

# B2B digital platform adoption by SMEs and large firms: Pathways and pitfalls

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## ABSTRACT

The ongoing paradigm shift towards two-sided and multi-sided platforms is reshaping business transactions and collaborations worldwide. Such digital platforms have found widespread acceptance in business-to-business markets, serving as catalysts for strategic networking, transparency, and traceability, especially in sourcing activities that demand strategic solutions for supplier selection and collaboration. Nonetheless, the variables influencing platform adoption in small and medium-sized enterprises (SMEs) and large firms remain somewhat opaque. In this study, the social network theory (SNT), diffusion of innovation (DOI) theory, and technology–organisation–environment (TOE) framework were used as analytical lenses. Drawing from a sample of 318 responses from supply chain managers, this study employs a fuzzy-set qualitative comparative analysis (fsQCA) to identify 15 configurations related to the adoption of two-sided platforms in both SMEs and large manufacturing firms. The results underscore that SMEs' drive for platform adoption is primarily anchored in their need for flexible, fluid networks, thus reinforcing the value of two-sided platforms in cultivating robust supplier relationships. In contrast, large firms are driven by potential advantages in efficiency and transactional security. However, the low adoption intention in both SMEs and large firms can be attributed to perceived barriers and a lack of perceived benefits, respectively.

## 1. Introduction

Globalisation has caused supply chains to transform into complex networks, presenting firms and strategic partners with a plethora of challenges (Hosseini & Ivanov, 2019). Under these circumstances, networking capabilities have emerged as key strategic assets that enable firms to maintain a competitive edge. Networks permit firms to collaborate, achieve economies of scale, and cultivate competitive advantages by sharing costs with partners (Peruchi, de Jesus Pacheco, Todeschini, & ten Caten, 2022).

Establishing and managing strategic supply networks has proven essential for manufacturing firms, particularly in their sourcing activities, to mitigate supplier risk exposure and to improve supplier selection, evaluation, and development (Hosseini & Ivanov, 2019). Efficient business–supplier networks can bolster the resilience of sourcing processes, the continuity of internal operations, and the synchronisation of

material flows (Xu, Elomri, Kerbache, & el Omri, 2020). Given the expansion of globalisation, firms can collaborate with a diverse array of suppliers and maintain efficient partnerships with the assistance of platforms capable of connecting an extensive network of partners (Peruchi et al., 2022; Shree, Singh, Paul, Hao, & Xu, 2021). As such, research indicates that innovative digital tools can facilitate strategic sourcing management and thereby strengthen relationships between partners and mitigate risk (Hosseini & Ivanov, 2019).

In this context, the recent proliferation of two-sided platforms can support firms' networking capabilities, ensuring the flexibility and continuity of sourcing processes. A two-sided platform is a specific type of multi-sided platform that facilitates interactions between two distinct yet interdependent customer groups by operating as a marketplace where supply and demand intersect without intermediation (Trabucchi & Buganza, 2020). It is a digital environment that connects potential buyers and sellers, thus allowing diverse entities to engage in economic

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exchanges, negotiations, and transactions and enhancing digital encounters between multiple actors (Trabucchi & Buganza, 2020).

Specifically, transaction platforms, which are the most common two-sided platforms, involve multiple customers interacting and participating in exchange activities (Teece, Pundziene, Heaton, & Vadi, 2022). Despite their widespread presence in various business contexts, transaction platforms have predominantly been studied in the context of business-to-consumer (B2C) relationships, such as Uber and Airbnb (Trabucchi & Buganza, 2020). In B2B contexts, two-sided platforms foster flexible, interconnected environments that help reduce transaction costs and increase transparency and information sharing, enabling firms to extend their boundaries (Wallbach, Coleman, Elbert, & Benlian, 2019). Given the increasing need for flexibility, traceability, and transparency in sourcing processes, two-sided platforms are becoming increasingly relevant for manufacturing firms struggling with rising sourcing costs and complexity (Wong, Leong, Hew, Tan, & Ooi, 2020).

However, despite the potential advantages of two-sided platforms, the perceived costs and challenges related to their integration with existing business processes may deter their adoption by manufacturing firms (Wong et al., 2020). The drivers that motivate manufacturing firms to adopt B2B platforms, particularly two-sided platforms, and the factors that inhibit this adoption have not been adequately explored in extant research (Shree et al., 2021; Veisdal, 2020). Considering the above, the present study investigated the benefits and barriers influencing manufacturing firms' decision to integrate two-sided platforms into their sourcing practices. The distinct adoption paths followed by SMEs and large firms were examined, as their sizes may result in different advantage perceptions. The need for platform providers to consider these distinct configurations when developing value propositions and strategies that align with the expectations of potential users was central to this investigation.

In pursuing this objective, we examined the phenomenon of two-sided platform adoption through the lens of the social network theory (SNT) (Borgatti & Li, 2009) in the context of the supply chain, complemented by two core innovation adoption theories: the diffusion of innovation (DOI) theory (Rogers, 2010) and the technology–organisation–environment (TOE) framework (Rogers, 2010). To classify the motivators that lead manufacturing firms towards platform adoption, we employed a fuzzy-set qualitative comparative analysis (fsQCA), which underscores the configurations of variables that stimulate high or low levels of intention to integrate digital platforms into sourcing processes (Pappas & Woodside, 2021). A sample of 318 responses from experienced managers involved in supply chain management processes was analysed, and 15 configurations related to two-sided platform adoption by SMEs and large manufacturing firms were identified.

The results revealed that SMEs with high adoption intention levels are primarily driven by their need for flexible and fluid networks, indicating that two-sided platforms are valuable for establishing and nurturing robust networks and partnerships with suppliers. Further, the adoption of platforms by large firms is driven by the aspiration to engage in transactions that offer increased efficiency and security. Conversely, low levels of intention to adopt two-sided platforms were found to be associated with high levels of perceived barriers in SMEs and a lack of perceived benefits in large firms.

The present paper also carries methodological implications, showing an additional reporting format for the fsQCA theoretical model (Fig. 2) and fsQCA findings (Fig. 3 and Fig. 4). This approach enhances the understanding of the findings, supplementing the traditional reporting standard suggested by Pappas and Woodside (2021).

The rest of this paper is structured as follows: Section 2 presents the theoretical foundation of the study, Section 3 describes the methods used, Section 4 presents the study findings, and Section 5 discusses the implications of the study. The final section offers the concluding remarks.

## 2. Theoretical foundations

The sourcing activities constituting the supply chain process were the focus of the present study. According to Giunipero, Bittner, Shanks, and Cho (2019), sourcing is “the process of fulfilling organisational buying needs by managing a supply base through strategic and transactional interactions with suppliers in alignment with corporate goals” (p. 1). Thus, sourcing involves firms' strategic engagement in selection, negotiation, and transaction activities with suppliers to meet buyers' demands (Giunipero et al., 2019).

Recent research has underscored the need to devise appropriate strategies to contend with the complexity of the sourcing process and to avert potential disruptions and inefficiencies (Giunipero et al., 2019). These strategies need to include the selection of suppliers, quality assessments of incoming products, the monitoring of transit time variability, and the establishment of robust communication networks to detect and assess unexpected obstacles. Supply chain management research has acknowledged that the risks associated with the sourcing process are significant factors that affect business profitability and sustainability (Giunipero et al., 2019). Previous empirical studies (Giunipero et al., 2019) have also demonstrated that collaborations between enterprises and suppliers are crucial for (1) resilient sourcing and (2) enhancing sourcing sustainability and environmental performance. Indeed, collaborations can stabilise the sourcing process by increasing the availability of resources and providing access to new markets. However, as networks grow and sourcing processes become increasingly global, firms need to develop partnerships beyond national borders. In this context, digital platforms can offer viable solutions for collaborating with distant enterprises and carrying out sourcing activities while mitigating risks. Shree et al. (2021) highlighted that platforms can streamline the sourcing process by facilitating connections between stakeholders, fostering economic harmonisation, and encouraging new patterns of value creation.

In recent years, interest in two-sided platforms has grown significantly, both from an academic and a managerial perspective (Trabucchi & Buganza, 2020). Two-sided platforms constitute a subset of the broader concept of multi-sided platforms, which are characterised by three elements: (1) two (or more) distinct groups of customers, (2) the presence of network externalities, and (3) the presence of a platform provider. Trabucchi and Buganza (2020) highlighted the emergence of two main lines of research on two-sided platforms in the management literature, with the first exploring transactional two-sided platforms and the second focusing on orthogonal two-sided platforms. To meet our research objectives, we focused on two-sided transactional platforms because they involve two distinct groups of actors interacting through an intermediary platform.

To ensure optimal platform utilisation, platform providers should understand and harmonise the expectations of potential users with the characteristics of the offered platform. However, there is a need for empirical studies on the capabilities, benefits, and challenges of adopting bilateral sourcing platforms (Wei, Wang, & Chang, 2021). Moreover, using two-sided platforms invariably calls for developing diverse business supplier collaborations, as platforms facilitate the emergence of collaborative networks (Mancha & Gordon, 2021). The SNT may be appropriate to explore the complex network of buyer-supplier relations (Borgatti & Li, 2009), as it posits that each firm can be visualised as a node communicating with the network and beyond. This necessitates the flow of information across nodes to accommodate organisational flexibility demands and a dynamic network structure for efficient information exchange and sharing (Magistretti, Dell'Era, Cautela, & Kotlar, 2023).

In addition, the extant literature positions the SNT as supporting the DOI model (Deroian, 2002; Shree et al., 2021) since network status influences the diffusion of new technologies. Two-sided platforms represent an emerging technological innovation whose adoption dynamics can be uncovered using the DOI and TOE frameworks (Rogers, 2010;

Shree et al., 2021). The DOI model has been widely accepted as identifying the critical characteristics of technological innovation, such as complexity, relative advantage, and testability (Rogers, 2010; Shree et al., 2021). However, this application of the DOI model is incomplete because it does not include the environmental context. Research has shown that the DOI model can be combined with the TOE framework to develop a more robust approach to explore the adoption of innovations by firms (Shree et al., 2021); the TOE framework considers the environment a critical driver of technology integration. The environmental context determines the limitations and opportunities that drive a firm to consider adopting new technology – in our case, two-sided platforms (Shree et al., 2021).

