$H_{3C}$: **Entrepreneurial Orientation has a positive moderating effect on the relationship between innovation performance and financial performance.**

## Methodology

To test the hypotheses, data were collected with a cross-sectional, internet-based survey (Dillman, 2007). A survey allows the use of perceptional measures (Morgan et al., 2016), as neither PO nor EO can be captured directly, and the collection of innovation performance data from industries in which frequently used proxies such as patent registrations or citations are not available. Finally, a

survey design can capture a large cross-section of the population so that its results enable higher generalizability than other methods.

*Measurement Items*

Except for PO, existing measurement scales were utilized or adapted. Following other researchers (Hinkin, 1995), a consistent 7-point Likert-type scale with the endpoints of "strongly disagree" and "strongly agree" was applied (slightly adapted if necessary) for measuring the predictors (PO and EO) and outcome variables (innovation and financial performance). A confirmatory factor analysis (CFA) was performed for scale purification and to verify the validity of the measurement model. Appendix AIII depicts the measurement items used for the constructs PO, EO, IP, and FP.

*Purchasing Orchestration*. The items are based on related constructs and conceptual literature. Relevant constructs included resource integration practices, sourcing processes, SCM practices, and orchestration practices (Hitt et al., 2011; Sirmon et al., 2007, 2011; Vanpoucke et al., 2014; Wowak et al., 2016; Schmelzle and Tate, 2022), which were adapted based on expert advice.

*Entrepreneurial Orientation*. The scale items of EO were based on existing scales in the seminal literature on innovation management and entrepreneurship and slightly adapted for this study (George and Marino, 2011; Dong et al., 2020). EO includes risk-taking, innovativeness, and proactiveness.

*Innovation and Financial Performance*. The applicability of survey data rather than secondary data for measuring organizational performance has been confirmed repeatedly (Lonial and Carter, 2015; Wiklund et al., 2011; Wiklund and Shepherd, 2003). Both perceptual (subjective) performance measures and (objective) measures based on secondary performance data

led to the same conclusions (Lonial and Carter, 2015; Rosenbusch et al., 2013). Compared to archival data, survey data allowed a way to capture a broader scope and multiple performance dimensions (Lonial and Carter, 2015).

*Control Variables.* Two control variables were added to safeguard the generalizability of the findings (Wagner, 2010), avoid omitting influential constructs (Flöthmann et al., 2018), and control for potential confounding consequences. First, firm size might influence organizational performance because large organizations have easier access to essential resources and innovative suppliers. Second, the innovation type (external vs. internal development) was another control variable. The participants indicated whether internal development, buying, or joint development with external partners prevailed at the firm.

*Survey Instrument Development*

A detailed survey pre-test was conducted with fifteen supply chain management experts (scholars and practitioners) who provided feedback about the questions' clarity and survey length (Dillman, 2007). Based on their comments, the attention checks and marker variables were slightly adjusted to ensure a better question flow. Two marker variable questions were dropped, and the wording of some questions was refined to eliminate ambiguity (Schwarz, 1999).

*Sample and Data Collection*

The unit of analysis is the organization. To address the research questions, the preferred target respondents were business-to-business (B2B) managers and SCM professionals with a sufficient level of knowledge about the innovation activities in their organization.

*Panel Data*. The B2B panel from Qualtrics was used. To study inter-organizational and sourcing phenomena, researchers have successfully utilized the panel data collection approach (Zhang and Li, 2019; Grela and Hofman, 2021). The response quality of survey research using assistance from survey research firms appears to show no significant difference compared to traditional mail-/phone-based surveys, with respondents being adequately knowledgeable about the subject matter (Morgan et al., 2016; Schoenherr et al., 2015). A key informant approach was applied because single respondents are advantageous if they can provide specialized knowledge and insights about the desired phenomena (Kumar et al., 1993; Kortmann et al., 2014).

*Data Screening*. The collected responses were assessed to arrive at a final data set. Screening questions were used to verify the respondent's qualifications. The participants' experience level with innovation projects was used as a qualifying screening question at the beginning of the survey. Moreover, all participants were required to answer an SCM topic question, and unacceptable answers led to removing the participant from the analysis. The screening questions ensured that the participants contributed a high level of experience with innovation practices in their organization (Schoenherr et al., 2015). After a successful pilot test, the primary sample was taken. The data were assessed regarding missing data, unengaged responses with obvious patterns (e.g., straight-lining or yea-saying), and speeders (Zhang and Conrad, 2014; Schoenherr et al., 2015). All respondents correctly recognized the three attention checks (which included a different category each time). In total, 247 complete, high-quality responses were retained for the subsequent data analysis.

*Common Methods and Nonresponse Bias*. Proactive measures were taken in the survey design to avoid the influence of nonresponse (NRB) and common method bias (CMB) (Kortmann et al., 2014; Ciampi et al., 2021). The use of Qualtrics panel data ensured the anonymity of all

participants to the researchers, thereby minimizing the influence of NRB, social desirability bias (SDB) (Dillman, 2007), and ultimately CMB (Podsakoff et al., 2003). The independent and dependent variables were positioned in separate sections of the questionnaire to minimize the potential influence of CMB (Podsakoff et al., 2003). All hypotheses were specified in a positive direction. The respondents were highly familiar with the subject matter (Morgan et al., 2016), which mitigates single-source bias. Assessing NRB, a means comparison test revealed no significant difference between the response means of the first 30 and the last 30 respondents (Hair et al., 2010; Flöthmann et al., 2018).

Furthermore, Harman's single-factor test was conducted to assess whether one factor accounted for most of the variance (Ciampi et al., 2021). Different extraction methods (maximum likelihood, principle axis factoring, and principle components) were used, and no single factor accounted for more than 50% of the explained variance in the model. Finally, a marker variable theoretically unrelated to the primary constructs was used to detect potential CMB (Lindell and Whitney, 2001; Ciampi et al., 2021). Thus, any correlation in the data would reflect common method variance. However, the marker showed little correlation to the other constructs. The assessment results suggest that neither NRB nor CMB were a severe concern in this research.

