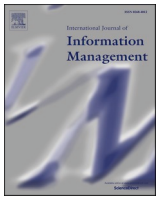
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How commitment and platform adoption drive the e-commerce performance of SMEs: A mixed-method inquiry into e-commerce affordances

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ABSTRACT

To cope with the digital transition exacerbated by the COVID-19 pandemic, managers of manufacturing small and medium enterprises (SMEs) need to adopt innovative practices to face uncertain scenarios and create long-term value, identified as transformational entrepreneurship practices. Among emerging digital technologies, digital platforms are shaping and outgrowing the e-commerce channel representing a potential opportunity for manufacturing SMEs to embrace digital transformation. Drawing on affordance theory, this research uses a mixed method approach to investigate how manufacturing SMEs' e-commerce commitment and digital platform adoption stimulate the actualization of three e-commerce affordances: consumer knowledge generation, internationalization, and customer diversification. Based on survey responses from 165 manufacturing SME managers, we find that direct selling through owned websites actualizes consumer knowledge generation and internationalization, indirect selling actualizes customer diversification and internationalization, and agency selling through third-party platforms actualizes all three affordances. The relationship between e-commerce commitment and ecommerce performance is mediated by consumer knowledge generation and internationalization but not by customer diversification. A fsQCA analysis outlines seven configurations actualizing these e-commerce affordances by pairing different ecommerce approaches with degrees of e-commerce commitment. Finally, an analysis of open-ended questions from 24 respondents complements the study and deeply interprets the seven unique configurations outlined.

1. Introduction

Alongside provoking a social and economic crisis, the COVID-19 pandemic has shifted consumers' buying habits by increasingly nudging them toward online purchases (Vázquez-Martínez et al., 2021). Thus, all companies, regardless of their size and heritage, need to adopt and exploit new digital opportunities to address this changing behavior and the great challenges posed by this volatile and uncertain post-pandemic market scenario (Dwivedi et al., 2020; Troise et al., 2022). Digital entrepreneurs undoubtedly have opportunities to create new digitally native business models adapted to the changing needs of consumers (Nambisan, 2017). More intimidating, however, is the digital transformation for small and medium enterprises (SMEs)[1] which manufacture physical goods. To best cope with this transition, SME managers must be ready for change and implement transformational entrepreneurship practices, defined as innovative entrepreneurial practices adopted to face uncertain crisis scenarios and create long-term value for a firm and its community (Maas & Jones, 2019; Schoar, 2010).

Among the emerging technologies shaping the entrepreneurial landscape, digital platforms play a prominent role (Sutherland & Jarrahi, 2018; Troise et al., 2020). E-commerce is one of the sectors impacted mainly by the evolution of digital platforms. For instance,

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[1] In accordance with the European Commission (2020), we define SMEs as enterprises employing fewer than 250 persons which have an annual turnover not exceeding EUR 50 million and/or an annual balance sheet not surpassing EUR 43 million.

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Amazon Marketplace, which connects manufacturers with end consumers, has continued to grow by an average of 35% every quarter since 2017 (Amazon, 2022), and the software-as-a-service platform Shopify has increased its turnover in the last five years more than tenfold, reaching almost 3 billion dollars in 2020 (Shopify, 2021). The evolution of these platforms has favored the emergence of newer approaches to online sales as opposed to the traditional *indirect selling approach* in which a SME manufacturer sells to an e-commerce reseller (whether a pure player or an omnichannel retailer), who then resells to the end consumer in a conventional business-to-business-to-consumer (B2B2C) dynamic (C. Chen et al., 2021). In particular, third-party e-commerce platforms such as Amazon Marketplace, eBay or Alibaba are increasingly gaining consideration within the online commerce marketplace, prompting SME manufacturers to adopt the so-called *agency selling approach,* in which the manufacturer relies on these third-party multi--sided platforms and sells directly to its end consumers via its platform account (Pu et al., 2020). The *direct selling approach*, in which manufacturers directly sell to end consumers through their website, is also undergoing a radical change thanks to lower development and administration costs, as well as reduced technical knowledge barriers. Although digital platforms have contributed to developing new approaches to e-commerce, it is still unclear which method is most desirable for SME managers who want to embrace transformational entrepreneurship practices.