Building on these premises, we hypothesised that the emergence of dynamic, technology-pervaded environments with increasingly globalised supply chains and complex sourcing processes would push manufacturing firms to pursue new technological solutions. As such, platforms present an opportunity to improve the efficiency and performance of sourcing activities. Fig. 1 presents the research domain and the role of two-sided platforms in manufacturing firms' sourcing activities.

### 2.1. Adoption routes of two-sided platforms in SMEs and large firms

The decision to adopt innovations to improve and streamline sourcing processes may follow different trajectories based on firm size. Scholars have recognised that firm size is a significant, but not decisive, factor in technology adoption (Shree et al., 2021). Compared to large firms, SMEs are financially constrained and have limited information flow and networking capabilities, giving rise to different decision paths towards adopting innovations (Yoon, Yoon, Nam, & Choi, 2021). As suggested by the SNT, SMEs face more challenges with B2B transactions and negotiations than large firms do, as they usually have less bargaining power (Madrid-Guijarro, Garcia, & van Auken, 2009). Further research on B2B online marketplaces has revealed that, compared to large firms, SMEs face difficulties in managing a network of digital partners (Yoon et al., 2021). Conversely, large firms tend to evaluate the costs of innovation adoption from strategic and organisational perspectives. Although several researchers have concluded that SMEs are more resistant than large firms to adopting new technologies, others have argued that this finding is not always accurate (Shree et al., 2021).

While resources, ownership structure, and technological readiness are significant factors influencing the adoption of new technologies, there is no conclusive relationship between the degree of innovation and firm size (Shree et al., 2021).

Drawing a parallel with blockchain, we hypothesised that firm size does not impede platform adoption; instead, it influences how platforms are adopted by SMEs and large firms. Therefore, the “baseline expectation” guiding this research was that two-sided platforms could be implemented in both SMEs and large firms, albeit through different paths and motivations. As firm resources and capabilities depend on the size of the firm, we posited that managers' assessments of platform adoption would differ based on firm size.

#### 2.1.1. Baseline expectation

Firm size does not limit the adoption of two-sided platforms in the sourcing process. However, manufacturing firms may follow different adoption paths depending on their size.

### 2.2. Supply network capabilities

Platforms enable firms to collaborate digitally with various actors, including suppliers, subcontractors, and customers, thereby creating a resilient global supply network (Mancha & Gordon, 2021). The significance of such supply networks has come to the fore, given the complexity, interactivity, and continuous evolution of multi-supplier interactions in response to a dynamic business environment (Ullah & Narain, 2021). Research shows that networking across suppliers ensures strategic and performance advantages for firms (Ullah & Narain, 2021).

According to the SNT, social ties and relationships foster superior economic outcomes (Borgatti & Li, 2009). In the context of supply chains, networks comprise dynamic interrelationships between focal firms and supplier firms (Choi & Krause, 2006). These viewpoints underscore the importance of supply network flexibility, which refers to firms' ability to adapt to changes using their inter-organisational and collaborative capabilities. Thus, supply network flexibility depends on the interconnected relationships among actors in a network.

Liao, Hong, and Rao (2010) stated that supply network flexibility is a firm's ability to reconfigure its supplier base effectively and efficiently. Accordingly, this multidimensional concept encompasses sourcing and

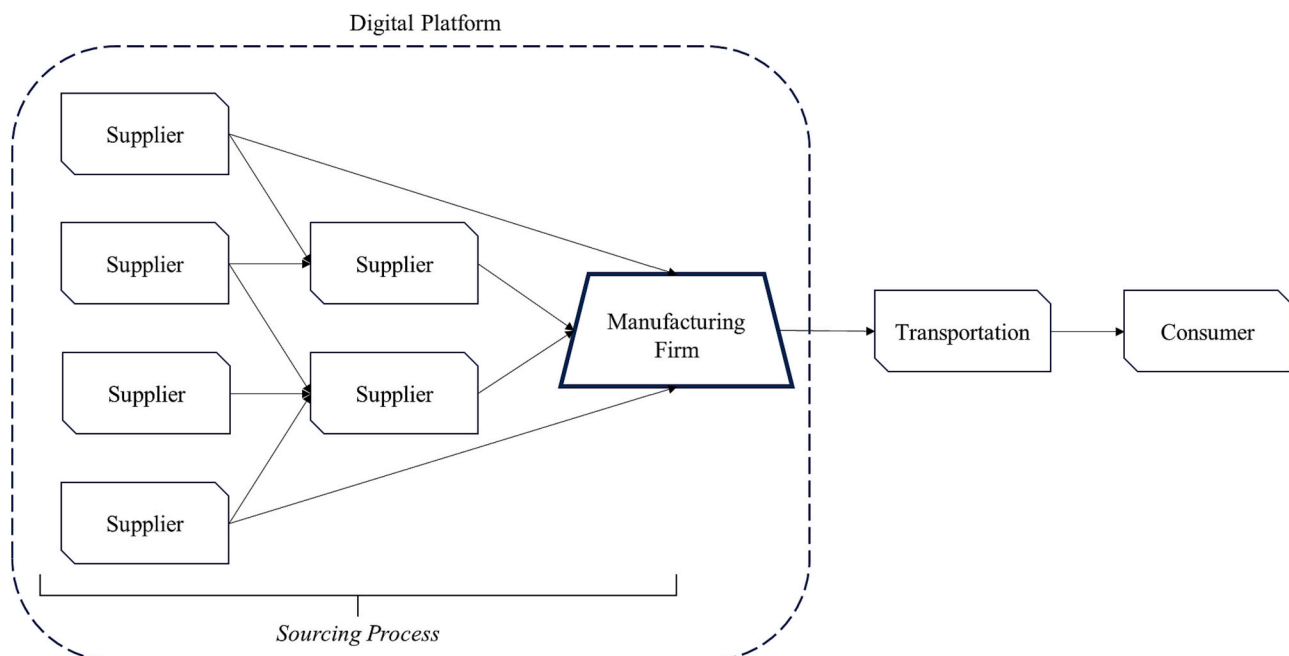


Fig. 1. Area of investigation.

supplier flexibility (Ullah & Narain, 2021). Sourcing flexibility pertains to a firm's ability to connect with suppliers and select or deselect them as necessary. In contrast, supplier flexibility refers to a supplier's ability to adjust delivery times and volumes in response to fluctuating environmental conditions.

Firms can enhance their sourcing activities by operating within a flexible supply network. They can expand the supplier selection phase, improve lead times, manage cost constraints associated with incoming orders, and mitigate labour and capacity shortages (Choi & Krause, 2006; Ullah & Narain, 2021). Therefore, manufacturing firms should aim to create dynamic networks that enable the selection and deselection of upstream suppliers based on their flexibility needs. Manufacturing firms also need to identify the optimal level of involvement in supplier relationships to secure appropriate partnerships (Rosenzweig & Roth, 2007). Furthermore, to respond to changes in the business environment, firms should strive to establish fluid partnering arrangements that facilitate the alignment of resources, skills, and knowledge across diverse entities within the supply network (Acharya, Ojha, Patel, & Gokhale, 2020). The ability to quickly change supply chain partners, thereby creating a synergistic effect with other actors, is at the core of fluid partnering (Acharya et al., 2020), and determining the degree of intimacy between a firm and a specific supplier allows for combining various strategic resources and creating synergistic partnerships that are difficult to imitate (Rosenzweig & Roth, 2007).

This capacity to establish fluid collaborations with suppliers can help firms improve the design and development of products or semifinished goods and choose appropriate raw materials (Acharya et al., 2020). According to Liao et al. (2010), networks and fluid partnerships are the primary components of sourcing agility. The ability to select suppliers from a flexible supply base and form intimate relationships leads to sourcing resilience. Since supply networks are not spatially confined and may include global suppliers, B2B relationships and ties need to be digitally fostered through platforms. Thus, two-sided platforms can serve as technological intermediaries that facilitate the development of a global yet flexible supply network. However, to harness the strategic potential of a global supply network, firms should possess specific capabilities, namely supply network flexibility and fluid partnering, which positively impact sourcing processes.

**Proposition 1.** Supply network flexibility and fluid partnering are either existing conditions or conditions that manufacturing firms seek to achieve by using two-sided platforms in their sourcing processes.

### 2.3. Perceived benefits

Platforms can benefit firms in multiple ways; they help improve sourcing efficiency and security (Garg et al., 2021) as well as environmental performance (Singh & El-Kassar, 2019) and provide strategic benefits (Croteau & Li, 2003). Numerous studies have underscored the role of platforms in achieving both efficiency and security in sourcing processes (Formentini, Ellram, Boem, & Da Re, 2019; Garg et al., 2021). For instance, blockchain studies have demonstrated how these technologies can help eliminate uncertainty, improve information efficiency and effectiveness, and overcome decision-making barriers (Menon & Jain, 2021).

The concept of relative advantage is a key component of the DOI theory, which explores technological innovation and its critical characteristics (Wong et al., 2020). It indicates that firms adopt new technologies that they perceive as bringing about business opportunities or addressing existing deficiencies. Relative advantage is also a central variable in the TOE framework, allowing its integration with the DOI theory. According to the TOE framework, the adoption and implementation of technological innovations are influenced by three contexts: technological, organisational, and environmental.

From an environmental perspective, two-sided platforms can sustain manufacturing firms by improving process transparency (Walker &

Brammer, 2012). Firms that aim to establish sustainable sourcing processes need to be involved in a greater degree of explicit and informal collaboration with their suppliers (Formentini et al., 2019; Panwar, Pinkse, & De Marchi, 2022). In this regard, two-sided platforms can be used to identify material and service suppliers that meet environmental standards and market demands (Cole, Stevenson, & Aitken, 2019). The additional environmental benefits of platforms include access to global networks, smooth selection of green suppliers, and fair and transparent treatment of suppliers (Walker & Brammer, 2012). Since transactional platforms facilitate the visibility of supplier information, manufacturing firms can engage with partners that adhere to environmental standards, thus fulfilling their social and environmental commitments and catering to consumers' growing demand for sustainability.