*Demographics*. The final data set represented a wide variety of organizations ranging from below 100 people to large corporations with > 50,000 employees (Appendix AI) and reported a relatively high level of job responsibility. Apart from 11 % of owners (including partners), more than 70% held a managerial position (Table I). Such extensive professional experience and managerial qualifications should enable a thorough perspective on the phenomenon across a broad section of organizations. Participants represent a good mix of companies regarding size, industries,

and functional responsibilities. The functional supply chain expertise was distributed broadly, and the participants represented all vital supply chain and related functions (Appendix AII).

****Insert Table I Approximately Here****

*The Measurement Model*

Construct Validity. Results of a confirmatory factor analysis in SPSS 26 using maximum likelihood extraction with varimax rotation indicated that items loaded strongly onto their respective constructs. Convergent validity was assessed using average variance extracted (AVE) and congeneric reliability (Table II). Discriminant validity was assessed using the heterotrait-monotrait (HTMT) test. The HTMT test produces a ratio of the average correlations of indicators across two constructs relative to the geometric mean of the averages of the correlations of indicators within each construct. An HTMT ratio of less than 0.85 suggests discriminant validity (Henseler et al., 2015; Ciampi et al., 2021). All constructs met the criteria for discriminant validity (Table III). In addition, a measurement model was also created in AMOS 25 to test the validity of the model as a whole. As displayed in Table IV, the results indicated that the measurement model exceeded minimum acceptable limits across all major criteria (Hooper et al., 2008).

*****Insert Table II Approximately Here*****

*****Insert Table III Approximately Here*****

*****Insert Table IV Approximately Here*****

**Results**

*Model Analysis and Hypotheses Testing*

The hypotheses were tested in SPSS 26 using the PROCESS macro (Hayes, 2017). PROCESS is particularly well suited for the simultaneous test of conditional direct and indirect effects and was viewed as an appropriate tool for hypothesis testing (Hayes, 2017). Specifically, the PROCESS Model 59, which mirrors this paper's hypothesized relationships, was applied. Output from PROCESS Model 59 provides two regression models and additional information on conditional and unconditional direct and indirect effects. Bootstrapping with 5,000 iterations was performed to verify the robustness of the modeling results (assessing whether the observed indirect effects are statistically significant) and to determine the bias-corrected confidence intervals (Hayes, 2017). Results from the moderated mediation test are displayed in Table V.

*****Insert Table V Approximately Here*****

In Model 1, where the focal outcome variable is innovation performance, results indicate a strong direct effect of PO→IP ( $\beta$ =.3944; p=.0069) and that EO has no moderating impact on the PO→IP relationship ( $\beta$ =-.0002; p=.9954). In Model 2, where financial performance is the focal outcome variable, there is no significant effect of PO→FP ( $\beta$ =-.3276; p=.1294) when EO = 0. Instead, the effect of PO→FP only occurs in the presence of EO. Thus, the significant POxEO interaction effect indicates that EO moderates the PO→FP relationship ( $\beta$ =.1308; p=.0039). The additional information on the conditional effects shows that PO's impact on financial performance increases from $\beta$ =.2284 at low levels of EO to $\beta$ =.5228 at high levels of EO. Indeed, EO moderates the PO→FP relationship at each of the subdimensions of PO (see Table VI).

Also seen in Model 2, results indicate a strong direct effect of IP→FP ( $\beta$ =.4805; p=.0236); however, EO has no moderating impact on the IP→FP relationship ( $\beta$ =-.0217; p=.6367). In other

words, IP maintains a strong, invariant direct effect on FP across levels of EO, as shown in the additional information.

The results of the moderated mediation analysis support all hypotheses except for $H_{3A}$ and $H_{3C}$ (Table V). Based on Model 1, the interaction between PO and EO is not significant (t= -.0057, $p$ = .9954). Thus, Hypothesis $H_{3A}$ is not supported. Entrepreneurial orientation does not moderate the relationship between purchasing orchestration and innovation performance. As hypothesized in $H_{3B}$, entrepreneurial orientation does strengthen the positive relationship between purchasing orchestration and financial performance. The results of Model 2 indicate that the interaction between PO and EO is significant (t= 2.9291, $p$ = .0039) for financial performance as a DV. However, for financial performance as DV, the interaction effect between innovation performance and EO is not significant (t= -.4731, $p$ = .6367), so Hypothesis $H_{3C}$ is not confirmed. The control variables showed no significant effects in Model 1 and Model 2.

In Table VI, Models 1A – 1C show the direct and indirect effects of the PO subdimensions structuring (PO_S), bundling (PO_B), and leveraging (PO_L) on organizational performance. Similar patterns can be seen in Table V. Results indicate strong direct effects of the PO subdimensions on IP, with no moderating effect from EO. Results also show that EO does have a clear moderating effect on the relationship between the PO subdimensions FP. Results indicate a strong direct effect of leveraging on innovation performance, PO_L→IP (β=.4870; p=.0004). The additional information on the conditional effects indicates that PO_L's impact on FP increases from β=.1850 at low EO levels to β=.3712 at high EO levels. Bundling shows the highest impact on FP: PO_B→FP increases from β=.1823 at low EO levels to β=.4201 at high levels of EO. A review of the hypotheses testing outcomes is summarized in Table VII.

*****Insert Table VI Approximately Here*****

*****Insert Table VII Approximately Here*****

**Discussion and Contribution**

This research aimed to analyze the performance implications of PO practices and the corresponding influence of EO on these relationships since this phenomenon needs additional research. Testing the new conceptualization of PO indicated important direct and indirect effects on an organization's innovation and financial performance, which will be discussed in this section.

Based on the literature, positive direct effects of resource orchestration practices on innovation and financial performance were hypothesized. The empirical results supported Hypotheses $H_{1A}$, $H_{1B}$, and $H_2$ as the direct effects of the conceptualized model were all significant (Table V). The research findings indicate that purchasing orchestration strongly and significantly affects innovation and financial performance. Hence, this research is consistent with the theoretical frameworks of resource orchestration and open innovation. As hypothesized, the study also revealed that IP positively impacts FP, confirming $H_2$. This finding is also consistent with the innovation literature. Furthermore, the mediation analysis revealed that innovation performance mediates the relationship between PO and financial performance.