To address this gap, recent research has used affordance theory to identify which affordances are actualized by e-commerce providers (Bayer et al., 2021; S. (Joseph) Chen & Tamilmani, Tran et al., 2022; Lehrer et al., 2018). In this regard, the emphasis has been often on consumers' perceptions, identifying affordances such as the possibility of: (a) breaking down the asymmetry of product information, (b) completing electronic transactions without leaving home, (c) having more choice options, or (d) sharing opinions on products (Bayer et al., 2021; Shao & Pan, 2019; Sun et al., 2019; Wang, Luo et al., 2022). Interestingly, less is known regarding how e-commerce enables transformational entrepreneurship for SME manufacturers. However, it is acknowledged that e-commerce, beyond possibly increasing sales, can be a driving force for firms' to increase their knowledge of consumers, speed up their internationalization, and find additional sources of revenue (Akter & Wamba, 2016; Elia et al., 2021; Marconatto et al., 2021). Thus, managers wishing to implement transformational entrepreneurship practices leveraging on e-commerce should first ensure the organization commits to this type of deployment with e-commerce commitment, defined as the management's resource investment and explicit attribution of prominence communicated to employees concerning e-commerce (Kowtha & Choon, 2001). Indeed, it is not sufficient to merely use an e-commerce platform to increase sales. Without a proper understanding of the applied technologies, companies risk being ineffective and diminishing their financial performance (Abebe, 2014; Yang et al., 2015). However, the literature has not yet focused on understanding whether the e-commerce approaches used by manufacturing SMEs are more or less suitable for fostering the different types of affordances that e-commerce can provide (Ballerini et al., 2023). Moreover, it is unclear how much effort entrepreneurs need to put into ensuring the success of their e-commerce strategy according to the various methods and platforms adopted.

Drawing on affordance theory, this research identifies three affordances that SME managers can actualize: consumer knowledge generation, internationalization, and customer diversification. This research aims to evaluate the role played by both the different e-commerce approaches and the level of e-commerce commitment in actualizing these affordances. Thus, this research outlines which combination of approaches and e-commerce commitment leads SME managers embracing transformational entrepreneurship practices to actualize e-commerce affordances. Therefore, the ultimate purpose of this paper is to highlight what combinations of e-commerce commitment and approaches are best suited for managers embracing transformational entrepreneurship practices to pursue the different strategic goals that e-commerce potentially affords. Accordingly, this study evaluates whether with the actualization of the respective affordances the managers attribute a high performance level to e-commerce.

This research adopts a mixed-method exploratory design. First, it conducts a structured equation modeling (SEM) quantitative analysis. Afterward, it produces a fuzzy-set qualitative comparative analysis (fsQCA) followed by the review of open questions from selected manufacturing SMEs' managers. The findings outline seven possible configurations of affordance actualization by pairing different e-commerce approaches and degrees of e-commerce commitment. Moreover, this research highlights how the actualization of internationalization and consumer knowledge generation affordances mediates the e-commerce commitment and performance relationship.

2. Literature review

2.1. Transformational entrepreneurship and digital platforms

Schoar (2010) distinguishes between subsistence and transformational entrepreneurship. The first form involves small businesses intended to support the owner and their few employees. Transformational entrepreneurship businesses aim to create economic and social value for their community (Maas & Jones, 2019). However, transformational entrepreneurship depends on context, making it "hard to define" (Ratten, 2022, p. 2). Although clear distinctions remain between subsistence and transformational entrepreneurship, the latter is multifaceted, affecting social, political, and economic domains, and multilayered, affecting individuals, firms, and communities (Virmani & Lépineux, 2016). Some studies have focused on the social impact of transformational entrepreneurship. For instance, it can encourage women's empowerment (Okeke-Uzodike, 2019) and boost developing nations' and local communities' economies (Egere et al., 2022). Beck (2013) has investigated how targeted funding can promote and incentivize transformational entrepreneurship. However, public administration and credit institutions still struggle to identify transformational entrepreneurship-oriented activities.

When confronted with long-term challenges, transformational entrepreneurs exhibit innovative tendencies and proactivity in adopting new business models and technologies (Marmer, 2012). Thus, we define transformational entrepreneurship as innovative entrepreneurial practices that counter uncertainty and create long-term value. Not surprisingly, transformational entrepreneurship has been accompanied by digital entrepreneurship, which digitalizes, in whole or part, company operations previously performed by individuals (Kraus et al., 2018). More specifically, digital entrepreneurship is based on the idea that the properties of digital technology will shape entrepreneurial behavior (Nambisan, 2017). Furthermore, transformational entrepreneurship necessitates change, which requires workers to learn new skills and entrepreneurs to invest in staff development (Dicuonzo et al., 2022). In addition, corporate digitalization demands a receptive company culture (Ciampi et al., 2022). Therefore, transformational entrepreneurship fits new digital technologies comparably to digitally native businesses and digital entrepreneurs.