Regarding strategic benefits, firms are increasingly required to offer customised products that align with market expectations (Pinto, 2020). The development of digital supply networks enables manufacturing firms to source raw materials that meet market requirements from responsible suppliers. Two-sided platforms allow firms to collaborate with various global suppliers to satisfy customer needs, thereby gaining a competitive edge and strategic benefits. As Croteau and Li (2003) stated, strategic benefits are tactical and competitive advantages stemming from digital platforms' impact on processes and relationships. By using transactional platforms in their sourcing practices, manufacturing firms can select and connect with remote suppliers that meet customers' desired characteristics. For example, addressing consumers' green needs through sustainable sourcing can give firms a strategic edge over their competitors. Based on the TOE and DOI frameworks, efficiency and security in sourcing processes, environmental performance, and strategic benefits are advantages that encourage the adoption of two-sided platforms in sourcing processes.

**Proposition 2.** Two-sided platforms provide a variety of advantages in the sourcing process, such as efficiency and security, environmental performance, and strategic benefits, which positively influence manufacturing firms' intention to adopt platforms in their sourcing processes.

### 2.4. Perceived barriers

According to the DOI and TOE principles, additional factors such as complexity and cost can influence a firm's adoption of an innovation (Wong et al., 2020). Notably, perceived technology complexity impacts technology adoption. Users are more likely to value a specific technological asset if it can be easily integrated into existing systems. Sun, Hall, and Cegielski (2020) reported that organisational members experience low levels of concern about using new technology when they feel they have control over the results. For instance, research on the adoption of blockchain, a technology comparable to platforms in the supply context, has shown that if technologies are perceived as beneficial but difficult to use, organisations need to provide adequate support to their workforce and equip them with the required technological competencies (Wong et al., 2020).

According to the DOI model, organisations can acquire new technologies, but the successful implementation of those technologies requires both competence and expertise. The more complex and challenging a technology is perceived to be, the more likely it is that the innovation will be rejected. In our study, technological complexity was expressed in terms of adoption fatigue, which is the effort that organisational members need to expend to acquire new technological skills. High levels of adoption fatigue can inhibit the adoption of new technological solutions, such as two-sided platforms (Wong et al., 2020).

Another factor that may hinder the adoption of innovative solutions is adoption cost (Wong et al., 2020). According to the theoretical approaches outlined above, organisational factors influence innovation adoption alongside technological aspects (Sun et al., 2020). Adopting two-sided platforms for sourcing processes can be considered an

investment that requires new digital solutions and training for the organisation and its partners. The perception of value plays a significant role in determining a firm's intention to adopt (Madrid-Guijarro et al., 2009), and high costs are barriers to adopting new technologies and systems. Studies have shown that perceived adoption cost is one of the most dominant barriers to innovation (Madrid-Guijarro et al., 2009; Wallbach et al., 2019). Conflicts may arise between the need to invest in an innovation and the risks associated with adopting something new. Wamba and Queiroz (2022) noted that when introducing innovations into supply chains, organisations should consider the costs related to the standardisation of inter-organisational business processes and interfaces (Magistretti et al., 2023). Given that continuous collaboration with a range of stakeholders is required for a supply chain, firms should consider the organisational costs of establishing trust in new technology among the actors involved. In the context of two-sided platforms, adoption costs can be both financial and organisational. The adoption of transactional platforms necessitates a financial investment and a digital redesign of the sourcing process. In sum, adoption fatigue and adoption costs inhibit technology deployment within an organisation.

**Proposition 3.** The adoption of two-sided platforms by manufacturing firms is inhibited by organisational and cost barriers. High perceived adoption costs and adoption fatigue levels negatively influence the adoption of two-sided platforms for sourcing processes.

Pappas and Woodside (2021) emphasised the necessity for

methodologies that identify divergent pathways towards a single objective. Accordingly, we employed an asymmetric approach to uncover the nuanced platform adoption/non-adoption patterns among SMEs and large manufacturing firms. Fig. 2 depicts the proposed theoretical model. Instead of highlighting the direct effects of the aforementioned factors, we suggest that the adoption of two-sided platforms occurs at the confluence of various conditions.

### 3. Data and methods

#### 3.1. Sample

To explore our propositions, we employed a survey methodology and gathered data from managers at SMEs and large manufacturing firms that are currently not utilising two-sided platforms for sourcing activities. Based on the European Union's classification, we defined SMEs as firms with 250 employees or less and large firms as having >250 employees.

We selected manufacturing firms in the United Kingdom for the present study. Despite a decline in the 1970s, the United Kingdom is currently the ninth-largest manufacturing nation in the world and may, therefore, present concrete opportunities for technology adoption. The United Kingdom has a long tradition of digitalisation processes based on business practices in high-tech and low-tech manufacturing firms. Moreover, the United Kingdom's national economic strategy relies on

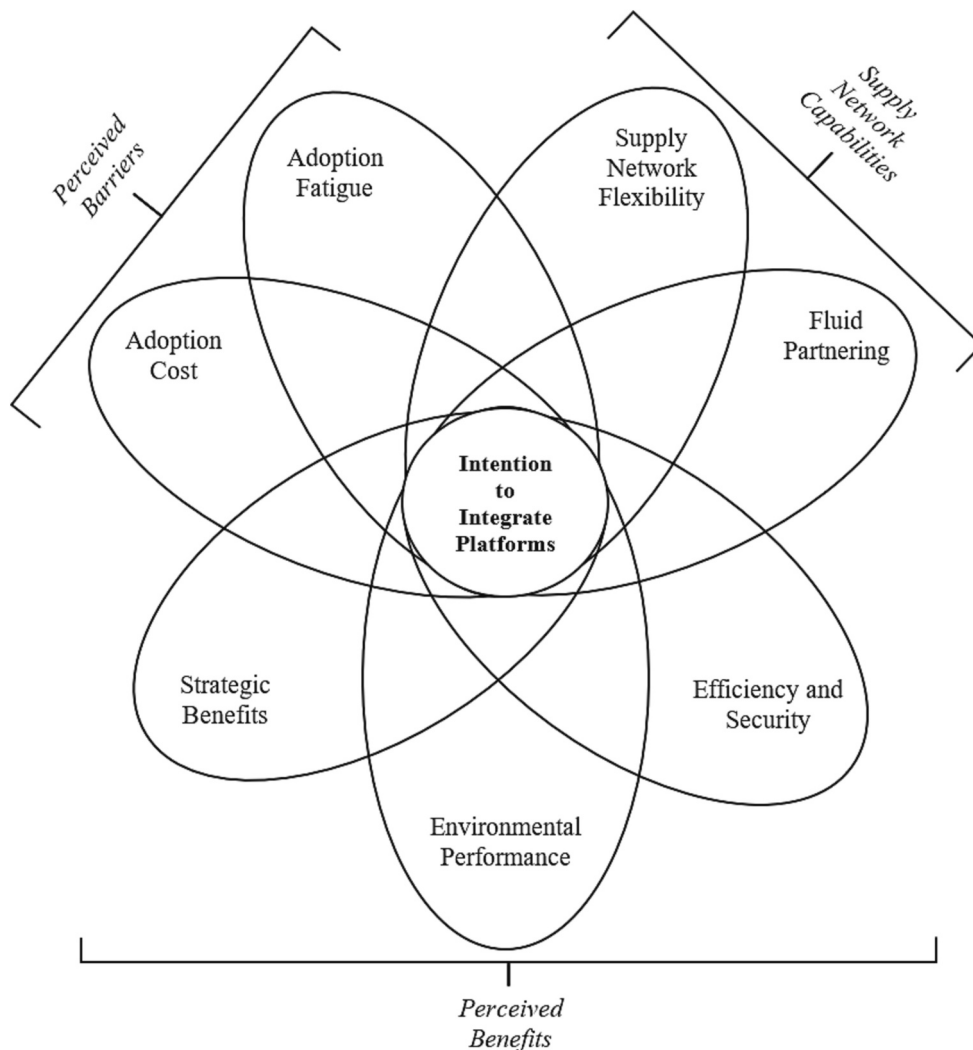


Fig. 2. Theoretical Model.

open innovation practices and digital business processes. As a result, this highly dynamic and innovative environment provided an appropriate setting to test firms' willingness to adopt new technologies for their sourcing processes.

Considering that our target sample consisted of firms currently not adopting digital platforms, we introduced the survey questions with an informative preface (Groves et al., 2011). This explanation outlined what digital platforms are, how they can be employed in the supply process, also including some tangible examples to guide attention and understanding. These examples were extrapolated and recontextualised from articles in professional and specialised journals, demonstrating how various applications of digital platforms can be integrated across a diverse array of manufacturing firms, regardless of their sector, technological level, or size. Throughout this preliminary explanation, we preserved a neutral tone, consciously refraining from accentuating either the advantages or disadvantages of digital platforms (Groves et al., 2011).

We first built a preliminary questionnaire draft and tested the content's accuracy with several managers working in large and small firms. Then, based on the feedback we received, we refined and distributed the questionnaire to supply chain managers working in manufacturing firms. These managers held a high level of seniority and decision-making power over the supply chain processes in their respective firms.