Notably, the modeling results have exciting ramifications concerning the hypothesized moderating effects. This research was motivated by understanding the moderating influence of varying degrees of entrepreneurial orientation on the primary relationships of the PO conceptual model. The results of the moderated mediation analysis revealed that only some of the proposed moderation hypotheses were supported. Interestingly, EO plays a different moderating role in terms of organizational performance consequences of PO, being significant regarding financial (hypothesis $H_{3B}$) but non-significant regarding innovation performance (hypothesis $H_{3A}$). Likewise, EO does not moderate the IP–FP relationship (hypothesis $H_{3C}$).

As an important finding, entrepreneurial orientation moderates the positive effect of PO on financial performance (hypothesis $H_{3B}$). In an organization with a high level of EO, the PO practices will have a higher impact on financial performance than in an organization with relatively low or medium EO levels. However, EO significantly influences neither the PO–IP nor the IP–FP relationships, as neither $H_{3A}$ nor $H_{3C}$ was supported. This finding appears counter-intuitive and contrary to the literature. As prior research has already established that EO directly affects innovation performance (Yun et al., 2016), this study focused on EO's moderating instead of direct effects. Based on the research results, the level of EO does not significantly affect how PO influences innovation performance. With the direct effect being positive and significant, PO appears to positively affect innovation performance regardless of the entrepreneurial environment in an organization.

There are three potential explanations why $H_{3A}$ was not supported in contrast to $H_{3B}$. One reason might relate to the operationalization of entrepreneurial orientation. Recall that EO is frequently applied as a unidimensional construct (Rosenbusch et al., 2013). EO includes innovativeness, risk-taking, and proactiveness (Tuan, 2017). The other two traits might neutralize a positive moderating effect of the "innovativeness" trait on innovation performance. For example, companies demonstrating a strong tendency toward proactiveness might experience a higher benefit from their PO practices in achieving financial rather than innovation performance. Future research could apply EO as a multi-dimensional construct and further investigate the moderating impact.

A second potential explanation relates to the operationalization of the innovation performance construct. Following the relevant literature, innovation performance was treated as a single-level construct in this research study. However, future research might investigate the effects

when treating IP as a multi-dimensional construct. IP might encompass innovation effectiveness and efficiency, the latter referring to the time and cost investment for innovation activities (Wagner, 2010). When looking at a broader, multi-dimensional IP construct, the moderating consequences of EO might be less impactful. Specifically, companies with a high propensity for risk-taking might not show a significant moderating impact on their innovation efficiency characteristics when looking at the relationship between PO and IP.

A third potential explanation might be that a solid entrepreneurial orientation positively influences the synchronization of all three PO practices of structuring, bundling, and leveraging (especially concerning leveraging practices) and thus results in higher financial performance (without affecting IP). Lower levels of EO appear to limit the successful conversion from innovativeness to financial success. More research is needed to understand better why EO has only partial moderating consequences on some but not all PO–Performance relationships.

Finally, hypothesis $H_{3C}$ was also not confirmed. EO did not significantly moderate the relationship between IP and FP. A possible explanation might be that EO has little impact on the organizational capability to convert innovation performance into higher financial outcomes. EO is a part of corporate culture and is characterized as an organization's stance toward entrepreneurship and innovation. Based on such a definition, it could be argued that once an organization has achieved innovation success, the stance toward innovation possibly becomes less impactful on financial performance. Looking at the IP–FP relationship, effective project management or marketing-related aspects might have a more significant influence than EO. Other dimensions of organizational culture might also be more relevant. Factors such as market orientation (MO) or an operational efficiency focus might lead to higher performance concerning top-line or bottom-line results. Future research should explore the moderating impact of additional cultural dimensions on

the IP–FP relationship. The conditional effect of supply chain orientation (looking both upstream and downstream) on the PO–Performance relationship would be another exciting area of future research.

To conclude, the analysis results imply that EO functions as an essential enabler to boost the performance consequences of PO in terms of financial success. This research highlights the vital relationship between PO and innovation and financial performance and the role of EO in this critical phenomenon.

*Theoretical Contribution*

There are several theoretical contributions from this research. First, scholars have shown that organizations must better understand the process of effectively sharing and absorbing external resources (Bezuidenhout and Bean, 2022). This study provides new insights into orchestrating external resources by addressing an under-researched area in the literature. The existing supply chain management literature stream is extended by introducing and empirically testing a conceptual model of PO confirming PO's role as an antecedent of organizational performance.

The positive direct effect of PO on both innovation and financial performance is confirmed. Furthermore, it is demonstrated that entrepreneurial orientation significantly strengthens the positive relationship between PO and financial performance. This relationship substantiates EO's more profound role and impacts as a construct in the resource management and supply chain management literature streams.

Second, the open innovation framework is broadened by highlighting the crucial role of managerial orchestration practices in general and PO practices in particular, adding an SCM perspective to the innovation literature stream. This research demonstrates effective resource

orchestration practices' positive contribution to organizational performance in the context of open innovation. The resource management perspective complements the body of knowledge in the OI research stream. The call for more research on the supply side within the open innovation approach was also addressed by confirming the critical performance impact of purchasing orchestration (Schmelzle and Tate, 2022) and indicating additional drivers of organizational performance (Liao et al., 2022).

Third, confirming the PO framework contributes to the resource orchestration literature by providing empirical validation for that theory. The PO operationalization can serve as a foundation for future studies. For example, the leveraging construct relates to the relationship with customers and other supply chain entities. In contrast to prior resource orchestration literature primarily focusing on internal resources, this research demonstrates that successful organizations leverage new capabilities based on an innovative reconfiguration and combination of internal and external resources (Nemeh and Yami, 2019).