Digital platforms are notable among new digital technologies. Information systems (IS) researchers describe them as "the extensible codebase of a software-based system that provides core functionality shared by the modules that interoperate with it and the interfaces through which they interoperate" (Tiwana et al., 2010, p. 676). Economists define platforms as products, services, or firms that mediate transactions between two or more groups of agents (Baldwin & Woodard, 2009, p. 22). Thus, digital platforms are software-based systems, products, and services that facilitate transactions between parties. However, digital platforms enable more than simply economic transactions. They can build and deepen consumer-vendor relationships, yielding valuable insights and new ideas (Dutot & Van Horne, 2015). In

addition, digital technologies enable rapid change response, which is crucial for companies in an unpredictable environment (Nambisan et al., 2017). The COVID-19 pandemic has forced many companies to digitize and reorganize labor through digital platforms (Dwivedi et al., 2020). Post-pandemic businesses must adapt to new forms of commerce and customer demands. Transformational entrepreneurship practices help non-digital firms create value by leveraging e-commerce digital platforms (Dicuonzo et al., 2022; Ratten, 2022). Ratten's (2022) qualitative inquiry shows how some Australian agricultural manufacturers used a local online marketplace during the pandemic and achieved satisfactory results as well as developing a greater interest and predisposition toward digital platforms, increasing their transformational entrepreneurship attitude. The case study on transformational entrepreneurship practices by Dicuonzo et al. (2022) claims that the company's strong commitment to its e-commerce platform, amplified after the pandemic, led to a significant increase in turnover through a scale-up in international markets.

Although current research has examined entrepreneurial and SMEs' use of digital platforms for social purposes (Amaral & Orsato, 2022; Troise et al., 2020), transformational entrepreneurship practices related to digital platforms remain understudied. Moreover, Ratten (2022) has highlighted the need to comprehend the attention that transformational entrepreneurs transfer or communicate to their employees regarding digital platforms. In addition, digital platforms for online commerce may affect transformational entrepreneurship, but little research has been conducted on this topic.

2.2. E-commerce affordances

The literature review reveals that transformational entrepreneurs are often characterized by a keen intuition for the use of new technologies (Virmani & Lépineux, 2016). Ratten's (2022) discussion of how transformational entrepreneurs venturing into exploiting new digital platforms gradually succeed in embedding them at the center of their strategy and fully profiting from them is particularly salient. These typical traits of transformational entrepreneurs draw a certain parallel with affordance theory. The affordance lens has been used by IS scholars to examine how technologies affect organizational design and performance (Strong et al., 2014; Zammuto et al., 2007). The term affordance was introduced by Gibson's work on the psychology of perceptions in the late 1970s (Gibson, 1979). According to this theory, subjects evaluate and apprehend objects in their environment in terms of their capacity for action, or affordance. Thus, the term affordance describes the relationship between the actor trait and a specific object trait (Chemero, 2003). The IS affordance perspective holds that technology enables interactions between organizations, entities, processors, facilities, systems, and objectives. Affordance is actualized when the actor recognizes a specific action in the object or technology. The actor's presence is necessary for the affordance to exist, yet it can still be potential (Strong et al., 2014). Thus, a technological item may have many affordances, but only some of these can be actualized. Therefore, associating transformational entrepreneurship practices as behaviors conducive to the actualization of different affordances toward a specific technology would not be improper.