We received 323 responses, of which 318 passed the manipulation

**Table 1**  
Sample Characteristics.

| Respondents' characteristics        |            |                                    |                            |     |        |
|-------------------------------------|------------|------------------------------------|----------------------------|-----|--------|
| <i>Age</i>                          |            | <i>Gender</i>                      |                            |     |        |
| 18–30                               | 17         | 5.35%                              | Male                       | 236 | 74.21% |
| 31–45                               | 188        | 59.12%                             | Female                     | 82  | 25.79% |
| 46–60                               | 97         | 30.50%                             |                            |     |        |
| > 60                                | 16         | 5.03%                              |                            |     |        |
|                                     |            | <i>Nationality</i>                 |                            |     |        |
|                                     |            | European                           |                            | 272 | 85.53% |
|                                     |            | Non-European                       |                            | 46  | 14.47% |
| <i>Industry expertise</i>           |            | <i>Firm position</i>               |                            |     |        |
| 1–5 years                           | 45         | 14.15%                             | Logistics and supply chain | 163 | 51%    |
| 6–10 years                          | 60         | 18.87%                             | Purchasing and procurement | 109 | 34%    |
| > 10 years                          | 213        | 66.98%                             | C-level executive or owner | 21  | 7%     |
|                                     |            | Production and/or operations       |                            | 12  | 4%     |
|                                     |            | Sales and/or distribution          |                            | 7   | 2%     |
|                                     |            | Other management positions         |                            | 6   | 2%     |
| <i>Seniority level</i>              |            |                                    |                            |     |        |
| Junior Manager                      | 19         | 5.27%                              |                            |     |        |
| Middle Manager                      | 197        | 62.26%                             |                            |     |        |
| Senior Manager                      | 102        | 32.08%                             |                            |     |        |
| Firms' characteristics              |            |                                    |                            |     |        |
| <i>Size (employee number)</i>       |            | <i>Manufacturing Sector (NACE)</i> |                            |     |        |
| 5–20                                | 19         | 5.97%                              | Chemicals                  | 23  | 7.23%  |
| 21–50                               | 36         | 11.32%                             | Computer and Electronics   | 38  | 11.95% |
| 51–250                              | 65         | 20.44%                             | Electrical and Machinery   | 33  | 10.38% |
| 251–500                             | 32         | 10.06%                             | Food                       | 44  | 13.84% |
| > 500                               | 166        | 52.20%                             | Furniture                  | 36  | 11.32% |
|                                     |            | Metallic                           |                            | 14  | 4.40%  |
| <i>Technological Level</i>          |            | Motor vehicles and transports      |                            | 27  | 8.49%  |
| High-Tech                           | 195        | 61.32%                             | Pharmaceutical             | 59  | 18.55% |
| Low-Tech                            | 123        | 38.68%                             | Plastics and non-metallic  | 17  | 5.35%  |
|                                     |            | Textile                            |                            | 27  | 8.49%  |
| <b>Total SMEs (≤ 250)</b>           | <b>120</b> | <b>37.73%</b>                      |                            |     |        |
| <b>Total Large Firms (&gt; 250)</b> | <b>198</b> | <b>62.27%</b>                      |                            |     |        |
| <b>Grand Total</b>                  | <b>318</b> |                                    |                            |     |        |

checks included in the questionnaire. Table 1 summarises the sample characteristics.

### 3.2. Bias control

The study sample included a heterogeneous set of upper and middle managers working at SMEs and large firms in different manufacturing sectors, thus preventing single-source bias (Bianchi, Marzi, Zollo, & Patrucco, 2019). Further, to avoid directional responses and ensure that the respondents' attention was not drawn to the relationships covered in this study, we did not reference the model in Fig. 2 during data collection (Groves et al., 2011). Social desirability bias was reduced by maintaining confidentiality and asking general questions about the behaviour of the organisation and its members (Groves et al., 2011). Additionally, the items were not related to individual behaviours or performance and were, therefore, less likely to be affected by social desirability bias (Groves et al., 2011). Four attention check questions were included in the survey, and respondents who failed more than one attention check were excluded from the study (Groves et al., 2011).

To ensure that response bias did not compromise data validity, we performed a series of robustness checks using independent sample *t*-tests, and no statistically significant differences were found upon comparing the responses of early and late respondents or randomly divided groups of respondents; the control variables were age, gender, size, industry, and technology level. Likewise, common method bias was checked using Harman's single factor test (31.341%) together with the use of a marker variable; both controls showed no significant issues. The variance inflation factor (VIF) for multicollinearity was at an acceptable level for all variables involved in the study ( $\mu = 3.711$ , tolerance  $> 0.20$ ), with no variable scoring above 5.

### 3.3. Measures and reliability

Previously validated scales were used to ensure the validity of the constructs. All items were measured on a seven-point Likert scale (1 = strongly disagree; 7 = strongly agree) and were slightly adapted to the context of digital platforms. Supply network capabilities were characterised by two variables: supply network flexibility (SNF) and fluid partnering (FP). SNF was measured using a four-item scale (Liao et al., 2010) concerning firms' capability to develop a network with a wide range of suppliers. FP was measured using a three-item scale (Rosenzweig & Roth, 2007) that focuses on the ability of a firm to cooperate with different suppliers and improve sourcing activities. The perceived benefits encompassed three variables: efficiency and security (ES), environmental performance (EP), and strategic benefits (SB). ES was measured using an adapted version of Garg et al.'s (2021) five-item scale, EP was tested using Singh and El-Kassar (2019) six-item scale, and SB was measured using Croteau and Li's (2003) three-item scale. The perceived barriers were adoption fatigue (AF) and adoption cost (AC). AF and AC were measured using a five-item scale adapted from Wong et al. (2020). Finally, the intention to integrate (ITI) digital platforms was measured using a five-item scale adapted from Pappas, Caputo, Pellegrini, Marzi, and Michopoulou (2021); the items concerned firms' willingness to integrate two-sided platforms into their supply processes.

Cronbach's alpha and McDonald's omega were above the suggested thresholds, and factor loadings and composite reliability were above satisfactory levels, confirming the internal consistency and reliability of the measures (Groves et al., 2011). The average variance extracted (AVE) values were well above 0.50, supporting the convergent validity of the construct measures.

Finally, in order to estimate the latent constructs, the corresponding items were weighted following a congeneric approach via the Congeneric Latent Construct Estimator (CLC Estimator) developed by Marzi, Balzano, Egidi, and Magrini (2023), which is accessible at <https://www.clcestimator.com/>. The use of the CLC Estimator aligns with the suggestions made by McNeish and Wolf (2020) to avoid using the simple

sum or unweighted averages of the items. The Maximum Likelihood method was employed for the factor extraction, weighing the items in the computation of the latent constructs based on their respective factor loadings. This approach improved the consistency of our measurements, thereby enhancing their overall accuracy and reliability (Marzi et al., 2023; McNeish & Wolf, 2020).

Table 2 provides a summary of the items, along with the reliability of the scales.

### 3.4. Fuzzy-set qualitative comparative analysis (fsQCA)

The fsQCA method was used to test the propositions. fsQCA combines quantitative and qualitative approaches by removing the limitations of methodologies based solely on direct relationships, such as regressions or structural equation modelling (Ragin, 2009). When causality in a research phenomenon is multifaceted, as in our case (with the desired outcome depending on a set of factors: supply network capabilities, perceived benefits, and perceived barriers), fsQCA is an appropriate method of analysis (Pappas & Woodside, 2021). Rather than estimating the net effects of an independent variable on a dependent variable, the fsQCA method examines the relationships between an outcome and all binary combinations of the independent variables. This methodological approach enables the identification of relevant configurations that guarantee high (or low) performance in the outcome condition (Ragin, 2009). According to Ragin (2009), applying fsQCA can overcome several limitations of traditional, linear classic test theory, as the method allows for causal asymmetry, neutral permutation, and limited diversity. Following the perspectives of Pappas and Woodside (2021) and Ragin (2009), we classified the conditions leading to high or low levels of intention to integrate two-sided platforms into sourcing processes, highlighting the variables that were the core conditions.

### 3.5. Calibration and the necessary conditions

To measure the conditions that drive a firm's intention to integrate two-sided platforms into sourcing processes, it was necessary to calibrate the latent variables (multi-item scales) calculated with CLC Estimator (Marzi et al., 2023; Pappas & Woodside, 2021). The values were calibrated on a fuzzy scale with the following three thresholds: the value covering 5% of the data values, which was established as the point of full non-membership (fuzzy score = 0.05); the value covering 50% of the data values, which was the crossover point (fuzzy score = 0.50); and the value covering 95% of the values, which was the point of full membership (fuzzy score = 0.95). The rank of each causal condition was between 0 and 1, which represented the categories “no membership” and “full membership”, respectively (Ragin, 2009). The statistics and calibration values for all conditions are displayed in Table 3.

Concurrently with calibration, it was important to test the necessity of each condition. We determined whether the seven conditions were always present (or absent) and necessary for two-sided platform adoption. The conditions were all below the threshold of 0.9, indicating that the condition variables could not explain the results individually and that combinations needed to be found (Pappas & Woodside, 2021).

## 4. Results and discussion

Since the outcome variable depends on multiple combinations of independent variables, we incorporated our seven causal conditions into an fsQCA truth table analysis to examine the different configurations of variables that lead to a high or low level of intention to adopt two-sided platforms. In performing the truth table, we set a frequency threshold of 4 and a consistency threshold of 0.90 for both SMEs and large firms (Pappas & Woodside, 2021), which allowed us to reach the recommended value of 80% included cases (Ragin, 2009). The results of the fsQCA for the target variables revealed multiple configurations associated with both high and low levels of intention to adopt two-sided

**Table 2**  
Items and Reliability Checks.

| Constructs and Items                    | $\alpha$ | $\omega$ | CR    | AVE   |
|-----------------------------------------|----------|----------|-------|-------|
| <b>Supply Network Flexibility (SNF)</b> |          |          |       |       |
| SNF1                                    |          |          |       |       |
| SNF2                                    |          |          |       |       |
| SNF3                                    | 0.860    | 0.863    | 0.856 | 0.599 |
| SNF4                                    |          |          |       |       |
| <b>Fluid Partnering (FP)</b>            |          |          |       |       |
| FP1                                     |          |          |       |       |
| FP2                                     | 0.835    | 0.862    | 0.795 | 0.565 |
| FP3                                     |          |          |       |       |
| <b>Efficiency and Security (ES)</b>     |          |          |       |       |
| ES1                                     |          |          |       |       |
| ES2                                     |          |          |       |       |
| ES3                                     | 0.796    | 0.813    | 0.835 | 0.504 |
| ES4                                     |          |          |       |       |
| ES5                                     |          |          |       |       |
| <b>Environmental Performance (EP)</b>   |          |          |       |       |
| EP1                                     |          |          |       |       |
| EP2                                     |          |          |       |       |
| EP3                                     | 0.867    | 0.872    | 0.874 | 0.537 |
| EP4                                     |          |          |       |       |
| EP5                                     |          |          |       |       |
| EP6                                     |          |          |       |       |
| <b>Strategic Benefits (SB)</b>          |          |          |       |       |
| SB1                                     |          |          |       |       |
| SB2                                     | 0.758    | 0.762    | 0.801 | 0.573 |
| SB3                                     |          |          |       |       |
| <b>Adoption Fatigue (AF)</b>            |          |          |       |       |
| AF1                                     | 0.840    | 0.821    | 0.814 | 0.523 |
| AF2                                     |          |          |       |       |