Another contribution relates to the connection of supply chain management and innovation literature streams to address a phenomenon at the intersection of both fields. The findings bridge both fields. Advancements in innovation drive a new supply chain management perspective and vice versa. A complex phenomenon will need to be thoroughly grounded in both literature streams. The literature on open innovation from a supply chain management perspective appears relatively fragmented, meaning that this research might initiate further studies. Drawing from SCM and innovation literature streams, a new cumulative body of knowledge is emerging, enhancing cross-disciplinary knowledge building.

To conclude, the PO framework extends beyond the knowledge exchange within the supply chain. Instead, PO is a systematic process of acquiring, integrating, and exploiting essential

external resources (Sirmon et al., 2011) and requires more research attention. Scholars have investigated SCI and collaboration with external partners, with external knowledge shared among supply chain partners (Yuen and Thai, 2017; Haque and Islam, 2018; Nemeh and Yami, 2019; Liao et al., 2022).

*Managerial Implications*

Purchasing orchestration practices relate to managing the inflow, integration, and commercialization of critical resources from supply chain members, strengthening the internal innovation processes to achieve a competitive advantage, and enhancing organizational performance (Chesbrough and Crowther, 2006; Enkel et al., 2020).

This research highlights the critical performance consequences of PO practices and encourages managers to coordinate better and synchronize the three PO processes of structuring, bundling, and leveraging support. Managers need to scrutinize their resource management practices and achieve a balance in how resources are orchestrated to improve their organizations' performance. Recent McKinsey reports attested to this study's findings, emphasizing that supply chain resources contribute noticeably to organizational success during a post-crisis environment Managers must be astute in orchestrating those resources (Am et al., 2020). Hence, managers are advised to enhance the organizational capabilities regarding strategic resource portfolio management due to the rising competitive importance of external resources.

Most importantly, this research demonstrates the crucial moderating effect of entrepreneurial orientation with an impact on financial performance. This should draw the practitioners' attention toward enhancing and maintaining a high level of entrepreneurial orientation in the organization. As the conditional effects on FP indicate (Tables V and VI), the

higher the level of EO, the higher the performance impact of effective PO practices. Consequently, managers are advised to shape the entrepreneurial orientation in their organization in addition to implementing effective PO practices. The study shows that medium and high levels of EO substantially impact how PO can affect organizational performance. The moderating effect of EO is particularly noticeable for structuring and bundling practices.

Specifically, the bundling practices showed the largest effect sizes in an environment of medium and high EO levels. Because of this, managers are advised to assess their internal practices of external knowledge acquisition, integration and absorption, and reconfiguration to create new strategic capabilities. Thereby, managers can drive the creation of new strategic capabilities assuming a sufficient level of EO in the company. Consequently, managers could exploit potential improvement opportunities within their organization based on the study's findings.

Additionally, managers will better understand the opportunity for the purchasing function to raise its strategic role within the organization. The objective is to develop and refine impactful managerial practices regarding identifying, acquiring, integrating, reconfiguring, and exploiting relevant external resources. Supply chain managers could play a significant role in establishing new, competitive PO capabilities that are highly difficult to imitate. This should create a sustainable competitive advantage in the marketplace.

**Conclusions, Limitations, and Future Research**

Accepting the strategic necessity of continuous innovation, organizations are increasingly orchestrating resources derived from external entities to create customer value. This research confirmed the positive impact of PO practices on organizational performance, and it explains how

companies can utilize internal and external resources to generate value. However, the study has several limitations.

First, uni-dimensional constructs were used, which is a limitation. There needs to be more consistency in the literature concerning operationalization, especially regarding the EO and IP constructs (George and Marino, 2011; Rosenbusch et al., 2013). As indicated in the discussion section, the moderating influences of EO traits, such as risk-taking or innovativeness, could (partially) offset each other. Similarly, using a broad, aggregated IP construct and not separating the innovation-related and the efficiency-related sub-dimensions of IP might have resulted in mixed moderation analysis results. A follow-up study could test an extended PO model and investigate the impact of the multi-dimensionality of the key constructs to provide new insights.

Another limitation is that this research focused on the moderating influence of entrepreneurial orientation on the relationship between PO and organizational performance. Further research could investigate additional moderating effects in the PO framework. The influence of new dimensions of organizational culture might need to be studied in more detail. Extending this PO conceptual model, further moderating effects on the PO–Performance relationship might be analyzed, especially regarding the performance implications of different contextual and cultural dimensions or an organization's governance structure.

It could be insightful to investigate the absorptive or integration capacity of the focal organization and assess the coordination capability to integrate relevant external resources effectively (Lamont et al., 2019). For instance, coordinating knowledge integration effectively might depend on several organizational aspects (Liao et al., 2022). As discussed, the firm-wide openness to new ideas from the outside plays a role (Bejlegaard et al., 2021). In addition, the

potential influence of governance structure (including agreements and contracts) and internal workflows and procedures might be investigated in future research.

PO requires effective collaboration with external and internal supply chain entities. Hence, the three PO processes of structuring, bundling, and leveraging could be analyzed in more depth and detail, focusing on how an organization can effectively connect the different entities to enhance the knowledge exchange and, subsequently, capability reconfiguration. Future research could extend the study to investigate the coordination and collaboration practices necessary to overcome organizational boundaries. Going beyond the focal organization, collecting dyadic or triadic data would provide the complementary perspective of supply chain partners.

Another future research opportunity is investigating potential performance impact variations of purchasing orchestration in different industrial settings in more detail. Possibly, PO practices show stronger effects in specific industries characterized by rapid innovation cycles. Finally, the conceptual model (Figure 1) could be tested in subsequent studies to compare and contrast purchasing orchestration practices between nascent firms and established large corporations.