Affordance theory has been applied to e-commerce platforms in recent literature (Bayer et al., 2021), especially from a consumer perspective. For instance, Bayer et al. (2021) has reviewed online shopping studies and reinterpreted them from an affordance perspective, identifying seven key consumer-related e-commerce affordances: electronic transactions, temporal interdependence, online platforms, information transparency, and social interactions, as well as tailored and proactive services. Among these, one of the most studied affordances is social interaction. Works on online social platforms like WeChat or e-commerce platforms like Taobao identify interactive or dynamic shopping-experience characteristics, including metavoicing, social networking, and parasocial information (Dong & Wang, 2018; Sun et al., 2019; Wang, Luo et al., 2022). According to Shao and Pan (2019), media richness and interactivity promote social interaction affordance and, thus, online social platform user participation. Information transparency also relates to Bayer et al.'s (2021) analysis of social interaction affordance. Specifically, e-commerce platforms encourage visibility, direction, and bullet information affordances (Sun et al., 2019; Wang, Luo et al., 2022). The visibility affordance arises from product information and photographs. Therefore, it may fall under information transparency, while guiding information and bullet information, which allude to other users' reviews of the product or the streamer's explanations, overlap with social interaction affordance.

Lehrer et al. (2018) take a different stance, focusing on the affordances that organizations might actualize by employing big data analytics. Specifically, using business e-commerce platform functionalities helps promote service innovation. De Luca et al. (2021) also conclude that big data affordances drive service innovation. Another concrete example of service innovation is virtual reality, which affords online shoppers to virtually try on garments, leading to a greater intention to buy (Tawira & Ivanov, 2022). However, firm-focused affordance research on e-commerce platforms is scarce. Few managerial e-commerce affordances have been identified in the literature, and assessing what corporate decisions and processes contribute to affordance actualization remains an unresolved challenge (De Luca et al., 2021).

3. Hypotheses and research model

In line with affordance theory, we define *e-commerce affordances* as actualizable possibilities of performing specific strategic actions offered by the e-commerce channel. As affordance theory suggests, affordances are relational (Chemero, 2003). Their nature is not in the features of an object (e-commerce channel) nor the subject (firms), but arises from the relationship between the ability of the latter to understand the object's features for strategic-oriented actions (Strong et al., 2014; Zammuto et al., 2007). Although an object may potentially embed various affordances, these are not necessarily perceived and actualized in the same way by all firms. As transformational entrepreneurs need to embrace change based on new technologies to gain long-term success, it is in their interest to be in the condition of actualizing all the affordances that technologies can potentially imply. Therefore, when bringing this theoretical rationale into the e-commerce channel context, it is critical to identify what induces firms, managers, and transformational entrepreneurs to actualize different e-commerce affordances. In particular, in line with Bayer et al. (2021), this study approaches the literature inherent to e-commerce for manufacturing SMEs and envisions affordances for its framework.

3.1. E-commerce commitment and e-commerce affordances

Nowadays, market knowledge is considered critical for every firm. Moreover, there is evidence that market-oriented companies have higher profits and revenues than their competitors, and historical records show they have a higher chance of preventing business failure (Kumar et al., 2011). Furthermore, Reijonen et al. (2012) infer that market-oriented SMEs tend to grow more than others. Therefore, manufacturers' strategic priority should be to acquire market and consumer information and use it for different purposes, from new product development (Zhan et al., 2018) to personalized marketing activities (Kaptein & Parvinen, 2015). In this regard, e-commerce websites provide access to an enormous variety of structured and unstructured data (Akter & Wamba, 2016; Plessis & Boon, 2004). These data are a valuable resource for acquiring market knowledge and accurate information on consumer trends (De Luca et al., 2021; Lehrer et al., 2018). According to Dicuonzo et al.'s (2022) case study on transformational entrepreneurship practices, the examined organization made its website a source of information about its consumer base. Consumer knowledge generation is thus conceptualized as a strategic affordance actualizable through

e-commerce commitment:

H1a. : E-commerce commitment is positively related to the actualization of the consumer knowledge generation affordance.

Although it is not necessary or immediately beneficial, but somewhat dependent on the maturity and vision of each specific company (Kuivalainen et al., 2012), internationalization remains a crucial success factor that has characterized the last two decades of the global economy. Transformational entrepreneurs have exploited technology to compete in the international environment while also taking advantage of their international presence by discovering new foreign technologies (Ngo & Igwe, 2019). Thus, there is a generalized consensus that SMEs with transformational entrepreneurship orientation must invest resources in their internationalization. Furthermore, effective online channel management is considered an efficient vehicle of internationalization for SMEs, since it enables them to break down new market entry costs (Hossain et al., 2021; Raymond et al., 2005). Therefore, it is conceivable that the more a company commits to the e-commerce employment, the more it should be able to actualize the potential affordance it can bring in terms of internationalization.