(continued on next page)

Table 2 (continued)

| Constructs and Items                                                                                                                 | $\alpha$ | $\omega$ | CR    | AVE   |
|--------------------------------------------------------------------------------------------------------------------------------------|----------|----------|-------|-------|
| relations could require a significant amount of effort.                                                                              |          |          |       |       |
| AF3 Learning how to use digital platforms in our buyer-supplier relations may not be easy.                                           |          |          |       |       |
| AF4 Our firm would fail to understand how to use digital platforms in our buyer-supplier relations. ( <i>dropped</i> )               |          |          |       |       |
| AF5 Digital platforms can be challenging to use in our buyer-supplier relations.                                                     |          |          |       |       |
| <b>Adoption Cost (AC)</b>                                                                                                            |          |          |       |       |
| AC1 Adopting digital platforms in our buyer-supplier relations could lead to an increase in facility costs for our firm.             |          |          |       |       |
| AC2 Adopting digital platforms in our buyer-supplier relations could result in higher operations and maintenance costs for our firm. |          |          |       |       |
| AC3 The cost of integrating digital platforms in our buyer-supplier relations may be unclear and difficult to understand.            | 0.787    | 0.826    | 0.852 | 0.536 |
| AC4 The integration cost of digital platforms in our buyer-supplier relations could be high for our firm.                            |          |          |       |       |
| AC5 The transaction costs associated with digital platforms in our buyer-supplier relations could be substantial for our firm.       |          |          |       |       |
| <b>Intention to Integrate Digital Platforms (ITI)</b>                                                                                |          |          |       |       |
| ITI1 Given the opportunity, we intend to incorporate digital platforms into our firm's buyer-supplier relations.                     |          |          |       |       |
| ITI2 We are willing to use digital platforms in the near future for our firm's buyer-supplier relations.                             |          |          |       |       |
| ITI3 Our firm has a strategic plan to implement digital platforms in our buyer-supplier relations.                                   | 0.844    | 0.843    | 0.876 | 0.587 |
| ITI4 We will recommend digital platforms to other companies for their buyer-supplier relations.                                      |          |          |       |       |
| ITI5 We predict that we should use digital platforms in the firm's buyer-supplier relations.                                         |          |          |       |       |

platforms in sourcing processes. The robustness of the emerging solutions was tested by following Fiss's (2011) suggestions for sensitivity analysis, with different crossover points set for calibration ( $\pm 25\%$ ). Minor, insignificant changes were observed in the permutations and numerical solutions, confirming the robustness of the fsQCA results (Fiss, 2011).

Tables 4 and 5 show the results of the fsQCA. Seven configurations – three for SMEs and four for large firms – were associated with high levels of intention to integrate two-sided platform solutions (Table 4). In contrast, eight configurations – four for SMEs and four for large firms – were associated with low intention levels (Table 5). Both combinations showed high coverage and consistency (Ragin, 2009).

As Table 4 shows, the overall solution coverage for SME cases associated with high intention levels could explain 70% of the cases in question (0.703 coverage). In addition, the overall solution coverage for large firm cases associated with high intention levels could explain 67% of the cases in question (coverage 0.676).

Table 5 presents the combinations associated with a low intention to integrate two-sided platforms into sourcing processes. The overall solution coverage for SME cases could explain 64% of the cases in question

Table 3  
fsQCA Calibration.

| Constructs         | Mean  | SD    | Min   | Max   | Fuzzy Score |       |       |
|--------------------|-------|-------|-------|-------|-------------|-------|-------|
|                    |       |       |       |       | 0.05        | 0.50  | 0.95  |
| <i>SMEs</i>        |       |       |       |       |             |       |       |
| SNF                | 4.500 | 1.343 | 1.500 | 7.000 | 2.500       | 4.500 | 6.750 |
| FP                 | 4.422 | 1.394 | 1.670 | 7.000 | 2.000       | 4.166 | 7.000 |
| ES                 | 4.873 | 1.334 | 2.000 | 7.000 | 2.000       | 5.000 | 6.800 |
| EP                 | 4.711 | 1.303 | 1.000 | 6.830 | 1.000       | 5.000 | 6.500 |
| SB                 | 4.885 | 1.259 | 2.000 | 7.000 | 2.333       | 5.000 | 6.666 |
| AF                 | 3.753 | 1.307 | 1.000 | 7.000 | 1.000       | 3.800 | 6.440 |
| AC                 | 3.848 | 1.191 | 1.000 | 6.400 | 1.400       | 4.000 | 5.800 |
| ITI                | 4.320 | 1.517 | 1.000 | 7.000 | 1.200       | 4.200 | 7.000 |
| <i>Large Firms</i> |       |       |       |       |             |       |       |
| SNF                | 4.751 | 1.287 | 1.000 | 7.000 | 2.000       | 5.000 | 6.613 |
| FP                 | 4.905 | 1.290 | 1.000 | 7.000 | 2.333       | 5.000 | 7.000 |
| ES                 | 5.407 | 1.058 | 2.600 | 7.000 | 3.440       | 5.400 | 7.000 |
| EP                 | 5.218 | 1.168 | 1.670 | 7.000 | 3.167       | 5.167 | 7.000 |
| SB                 | 5.350 | 1.093 | 3.000 | 7.000 | 3.333       | 5.000 | 7.000 |
| AF                 | 3.687 | 1.065 | 1.000 | 6.200 | 1.620       | 3.600 | 5.400 |
| AC                 | 3.672 | 1.141 | 1.000 | 6.400 | 1.200       | 3.800 | 5.580 |
| ITI                | 4.437 | 1.415 | 1.000 | 7.000 | 1.730       | 4.400 | 7.000 |

(0.643 coverage), while the solution coverage for large firm cases could explain 78% of the combinations (0.780 coverage). The non-specularity of the solutions associated with high and low levels of intention to integrate two-sided platforms established the validity of our research, and the results showed different decision paths.

The various combinations of variables indicate that firms have different needs and constraints, depending on their size, and follow diverse decision paths for two-sided platform adoption. This confirmed our baseline expectation that firm size does not limit the possibility of adopting new technology but defines the different decision processes involved.

#### 4.1. Discussion of configurations leading to a high intention to integrate two-sided platforms

The results regarding high levels of intention to integrate two-sided platforms into sourcing processes varied depending on firm size. Decision-makers from SMEs expressed a high willingness to adopt two-sided platforms, viewing them as appropriate tools for developing fluid partnerships. By affiliating with industry platforms, SMEs can increase exchanges, create networks with remote sourcing actors, and thus broaden their reach into new collaborations and markets. These findings align with the SNT, suggesting that broad exposure to distant individuals and firms stimulates innovation and increases resilience in uncertain environments (Mancha & Gordon, 2021). As sourcing activities are centred on the concept of supplier selection (Giunipero et al., 2019), transaction platforms can foster the exploration and development of partnerships with global players, motivating SMEs to adopt them.

For large firms, the results showed a significant focus on two-sided platforms as drivers of the strategic benefits associated with transactions. Large firms adopt two-sided platforms because they promote efficiency and security in the supply process, offering a viable solution to reduce transaction costs. The results for large firms were in line with the DOI framework, as high degrees of technology adoption were found to occur when benefits were perceived (Shree et al., 2021). Platforms can aid sourcing and trading negotiations by providing traceability and shared standards. Therefore, these elements should be considered by platform providers when developing strategies to motivate firms' adoption intentions. Fig. 3 graphically summarises the configurations that lead to a high level of intention to integrate two-sided platforms into the sourcing process.



**Table 4**  
Configurations leading to a High Intention to integrate platforms.

| Configuration                    | Solutions |       |       |             |       |       |       |
|----------------------------------|-----------|-------|-------|-------------|-------|-------|-------|
|                                  | SMEs      |       |       | Large Firms |       |       |       |
|                                  | SH1       | SH2   | SH3   | LH1         | LH2   | LH3   | LH4   |
| Supply Network Flexibility (SNF) |           |       | ○     | ⊗           | ●     | ○     | ●     |
| Fluid Partnering (FP)            | ●         | ●     | ○     | ⊗           | ●     | ○     | ●     |
| Efficiency and Security (ES)     |           | ●     |       | ●           | ●     |       | ●     |
| Environmental Performance (EP)   |           | ●     |       |             | ●     |       |       |
| Strategic Benefits (SB)          |           | ●     |       | ●           | ●     |       |       |
| Adoption Fatigue (AF)            | ○         |       |       |             | ●     | ⊗     | ⊗     |
| Adoption Cost (AC)               | ○         |       |       |             |       | ●     | ●     |
| Consistency                      | 0.845     | 0.848 | 0.827 | 0.913       | 0.925 | 0.902 | 0.867 |
| Raw Coverage                     | 0.579     | 0.562 | 0.393 | 0.459       | 0.395 | 0.358 | 0.311 |
| Unique Coverage                  | 0.072     | 0.075 | 0.009 | 0.120       | 0.091 | 0.061 | 0.013 |
| Overall solution consistency     | 0.817     |       |       | 0.875       |       |       |       |
| Overall solution coverage        | 0.703     |       |       | 0.676       |       |       |       |

Note: Black circles ( ● ) indicate the presence of a condition, and circles with “x” ( ⊗ ) indicate its absence. Large circle; core condition, Small circle; peripheral condition; Blank space; “don’t care” condition