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## Appendix

****Insert Appendices AI through AIII Approximately Here****

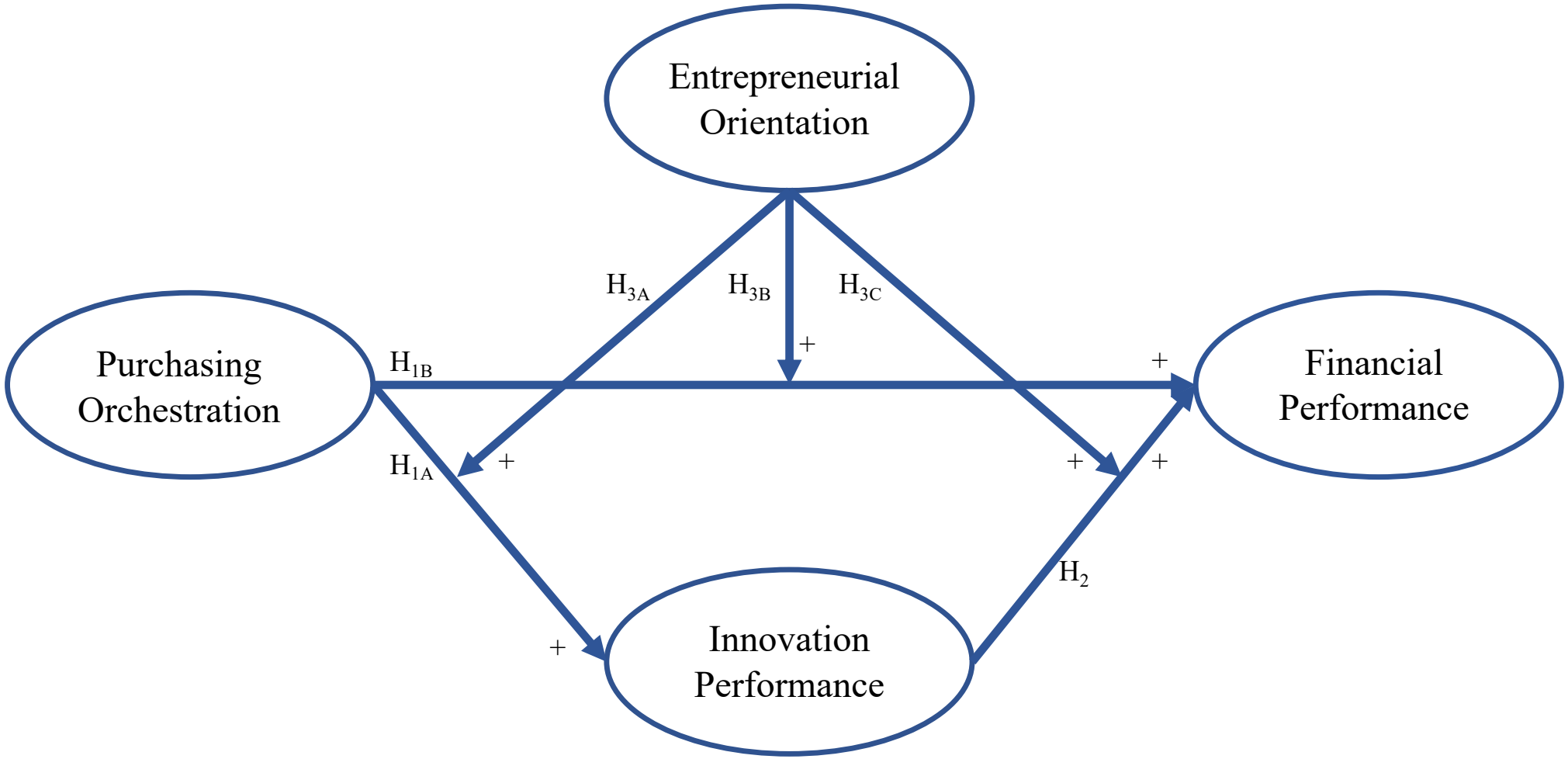


Figure 1. Conceptual Model of PO

**Table I.**
Demographics: Participant experience (tenure) and level of responsibility

| No. of Years Employed at Current Organization | Frequency | Percentage | Cumulative Percentage | Job Title / Responsibility | Frequency | Percentage | Cumulative Percentage |
|---|---|---|---|---|---|---|---|
| Less than 1 year | 3 | 1.2 | 1.2 | Manager, Supervisor, Head of Function | 79 | 32.0 | 32.0 |
| 1 – 4.9 years | 46 | 18.6 | 19.8 | Director, SVP, VP, Plant Mgr, General Mgr | 58 | 23.5 | 55.5 |
| 5 – 9.9 years | 106 | 42.9 | 62.8 | CEO, COO, CFO | 39 | 15.8 | 71.3 |
| 10 – 14.9 years | 43 | 17.4 | 80.2 | Specialist | 31 | 12.6 | 83.8 |
| 15 – 19.9 years | 19 | 7.7 | 87.9 | Owner, (Managing) Partner | 28 | 11.3 | 95.1 |
| 20 years or more | 30 | 12.1 | 100.0 | Undisclosed | 12 | 4.9 | 100.0 |
| **Total** | **247** | **100.0** | | **Total** | **247** | **100.0** | |

**Table II.**
Convergent Validity and Reliability Analysis

| Construct | Item | Mean | St. Dev | Loading† | Validity (AVE)* | Reliability ($\rho_C$)‡ |
|---|---|---|---|---|---|---|
| Purchasing Orchestration | PO_1 | 5.50 | 1.32 | .766 | .613 | .95 |
| | PO_2 | 5.65 | 1.42 | .757 | | |
| | PO_3 | 5.67 | 1.33 | .807 | | |
| | PO_4 | 5.70 | 1.26 | .833 | | |
| | PO_5 | 5.65 | 1.14 | .770 | | |
| | PO_6 | 5.71 | 1.13 | .712 | | |
| | PO_7 | 5.55 | 1.24 | .740 | | |
| | PO_8 | 5.73 | 1.23 | .836 | | |
| | PO_9 | 5.05 | 1.47 | .784 | | |
| | PO_10 | 5.36 | 1.35 | .855 | | |
| | PO_11 | 5.40 | 1.42 | .820 | | |
| | PO_12 | 5.66 | 1.28 | .727 | | |
| | PO_13 | 5.69 | 1.25 | .753 | | |
| Entrepreneurial Orientation | EO_1 | 5.28 | 1.38 | .803 | .638 | .88 |
| | EO_2 | 5.21 | 1.52 | .841 | | |
| | EO_3 | 4.80 | 1.62 | .739 | | |
| | EO_4 | 5.23 | 1.42 | .809 | | |
| Innovation Performance | IP_1 | 5.47 | 1.26 | .740 | .627 | .83 |
| | IP_2 | 5.48 | 1.43 | .866 | | |
| | IP_3 | 5.58 | 1.41 | .764 | | |
| Financial Performance | FP_1 | 5.36 | 1.17 | .733 | .626 | .87 |
| | FP_2 | 5.27 | 1.22 | .811 | | |
| | FP_3 | 5.33 | 1.19 | .779 | | |
| | FP_4 | 5.45 | 1.19 | .839 | | |