**Table 5**  
Configurations leading to a Low Intention to integrate platforms.

| Configuration                    | Solutions |       |       |       |             |       |       |       |
|----------------------------------|-----------|-------|-------|-------|-------------|-------|-------|-------|
|                                  | SMEs      |       |       |       | Large Firms |       |       |       |
|                                  | SL1       | SL2   | SL3   | SL4   | LL1         | LL2   | LL3   | LL4   |
| Supply Network Flexibility (SNF) | ○         | ●     | ○     | ●     | ●           | ●     | ○     | ○     |
| Fluid Partnering (FP)            | ○         | ●     | ○     | ●     | ●           | ●     | ○     | ○     |
| Efficiency and Security (ES)     | ●         | ○     | ⊗     | ○     |             |       | ○     |       |
| Environmental Performance (EP)   |           | ○     | ⊗     | ○     | ⊗           |       | ○     | ⊗     |
| Strategic Benefits (SB)          |           | ⊗     | ⊗     | ○     |             | ⊗     | ⊗     |       |
| Adoption Fatigue (AF)            | ●         |       | ○     | ●     |             |       |       | ●     |
| Adoption Cost (AC)               | ●         |       |       | ●     |             |       |       | ●     |
| Consistency                      | 0.890     | 0.787 | 0.810 | 0.809 | 0.873       | 0.916 | 0.916 | 0.873 |
| Raw Coverage                     | 0.456     | 0.366 | 0.359 | 0.351 | 0.534       | 0.500 | 0.463 | 0.438 |
| Unique Coverage                  | 0.153     | 0.043 | 0.040 | 0.007 | 0.054       | 0.056 | 0.065 | 0.028 |
| Overall solution consistency     | 0.785     |       |       |       | 0.845       |       |       |       |
| Overall solution coverage        | 0.643     |       |       |       | 0.780       |       |       |       |

Note: Black circles ( ● ) indicate the presence of a condition, and circles with “x” ( ⊗ ) indicate its absence. Large circle; core condition, Small circle; peripheral condition; Blank space; “don’t care” condition

**4.1.1. SMEs' pathways**

With regard to SMEs, Solution 1 (SH1) revealed that the presence of FP and the absence of AC and AF form an effective combination that drives SMEs to adopt two-sided platforms for their sourcing processes. A significant proportion of decision-makers were willing to adopt platforms because they understood the potential for cooperation with distant suppliers. The second solution (SH2) showed that SMEs may decide to adopt two-sided platforms to expand their partnerships with a wide array of distant suppliers. Furthermore, decision-makers may perceive the platform as guaranteeing great benefits in terms of the efficiency and security of sourcing processes (Garg et al., 2021), environmental performance (Singh & El-Kassar, 2019), and strategic benefits (Croteau & Li, 2003).. The third solution (SH3) was associated with low raw coverage and highlighted the importance of fluid partnering with SME decision-makers, as two-sided platforms are strategic assets for expanding the supply base and establishing more fluid, flexible digital partnerships.

The various combinations revealed that SMEs tend to have high levels of intention to adopt two-sided platforms. SMEs understand that to survive in a dynamic global market, they need to develop networking and partnership capabilities and improve their use of technological tools. These findings are supported by the literature on supply chains and partnering, according to which firms may develop the need to reconfigure sourcing partners by replacing inefficient parties with those who can satisfy the changing demands of the business environment

(Acharya et al., 2020). Thus, two-sided platforms have the potential to connect and bring together distant actors with shared objectives. Consequently, the ability of two-sided platforms to create new markets and networks with co-creation value is what drives SMEs' adoption intentions.

Considering the motivators that drive SMEs to embrace platforms, it is crucial for platform providers to focus on the quality of the installed base. The study findings emphasised that the quality factor may be associated with firms' capacity to expand their networks through platform interactions and their ability to cultivate partnerships grounded in trust and mutual collaboration. Since SMEs are more likely to adopt platforms when they can establish fluid partnerships, platform providers need to pay close attention to participants' perceptions of platform quality, as platforms can promote long-term sustainable partnerships among participants based on perceived quality.

**4.1.2. Large firms' pathways**

With regard to large firms, the results revealed four solutions, mainly driven by the DOI-TOE framework, were associated with a high level of intention to integrate two-sided platforms into sourcing activities. These solutions were developed using the concept of perceived benefits and barriers, highlighting that large firms only adopt new technology if it presents highly achievable benefits, such as operational advantages.

The first solution (LH1) reflected the willingness of large firms' decision-makers to adopt two-sided platforms for their strategic

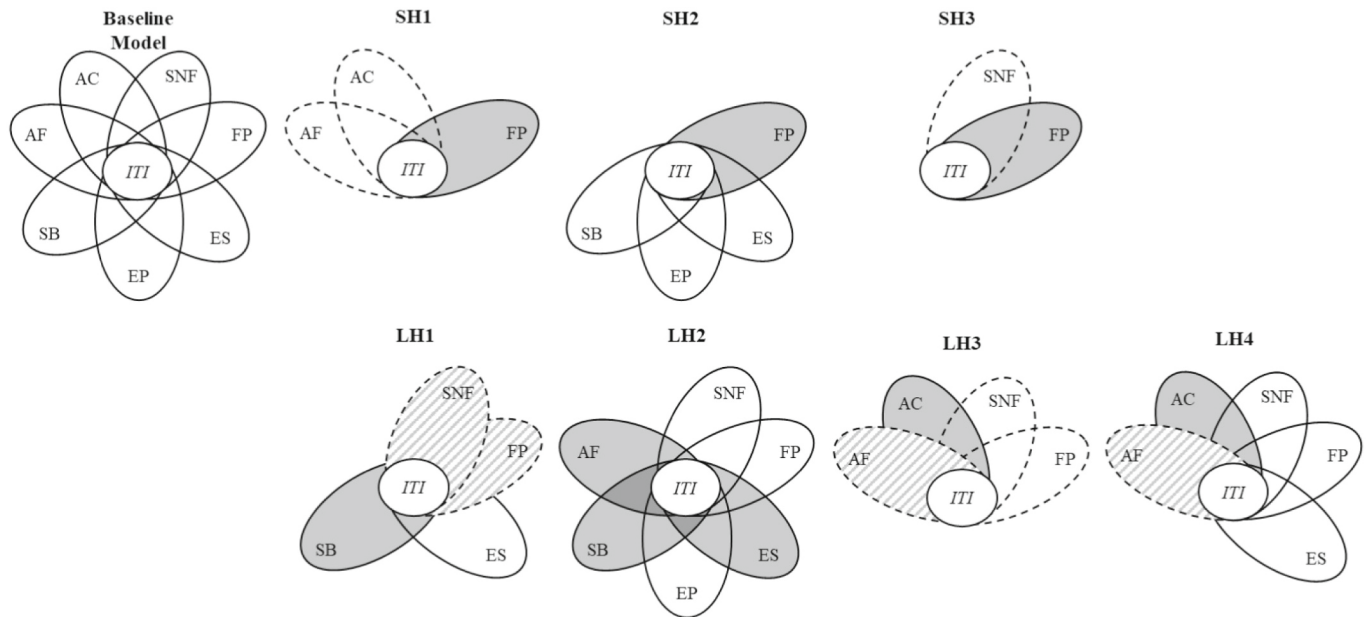


Fig. 3. Graphical representations of configurations leading to a High Intention to integrate platforms.

Note: Bold lines indicate the presence of a condition; dashed lines indicate its absence. Solid-filled circles indicate the presence of a core condition; dashed-filled circles indicate the absence of a core condition. The absence of circles indicates a “don't care” condition.

benefits. Supply network capabilities were not included in this solution. This configuration was rooted in perceived relative advantages, as large firms are generally inclined to adopt new solutions that can enhance the sourcing process. Sourcing processes are becoming increasingly complex and represent a functional area in which activity optimisation can yield substantial synergies and competitive advantages (Formentini et al., 2019). For instance, cultural and functional barriers may impede the smooth running of sourcing tasks in global firms. A two-sided platform is a tool capable of stemming potential obstacles. By reducing transaction costs and increasing information transparency, two-sided platforms can provide access to high-quality partnerships, diversification, and risk reduction, potentially aiding firms in developing a competitive sourcing strategy. The absence of variables such as networking and partnering indicated that, since large firms already possess a vast supply base, the desire to adopt a two-sided platform was tied solely to the possibility of gaining advantages.

The second combination (LH2) was structured around three main variables: perceived efficiency, security, and strategic benefits. The findings in this regard were closely related to the concept of transaction costs. Platform adoption can overcome opportunistic behaviours and informational limitations, which often affect global sourcing practices. They can reduce transaction costs, improve accessibility to services, and manage consumerism, thereby contributing to sustainability (Teece et al., 2022). Furthermore, adoption fatigue was an additional fundamental condition in this second combination. Decision-makers have recognised that two-sided platforms may require experience and learning efforts; these aspects are not limiting, as the associated benefits are superior. The results of LH2 align with the DOI theory, with high levels of technology adoption intention emerging when the perceived benefits outweighed the limitations posed by fatigue and potential costs.

Solutions 3 and 4 (LH3, LH4) also showed the presence of barriers. Decision-makers exhibited high intention levels for adopting two-sided platforms, highlighting that adoption occurs when a platform's benefits overcome the perceived costs. The decision-making paths that influenced large firms' adoption intentions to high degrees were driven by the strategic benefits of platforms. These findings align with the DOI theory, according to which an innovation spreads when the benefits of the innovation and the strategic direction of a firm are compatible. In

contrast to the results obtained for SMEs, large firms' willingness to adopt two-sided platforms for their sourcing processes was found to be aimed at improving the exploitation of existing networks and capturing value from network efficiency without creating new partnerships (Teece et al., 2022). While SMEs perceive platforms as tools for creating and leveraging new networks, large firms are attracted to platforms as suitable vehicles for streamlining transactions and negotiating with existing suppliers. Security, efficiency, and strategic benefits through platform transactions are key objectives of the adoption process for large firms. These findings validate and enhance the significance of the governance mechanisms inherent to platforms (Veisdal, 2020).

Platforms' governance mechanisms are crucial for facilitating customer engagement in a hyperconnected environment where actors enjoy relatively easy access to alternative information (Song, Xue, Rai, & Zhang, 2018). However, challenges in conducting transactions on the platform may arise due to communication barriers, additional costs, divergent interests, and a lack of trust among partners. These challenges result in pre-transaction costs associated with contract drafting and negotiation as well as post-transaction costs associated with the monitoring and enforcement of agreements (Wei et al., 2021).

While some scholars have argued that B2B digital platforms can alleviate information asymmetry by enhancing the transparency and efficiency of B2B exchanges (Wei et al., 2021), others have suggested that, compared to traditional channels, information asymmetry may be exacerbated in online B2B exchanges due to challenges associated with evaluating the quality and commitment of business partners (Yoon et al., 2021). This underscores the need for informal controls in this context. Our empirical findings support these considerations; large firms were found to be drawn to two-sided platforms only when transactions offered competitive advantages, such as enhanced efficiency and transparency and long-term strategic benefits.