*† Maximum likelihood extraction with varimax rotation*
** AVE Average Variance Extracted = Average of squared factor loadings*
*‡ $\rho C = (\Sigma\lambda)2 / [\ (\Sigma\lambda)2 + (\Sigma\sigma 2)\ ]$*

**Table III.**
Discriminant Validity Analysis (Heterotrait-Monotrait Ratios)

| | PO | EO | IP |
|---|---|---|---|
| EO | .780 | | |
| IP | .793 | .836 | |
| FP | .721 | .725 | .819 |

*HTMT ratio less than .85 indicates discriminant validity*

**Table IV.**
Measurement Model Results from AMOS 25

| Measurement Model | $\chi^2$ | Prob. *p* | Df | $\chi^2$/df | CFI | RMSEA | *P*-CLOSE |
|---|---|---|---|---|---|---|---|
| | 548.573 | .000 | 246 | 2.230 | .937 | .069 | .000 |

**Table V.**
Moderated Mediation Effects of PO on Organizational Performance

| **Model 1** | **Effect** | **SE** | **t (sig)** | **LLCI*** | **ULCI*** |
|---|---|---|---|---|---|
| **Dependent Variable** | | | | | |
| Innovation Performance (IP) | | | | | |
| **Controls** | | | | | |
| Innovation Type | -0.0139 | 0.1062 | -0.1307(0.8961) | -0.2234 | 0.1956 |
| Firm Size | -0.0024 | 0.0369 | -0.0649(0.9483) | -0.0753 | 0.0705 |
| **Independent Variables** | | | | | |
| Purchasing Orchestration (PO) | 0.3944 | 0.1443 | 2.7334(0.0069) | 0.1096 | 0.6792 |
| Entrepreneurial Orientation (EO) | 0.4231 | 0.1605 | 2.6367(0.0091) | 0.1064 | 0.7398 |
| POxEO | -0.0002 | 0.0282 | -0.0057(0.9954) | -0.0559 | 0.0556 |
| **Model 1 Summary** | **$R^2$** | **$\Delta R^2$** | **F** | **p** | |
| Base Model | 0.6609 | - | 57.1752 | 0.0000 | |
| Including POxEO | | 0.0000 | 0 | 0.9954 | |

| **Model 2** | **Effect** | **SE** | **t (sig)** | **LLCI*** | **ULCI*** |
|---|---|---|---|---|---|
| **Dependent Variable** | | | | | |
| Financial Performance (FP) | | | | | |
| **Controls** | | | | | |
| Innovation Type | -0.1101 | 0.1062 | -1.0365(0.3014) | -0.3197 | 0.0995 |
| Firm Size | 0.0336 | 0.0372 | 0.9031(0.3677) | -0.0398 | 0.1070 |
| **Independent Variables** | | | | | |
| Purchasing Orchestration (PO) | -0.3276 | 0.2150 | -1.5236(0.1294) | -0.7520 | 0.0968 |
| Innovation Performance (IP) | 0.4805 | 0.2105 | 2.2830(0.0236) | 0.0651 | 0.8960 |
| Entrepreneurial Orientation (EO) | -0.4617 | 0.1789 | -2.5801(0.0107) | -0.8148 | -0.1085 |
| POxEO | 0.1308 | 0.0447 | 2.9291(0.0039) | 0.0427 | 0.2190 |
| IPxEO | -0.0217 | 0.0458 | -0.4731(0.6367) | -0.1121 | 0.0688 |
| **Model 2 Summary** | **$R^2$** | **$\Delta R^2$** | **F** | **p** | |
| Base Model | 0.6204 | - | 35.5546 | 0.0000 | |
| Including POxEO | | 0.0187 | 8.5799 | 0.0039 | |
| Including IPxEO | | 0.0005 | 0.2239 | 0.6367 | |

| | **Effect** | **SE** | **t (sig)** | **LLCI*** | **ULCI*** |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| **Additional Info on Conditional Direct Effect of PO→FP** | | | | | |
| At Low Levels of EO | 0.2284 | 0.0770 | 2.9653(0.0034) | 0.0764 | 0.3805 |
| At Medium Levels of EO | 0.4247 | 0.0944 | 4.4975(0.0000) | 0.2383 | 0.6110 |
| At High Levels of EO | 0.5228 | 0.1174 | 4.4546(0.0000) | 0.2912 | 0.7544 |
| **Additional Info on Conditional Indirect Effect of PO→IP→FP** | | | | | |
| At Low Levels of EO | 0.1529 | 0.0531** | n/a | 0.0743** | 0.2802** |
| At Medium Levels of EO | 0.1400 | 0.0480** | n/a | 0.0608** | 0.2491** |
| At High Levels of EO | 0.1336 | 0.0634** | n/a | 0.0298** | 0.2784** |

**95% level of confidence for all reported confidence intervals (CI)*
*** Bootstrapped estimates using a sample of 5,000*

**Table VI.**
Moderated Mediation Effects of the PO Subdimensions on Organizational Performance

| **Model 1A** | **Effect** | **SE** | **t (sig)** | **LLCI*** | **ULCI*** |
|---|---|---|---|---|---|
| **Dependent Variable** | | | | | |
| Innovation Performance (IP) | | | | | |
| **Independent Variables** | | | | | |
| PO_S (Structuring) | 0.1810 | 0.1290 | 1.4029(0.1624) | -0.0736 | 0.4356 |
| Entrepreneurial Orientation (EO) | 0.4942 | 0.1522 | 3.2467(0.0014) | 0.1938 | 0.7947 |
| PO_SxEO | 0.0078 | 0.0266 | 0.2945(0.7687) | -0.0446 | 0.0603 |
| **Model 1A Summary** | **$R^2$** | **$\Delta R^2$** | **F** | **p** | |
| Base Model | 0.6335 | - | 50.6941 | 0.0000 | |
| Including PO_SxEO | | 0.0002 | 0.0867 | 0.7687 | |

| **Model 1B** | **Effect** | **SE** | **t (sig)** | **LLCI*** | **ULCI*** |
|---|---|---|---|---|---|
| **Dependent Variable** | | | | | |
| Innovation Performance (IP) | | | | | |
| **Independent Variables** | | | | | |
| PO_B (Bundling) | 0.1411 | 0.1480 | 0.9536(0.3416) | -0.1509 | 0.4331 |
| Entrepreneurial Orientation (EO) | 0.3987 | 0.1675 | 2.3800(0.0184) | 0.0681 | 0.7293 |
| PO_BxEO | 0.0234 | 0.0292 | 0.8036(0.4227) | -0.0341 | 0.0810 |
| **Model 1B Summary** | **$R^2$** | **$\Delta R^2$** | **F** | **p** | |
| Base Model | 0.6327 | - | 50.5385 | 0.0000 | |
| Including PO_BxEO | | 0.0013 | 0.6457 | 0.4227 | |

| **Model 1C** | **Effect** | **SE** | **t (sig)** | **LLCI*** | **ULCI*** |
|---|---|---|---|---|---|
| **Dependent Variable** | | | | | |
| Innovation Performance (IP) | | | | | |
| **Independent Variables** | | | | | |
| PO_L (Leveraging) | 0.4870 | 0.1353 | 3.6002(0.0004) | 0.2201 | 0.7540 |
| Entrepreneurial Orientation (EO) | 0.5470 | 0.1426 | 3.8354(0.0002) | 0.2655 | 0.8285 |
| PO_LxEO | -0.0243 | 0.0257 | -0.9456(0.3456) | -0.0751 | 0.0264 |
| **Model 1C Summary** | **$R^2$** | **$\Delta R^2$** | **F** | **p** | |
| Base Model | 0.6654 | - | 58.3216 | 0.0000 | |
| Including PO_LxEO | | 0.0017 | 0.8942 | 0.3456 | |

| | Effect | SE | t (sig) | LLCI* | ULCI* |
|---|---|---|---|---|---|
| **PO_S: Additional Info on Conditional Effects** | | | | | |
| **Direct Effect of PO_S→FP** | | | | | |
| PO_S→FP At Low Levels of EO | 0.1102 | 0.0560 | 1.9677(0.0507) | -0.0003 | 0.2207 |
| PO_S→FP At Medium Levels of EO | 0.2365 | 0.0736 | 3.2153(0.0016) | 0.0913 | 0.3817 |
| PO_S→FP At High Levels of EO | 0.2997 | 0.0927 | 3.2318(0.0015) | 0.1167 | 0.4827 |
| **Indirect Effect of PO_S→IP→FP** | | | | | |
| PO_S→IP→FP At Low Levels of EO | 0.0931 | 0.0372** | n/a | 0.0280** | 0.1754** |
| PO_S→IP→FP At Medium Levels EO | 0.1040 | 0.0372** | n/a | 0.0353** | 0.1826** |
| PO_S→IP→FP At High Levels of EO | 0.1098 | 0.0497** | n/a | 0.0209** | 0.2135** |
| **PO_B: Additional Info on Conditional Effects** | | | | | |
| **Direct Effect of PO_B→FP** | | | | | |
| PO_B→FP At Low Levels of EO | 0.1823 | 0.0654 | 2.7896(0.0059) | 0.0533 | 0.3113 |
| PO_B→FP At Medium Levels of EO | 0.3408 | 0.0824 | 4.1344(0.0001) | 0.1781 | 0.5035 |
| PO_B→FP At High Levels of EO | 0.4201 | 0.1022 | 4.1121(0.0001) | 0.2184 | 0.6217 |
| **Indirect Effect of PO_B→IP→FP** | | | | | |
| PO_B→IP→FP At Low Levels of EO | 0.0972 | 0.0492** | n/a | 0.0321** | 0.2224** |
| PO_B→IP→FP At Medium Levels EO | 0.1118 | 0.0365** | n/a | 0.0458** | 0.1898** |
| PO_B→IP→FP At High Levels of EO | 0.1192 | 0.0464** | n/a | 0.0273** | 0.2119** |
| **PO_L: Additional Info on Conditional Effects** | | | | | |
| **Direct Effect of PO_L→FP** | | | | | |
| PO_L→FP At Low Levels of EO | 0.1850 | 0.0781 | 2.3684(0.0190) | 0.0308 | 0.3392 |
| PO_L→FP At Medium Levels of EO | 0.3092 | 0.0822 | 3.7614(0.0002) | 0.1469 | 0.4714 |
| PO_L→FP At High Levels of EO | 0.3712 | 0.1022 | 3.6338(0.0004) | 0.1696 | 0.5729 |
| **Indirect Effect of PO_L→IP→FP** | | | | | |
| PO_L→IP→FP At Low Levels of EO | 0.1573 | 0.0515** | n/a | 0.0699** | 0.2694** |
| PO_L→IP→FP At Medium Levels EO | 0.1499 | 0.0411** | n/a | 0.0720** | 0.2357** |
| PO_L→IP→FP At High Levels of EO | 0.1457 | 0.0546** | n/a | 0.0437** | 0.2581** |