To meet these expectations, formal and informal controls need to be implemented for platform governance, and platform configurations need to be tailored to the needs of potential participants. Recent research has also emphasised the importance of addressing technological requirements, such as integrating blockchains into platforms, for increased efficiency and security (Trabucchi, Moretto, Buganza, & MacCormack, 2020).

In sum, the literature in this domain indicates that platforms should be adapted to meet users' needs and expectations. Understanding the requirements of firms in accordance with their size is crucial for promoting the development and quality of fluid partnerships through platforms. Furthermore, leveraging formal and informal governance mechanisms can provide strategic advantages to large firms.

4.2. Discussion of configurations leading to a low intention to integrate two-sided platforms

Upon focusing on the negated condition of the intention to adopt two-sided platforms, four solutions emerged from the SME and large firm samples. It is worth noting that solutions with a negated condition were not symmetrical to positive adoption solutions (Ragin, 2009). The decisional paths leading SMEs and large firms to not adopt two-sided platforms for their sourcing processes followed different trajectories.

Small and large firms exhibit low degrees of platform adoption when they encounter significant barriers and a lack of achievable benefits. Adoption fatigue and adoption costs are the primary barriers to platform adoption by small and large firms, demonstrating that size is a proxy rather than a prevalent characteristic in SMEs (Shree et al., 2021). As the DOI framework suggests, perceived barriers inhibit potential affiliation with a platform by firms (Rogers, 2010). In addition, the absence of obtainable benefits contributes to a decrease in a firm's willingness to adopt a two-sided platform. SMEs and large firms do not integrate two-sided platforms into sourcing processes when they lack strategic benefits and high environmental performance. This last aspect is consistent with the TOE model, which posits that external environmental pressures may prompt firms to make sustainable technological changes. However, when firms do not perceive the ability of platforms to reduce transaction costs by monitoring suppliers' environmental standards, platform adoption levels are likely to be low. Platform providers should take these barriers into consideration to develop appropriate strategies to improve the perception of the benefits of integrating a platform within the firm's processes and procedures. Fig. 4 graphically summarises the configurations that lead to firms' low levels of intention to integrate two-sided platforms into the sourcing process.

4.2.1. SMEs' pitfalls

SL1 indicated that SMEs have low levels of intention to integrate two-sided platforms into their sourcing processes when adoption fatigue is high. The perception that new technology is too difficult to learn and requires a great deal of experience reduces firms' willingness to adopt it. Under these conditions, SME decision-makers may perceive high levels of effort and fatigue as reasons for not adopting two-sided platforms and thereby fail to grasp the potential of platforms (Rogers, 2010). Research has shown that perceived complexity can reduce innovation, which is consistent with DOI–TOE assumptions (Shree et al., 2021). SL1 also revealed that decision-makers associate the use of two-sided platforms with high levels of efficiency and security. However, the perceived costs were higher than the perceived benefits in the present study, making the latter insufficient for fostering positive attitudes towards platforms. These results are consistent with Proposition 3, which states that perceived barriers limit firms' willingness to adopt two-sided platforms for their sourcing processes. Negative perceptions of digital platforms and high adoption costs may stem from digital transformation gaps and value barriers related to firms' mindsets, business models, and reconfiguration (Teece et al., 2022).

SL2 and SL3 were structured around the absence of strategic benefits, environmental performance, and efficiency and security. Thus, SME decision-makers were found to have low levels of intention to integrate two-sided platforms into sourcing processes when the perceived benefits were lacking. These considerations align with our theoretical approach, confirming that perceived benefits lead a firm to adopt new technology. In addition, when the relative benefits of using two-sided platforms for sourcing processes are not perceived, the intention to integrate new technology is reduced.

The last combination concerning SMEs (SL4) emphasised the role of perceived costs in reducing the intention to adopt platforms. Here, adoption costs and fatigue are barriers to the adoption of platforms for SMEs' sourcing activities (Wong et al., 2020). These barriers preclude capturing the potential benefits of platforms. SL4 is structured around two relevant concepts in the literature on digital platforms: affiliation costs and user experience (Loux, Aubry, Tran, & Baudoin, 2020). Several studies on platform adoption in B2B contexts have emphasised that investment or affiliation costs can take the form of a fixed access fee,

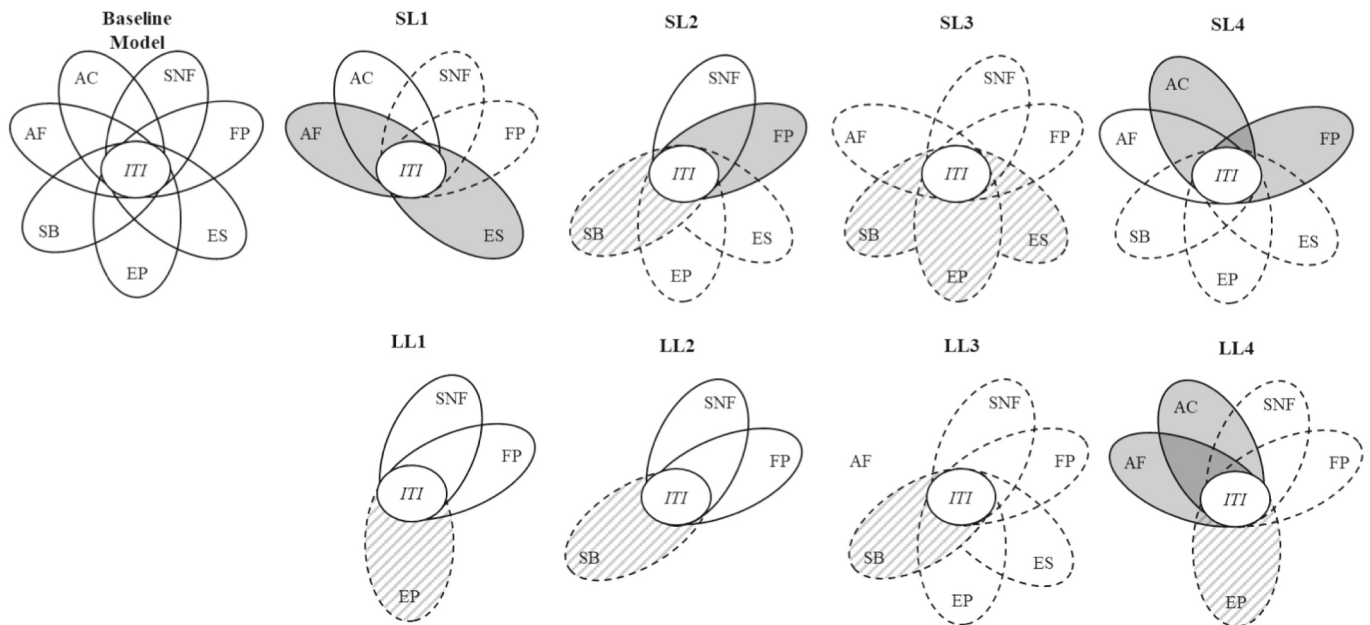


Fig. 4. Graphical representations of configurations leading to a Low Intention to integrate platforms. Note: Bold lines indicate the presence of a condition; dashed lines indicate its absence. Solid-filled circles indicate the presence of a core condition; dashed-filled circles indicate the absence of a core condition. The absence of circles indicates a “don't care” condition.

resource-related expenses (such as time and money required to learn how to use the platform), and opportunity costs (Loux et al., 2020).

The different combinations mentioned above suggest that SMEs have low platform adoption intentions when the perceived barriers are high. Adoption costs and fatigue, along with a lack of perceived benefits, are the leading causes of low platform integration intentions.

Consistent with the literature, SMEs' platform adoption often involves modifying internal and inter-organisational processes, resulting in substantial costs beyond the platform's price. Thus, platform providers should not only focus on pricing policies but also strive to enhance user experiences and simplify the platform structure to facilitate adoption (Loux et al., 2020). This is particularly critical in contexts where a pragmatic mentality, similar to that associated with SMEs, may be absent, requiring the adaptation of organisational processes (Maggis-tretti et al., 2023).

#### 4.2.2. Large firms' pitfalls

For large firms, perceived barriers and the absence of strategic benefits and environmental performance were found to be the main drivers of low two-sided platform adoption intention. According to solution LL1, decision-makers in large firms fail to adopt two-sided platforms when they perceive that the platforms do not enhance environmental performance. Given the renewed attention of consumers and society towards environmental issues, two-sided platforms could offer an alternative for firms to select suppliers based on environmental standards, resulting in greater external commitment. This combination aligns with the DOI–TOE theoretical framework, according to which innovation occurs when perceived benefits are associated with technological innovation and pressures from the external environment, leading to the adoption of the innovation (Shree et al., 2021). Specifically, as consumers are increasingly concerned about product sustainability and raw material traceability, firms may seek to respond to these external demands through new strategies. Two-sided platforms can support firms in terms of information quality, transparency, and traceability; failure to recognise these aspects leads to low levels of platform adoption.

Solution LL2 was structured around the absence of strategic benefits. When firms determine that innovations cannot deliver long-term strategic benefits, their willingness to adopt a two-sided platform is minimal. The lack of strategic benefits is also a core condition of the third combination (LL3). In addition, decision-makers' perceptions of low efficiency, security, and environmental performance levels result in the absence of perceived platform benefits. Finally, Solution LL4 showed that large firms do not associate the use of two-sided platforms with environmental performance (Cole, Stevenson, & Aitken, 2019) and that the perceived monetary and learning costs of adoption tend to be high.

These combinations indicate that the adoption of platforms by large firms may be hindered by high affiliation costs. To address this issue, platform providers should devise pricing strategies that facilitate the entry of large firms into the supply networks, thereby mitigating the perceived costs. Without sufficient benefits, the perceived costs will escalate. Therefore, platform providers should establish robust governance mechanisms that ensure transparency in transactions (Veisdal, 2020) as well as high levels of quality and efficiency. The implementation of appropriate formal and informal governance strategies has the potential to alleviate the perception of affiliation costs and stimulate platform adoption.

Overall, the decision-making paths that lead to small and large firms exhibiting a low willingness to adopt two-sided platforms for their sourcing processes are similar. All of the aforementioned solutions were structured around perceived barriers (Proposition 3) and a lack of strategic and environmental benefits (Proposition 2). These findings are consistent with the reports of previous studies on technology adoption, which showed that organisational inertia (adoption fatigue) and high adoption costs inhibit a firm's willingness to change the way it operates (Wong et al., 2020). The combinations indicated that the DOI–TOE framework is appropriate for explaining the motivators that reduce

technological change and for highlighting the barriers and the absence of strategic and environmental benefits associated with innovation.

## 5. Implications

This study contributes to the stream of management literature interested in two-sided platform adoption, focusing on the positive and negative combinations that foster technology adoption for the sourcing activities of SMEs and large firms. Given the renewed research attention on digital platforms (Lou, Wang, & Xia, 2022; Trabucchi & Buganza, 2020), the present study makes significant contributions to the debate on two-sided platforms in B2B contexts.

### 5.1. Theoretical implications

Previous studies on two-sided platforms have minimally explored the factors that motivate firms to adopt platforms (Veisdal, 2020). Nevertheless, platform providers need to develop strategies that align with the expectations and desires of potential users. Analysing the decision pathways that promote the adoption of two-sided platforms is also necessary for sourcing contexts, as these platforms can aid firms in supplier selection, search, and negotiation – the central elements of sourcing activities. Thus, by regarding two-sided platforms as transactional digital systems capable of facilitating interactions between multiple users (Trabucchi et al., 2020), we have broadened the discussion on the motivating factors that prompt manufacturing firms to integrate two-sided platforms into their sourcing processes. This provides a starting point for platform providers to develop appealing strategies.

In this study, we fortified the SNT–DOI–TOE framework by emphasising how the adoption and diffusion of digital platforms is related to the platform's ability to interconnect disparate realities and firms. Through various combinations of variables, we showed that a firm's willingness to adopt a transactional platform is influenced by the benefits associated with the new technology and by the platform's capability to establish resilient networks and partnerships through which sourcing can be improved (Veile, Schmidt, & Voigt, 2022). These findings align with recent literature, suggesting that sourcing should be considered a strategic activity capable of coordinating external actors and cultivating intra-organisational and relational mechanisms (Forkmann, Henneberg, & Mitrega, 2018). From this perspective, the adoption of two-sided platforms by both large and small firms is determined by the perceived benefits and barriers and the ability to develop a robust network. Other theoretical lenses used in innovation management do not align with our conceptual model and findings, as they do not consider the relational aspect of technology adoption (Shree et al., 2021). Thus, we demonstrated that associating the SNT framework with the DOI–TOE framework is crucial for understanding the mechanisms that lead manufacturing firms to consider adopting a platform.

Further, the combinations resulting from the study demonstrated that the decision to integrate two-sided platforms into sourcing processes varies depending on firm size. SMEs are inclined to adopt two-sided platforms when they have established networks and partnering capabilities and see platform adoption as an opportunity to enhance their supply base. This is significant because small firms can gain advantages and overcome the conditions of environmental uncertainty only through collaboration (Chan, Chong, & Zhou, 2012). The dynamics of two-sided platform adoption in small firms can be explained through SNT, which suggests that social networks provide unique value by transmitting information and knowledge through connections with other suppliers.

With respect to the adoption of two-sided platforms in large firms, the study findings aligned with the DOI–TOE assumptions. Specifically, they showed that large firms may integrate new technological solutions into their sourcing processes when they perceive relative benefits associated with the innovations. The data from decision-makers in large

firms revealed that environmental expectations are important for adopting two-sided platforms (Pinto, 2020). Considering the current context's focus on environmental dynamics and sustainability awareness, large firms may adopt two-sided platforms for their sourcing processes and thereby improve supplier selection, increase environmental performance, and meet society's green expectations (Pinto, 2020).

Next, we showed that decision-makers have low levels of adoption intentions when the perceived barriers are high or when competitive and environmental advantages cannot be achieved. The intention to adopt platforms is low when complexity is high, benefits are absent, and large enterprises do not adopt new technological solutions unless they guarantee long-term benefits.

The combinations emerging from this study also have important implications for the literature on platforms. Our results highlight the need for platform providers to develop specific strategies based on the factors that motivate firms to adopt platforms. Depending on the firm size, it may be necessary to focus on the quality of participation (Trabucchi, Buganza, & Verganti, 2021) rather than the quantity of the installed base, since SMEs generally aim to use two-sided platforms as tools to develop fluid partnerships that are characterised by a greater sense of intimacy than the development of a large network. However, platform providers should act on platform governance through formal and informal controls to ensure informational transparency and partner trust (Wei et al., 2021), which are essential for large firms to gain strategic advantages from platform adoption. We demonstrated that firm size is a factor in platform adoption, but different users seek different value propositions. These insights make it clear that platforms need to develop specific adjustments.

Finally, our results contribute to the literature on sourcing by demonstrating that in an increasingly globalised context, the research and selection of potential suppliers should move towards innovative solutions capable of ensuring long-term sustainability and resilience. This study provides a relational and technological understanding of the dynamics involved in adopting two-sided platforms for sourcing processes from strategic, innovative industrial marketing perspectives.

## 5.2. Practical implications

The present study's findings can assist managers in manufacturing firms in understanding network value creation and the potential that two-sided platforms bring to the sourcing process. In an ever-evolving environment, both small and large firms constantly seek new digital solutions that can enhance the resilience of strategic processes and pave the way for the transformation of traditional practices (Panwar et al., 2022). In this context, platforms transform firms' supplier selection and negotiation processes, thus creating a synergistic global collaborative network (Panwar et al., 2022; Teece et al., 2022). Firms that have not embraced the use of two-sided platforms may reconsider their decisions by analysing the benefits these platforms can provide. For instance, the information transparency inherent in two-sided platforms can provide increased efficiency and security during partner search and negotiation processes, in turn leading to strategic advantages. Furthermore, platforms can help firms select suppliers that meet the quality and environmental standards required by the market (Wallbach et al., 2019). Consequently, the managers of manufacturing firms need to ensure that the organisation is adequately prepared to incorporate platform-related processes into its existing structure. With changes in the communication channels and methods followed by platforms, appropriate technological infrastructure may be necessary (Veile et al., 2022).

Based on our findings, SMEs, which typically have fewer resources than large enterprises, may be able to formulate suitable strategies to increase technology adoption. As the adoption effort is one of the main barriers, top management should ensure that technical support and resources are provided for their employees, ensuring that a systematic approach to implementing two-sided platforms in sourcing processes is taken. It is also important for SMEs to avoid introducing new

applications without carefully considering existing technological standards and infrastructure. Firms should provide sufficient technical support and change management measures, such as training and communication.

Platform governance needs to be adjusted to facilitate transaction cost reduction and the attainment of the strategic advantages necessary for large firms (Veisdal, 2020). For example, these may include increasing the formal and informal controls over the information provided by suppliers and integrating new technologies into the platform for greater transaction transparency. All of these elements contribute to increased trust among the actors in the platform. Additionally, important to associate the quality of participation with quantity (Trabucchi et al., 2021). Although these are not new elements in platform literature, they hold elements of originality when related to the B2B context of sourcing activities and when conceived as necessary solutions derived from user expectations. Generally, a platform's success should be ensured by implementing appropriate strategies developed based on potential customers' needs. We demonstrated that specific interventions are required for different firm sizes. Therefore, size is a factor influencing firms' willingness to adopt two-sided platforms, but it is also an essential element for platform providers' development of strategic solutions.

Managers should transform their respective firm's vision by providing human resources with a comprehensive understanding of platforms and their mechanisms, thereby reducing the perceived barriers to platform adoption. In addition, platform providers should strive to provide different beneficial outcomes based on user profiles, which would encourage the simultaneous development of various revenue models.

## 6. Conclusions and limitations

This study explored the configurations that influence manufacturing firms' adoption and non-adoption of two-sided platforms for sourcing processes. Based on SNT and DOI-TOE, we explored how supply network capabilities, perceived benefits, and perceived barriers can motivate upper and middle managers to adopt two-sided platforms for sourcing. Moreover, the different combinations could provide starting points for platform providers to establish strategies capable of attracting potential users. Using the fsQCA method, we tracked the different combinations of variables that could lead to SMEs and large firms adopting two-sided platforms. The results revealed three decision patterns associated with high levels of platform adoption among SMEs and four patterns associated with high platform adoption levels among large firms. In addition, we outlined eight decision paths associated with low levels of two-sided platform adoption, divided equally between SMEs and large firms.

While we focus on the relative advantages and complexity of technology, future studies should investigate other aspects that constitute the DOI-TOE framework, such as compatibility, which describes how consistent the innovation is with the values, experiences, and needs of potential adopters. In fact, the success of two-sided platforms may be related to a culture of innovation and the values of managers and employees. This aspect represents one of the study's limitations: considering the innovative culture of a firm as an influencing driver of platform adoption and the ability to capture the platform's benefits. The sample comprised SMEs and large firms based in the United Kingdom, and the chosen geographic context involved the significant presence of innovative manufacturing firms. It is necessary to replicate the present study's results in different geographic contexts in the future.

Finally, this paper also presents methodological implications by introducing a novel reporting format for the fsQCA-based studies, as depicted in Fig. 2. This model encapsulates key theoretical aspects, allowing for a more nuanced understanding of the subject matter. Likewise, our reporting format is applied to presenting fsQCA findings, as illustrated in Figs. 3 and 4, thus facilitating a comprehensive grasp of

the research results. Our approach to data presentation is not merely an aesthetic choice but an extension of data comprehension, allowing the findings to be accessed and interpreted more intuitively. Our reporting format builds upon the one proposed by Pappas and Woodside (2021). Their contributions to the field have established foundational standards for reporting in fsQCA studies, and our work aims to further these advancements by offering additional data representation formats.

#### CRedit authorship contribution statement

**Giacomo Marzi:** Supervision, Conceptualization, Methodology, Formal analysis, Writing – original draft, Writing – review & editing. **Anna Marrucci:** Formal analysis, Writing – original draft, Writing – review & editing. **Donata Vianelli:** Writing – original draft, Validation, Funding acquisition. **Cristiano Ciappei:** Validation.

#### Data availability

The authors do not have permission to share data.

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