**95% level of confidence for all reported confidence intervals (CI)*

*** Bootstrapped estimates using a sample of 5,000*

**Table VII.**
Hypotheses Tests – Summary of Results

| Hypothesis | Model | Dependent Variable | Proposed Effect | Results |
|---|---|---|---|---|
| **$H_{1A}$** (PO → IP) | Model 1 | IP | Positive | Supported |
| **$H_{3A}$** (PO * EO) | Model 1 | IP | Positive | Not supported |
| **$H_{1B}$** (PO → FP) | Model 2 | FP | Positive | Supported |
| **$H_{2}$** (IP → FP) | Model 2 | FP | Positive | Supported |
| **$H_{3B}$** (PO * EO) | Model 2 | FP | Positive | Supported |
| **$H_{3C}$** (IP * EO) | Model 2 | FP | Positive | Not supported |

**Appendix AI.**
Demographics: Firm Size

| No. of Employees | Frequency | Percentage | Cumulative Percentage | Estim. Annual Revenue (US$) | Frequency | Percentage | Cumulative Percentage |
|---|---|---|---|---|---|---|---|
| Less than 100 | 40 | 16.2 | 16.2 | Less than $10 million | 61 | 24.7 | 24.7 |
| 100 – 999 | 68 | 27.5 | 43.7 | $10 million to $99 million | 79 | 32.0 | 56.7 |
| 1,000 – 4,999 | 75 | 30.4 | 74.1 | $100 million to $999 million | 56 | 22.7 | 79.4 |
| 5,0000 – 9,999 | 33 | 13.4 | 87.4 | $1 billion to $9.9 billion | 31 | 12.6 | 91.9 |
| 10,000 – 49,999 | 20 | 8.1 | 95.5 | $10 billion to $49.9 billion | 14 | 5.7 | 97.6 |
| 50,000 or more | 11 | 4.5 | 100.0 | $50 billion or more | 6 | 2.4 | 100.0 |
| **Total** | **247** | **100.0** | | **Total** | **247** | **100.0** | |

**Appendix AII.**

Demographics: Industry and Primary Function of Participants

| Industry | Frequency | Percentage | Cumulative Percentage | Primary Function | Frequency | Percentage | Cumulative Percentage |
|---|---|---|---|---|---|---|---|
| Others (e.g., consulting, engineering, services) | 62 | 25.1 | 25.1 | | | | |
| Consumer Products | 48 | 19.4 | 44.5 | | | | |
| Information technology, software | 34 | 13.8 | 58.3 | | | | |
| Industrial equipment, machinery, scientific tools | 25 | 10.1 | 68.4 | | | | |
| Banking, financial services, insurance | 21 | 8.5 | 76.9 | Marketing, Demand Mgt, Customer Service | 58 | 23.5 | 23.5 |
| Chemicals, health care, pharma, biotech | 15 | 6.1 | 83.0 | Supply Chain Planning, Strategy, Sourcing/ Purchasing | 57 | 23.1 | 46.6 |
| Transportation equipment (e.g., automotive, aerospace) | 15 | 6.1 | 89.1 | Manufacturing / (Service) Operations | 45 | 18.2 | 64.8 |
| Food and beverages, restaurants | 12 | 4.9 | 93.9 | Supply Chain IT / Systems | 42 | 17.0 | 81.8 |
| Energy, utilities, oil & gas | 7 | 2.8 | 96.8 | Research & Development | 23 | 9.3 | 91.1 |
| Media, advertisement, communications | 5 | 2.0 | 98.8 | Other | 13 | 5.3 | 96.4 |
| Electronics, electrical appliances | 3 | 1.2 | 100.0 | Logistics / Transportation | 9 | 3.6 | 100.0 |
| **Total** | **247** | **100.0** | | **Total** | **247** | **100.0** | |

**Appendix AIII.**
Measurement Items: PO, EO, IP, and FP

| Construct | Item | |
|---|---|---|
| Purchasing Orchestration* | PO_1 | Obtains externally available know how from the supply chain to complement existing capabilities |
| | PO_2 | Invests in innovative technology developed by external companies from the supply chain |
| | PO_3 | Renews its in-house process capabilities by adding expertise from suppliers |
| | PO_4 | Captures knowledge from the supply chain |
| | PO_5 | Recombines external knowledge to create new organizational know how |
| | PO_6 | Converts external knowledge into in-house capabilities |
| | PO_7 | Synchronizes internal with external innovation activities |
| | PO_8 | Coordinates the product /service development activities with members of our supply chain |
| | PO_9 | Creates liaison position(s) to facilitate the information flow with our suppliers |
| | PO_10 | Uses colocation between in-house experts and external development partners from the supply chain |
| | PO_11 | Emphasizes joint decision-making with key suppliers involved in NPD |
| | PO_12 | Offers innovative solutions to customers based on joint development with members of the supply chain |
| | PO_13 | Deploys supply chain resources to create customer value in the marketplace |
| Entrepreneurial Orientation† | EO_1 | Initiates actions which competitors then respond to |
| | EO_2 | Is the first business to introduce new products/services, administrative techniques, operating technologies, etc. |
| | EO_3 | A strong inclination for high risk projects (with chances of very high returns) |
| | EO_4 | Bold wide-ranging acts are necessary to achieve the firm's objectives |
| Innovation Performance‡ | IP_1 | Accelerated the commercialization pace of the new products or services by innovation |
| | IP_2 | Developed new technology to improve its operational processes |
| | IP_3 | Purchased new equipment to enhance productivity |
| Financial Performance‡ | FP_1 | Total sales relative to stated objectives |
| | FP_2 | Return on assets relative to stated objectives |
| | FP_3 | Return on investment related to stated objectives |
| | FP_4 | Profitability relative to stated objectives |

**Newly developed construct based on Hitt et al. (2011); Sirmon et al. (2007, 2011); Vanpoucke et al. (2014); Wowak et al. (2016), Schmelzle and Tate (2022)*
*†George and Marino (2011); Dong et al. (2020)*
*‡Wiklund and Shepherd (2003); Chen et al. (2009); Vanpoucke et al. (2014); Lonial and Carter (2015)*