H1b. : E-commerce commitment is positively related to the actualization of the internationalization affordance.

Normally, SME manufacturers should avoid depending on a reduced number of customers. Customer concentration can lead to cash flow and stock price problems if a large customer does not pay or stops contracting the manufacturer as a supplier (Lee et al., 2020). In particular, SMEs highly exposed to business-to-business (B2B) customer dependency are at risk because they typically have few large customers. Especially during economic crises like the one recently generated by the COVID-19 pandemic, SMEs with more chances to survive are the ones with the most extensive B2B customer portfolios (Marconatto et al., 2021). Creating a new distribution channel can mitigate the risk of customer dependency (Manral & Harrigan, 2018). Selling online could represent a viable new channel opening leading to an increase in customer diversification and could be interpreted as a viable transformational entrepreneurship practice to prevent or face crises. Therefore, customer diversification is a strategic affordance actualizable through e-commerce commitment:

H1c. : E-commerce commitment is positively related to the actualization of customer diversification affordance.

3.2. E-commerce affordances and e-commerce performance

According to affordance theory, a highly actualized affordance will induce the subject to attribute a great relevance to the object. For example, De Luca et al. (2021) point out how the actualization of big data technology affordances lead to an increase in service innovation, and consequently to increased performance with respect to the use of these tools. In other words, as managers become more aware of the utilities of the features provided by big data tools, so their usage becomes more performative. Accordingly, in this context we define e-commerce performance as the degree of efficacy that SMEs managers ascribe to their firms' deployment of an e-commerce channel.

Considering consumer knowledge generation, the big data tools generating big data affordances that are mentioned by Lehrer et al. (2018) include Google Analytics. Apart from Google Analytics, the online channel offers many solutions enabling data acquisition via e-commerce. Even major third-party platforms such as Alibaba provide user-friendly dashboards and reports highlighting consumers data to their vendors (Li et al., 2018). Therefore, if managers behaving as transformational entrepreneurs were able to actualize the possibility of acquiring data about their consumers, they could effectively use such information to their advantage by adapting their services and marketing investments in order to wisely attract and satisfy their clientele. Thus, it is consistent to assume that managers who are effectively benefiting from consumer knowledge generation would attribute a satisfactory performance level to e-commerce:

H2a. Actualizing the consumer knowledge generation affordance is positively related to e-commerce performance.

With regard to internationalization, Dicuonzo et al. (2022) mention how the transformational entrepreneurs who focused on their e-commerce adoption in response to the COVID-19 crisis attributed an improved internationalization effect to their online channel implementation. Conveniently, Elia et al. (2021) support that firms investing in e-commerce by hiring an e-commerce manager, for example, achieve better export performance than firms selling mainly through traditional channels, albeit with an export manager. It is therefore logical to assume that the higher the level of internationalization affordance actualization by SME manufacturers, the greater the benefit and success they ascribe to their e-commerce strategy. Therefore:

H2b. Actualizing the internationalization affordance is positively related to e-commerce performance.

In line with the rationale adopted for hypotheses H2a and H2b, we continue considering customer diversification an affordance that can be realized through e-commerce commitment. Besides considering diversification as a transformational entrepreneurship practice to minimize risk in times of crisis (Marconatto et al., 2021), scholars argue that diversification is a real argument for improving financial performance such as sales growth or profitability. Narasimhan and Kim's (2002) empirical work supports how firms' that engage new suppliers or distributors manage to minimize logistical costs, or cultural and skills barriers, thereby increasing their financial performance. If the adoption of the online channel does indeed allow for the actualization of customer diversification in the eyes of managers, they may consequently attribute an important impact on their strategy and thus on company performance to it. Therefore, we formulate the following hypothesis:

H2c. : Actualizing the customer diversification affordance is positively related to e-commerce performance.

3.3. The mediating role of e-commerce affordances

Although the resources that businesses deploy to embark on the e-commerce trajectory are crucial, technological resources alone are insufficient (Yang et al., 2015). Accordingly, Abebe (2014) finds that manufacturing SMEs' entrepreneurial orientation toward adopting an e-commerce strategy is crucial to their success. Furthermore, a genuine commitment to the online channel requires that in addition to the resources invested, company executives explicitly prioritize e-commerce in the organization's future and that this translates into concrete actions such as hiring or training qualified personnel (Kowtha & Choon, 2001). However, a frequent reason behind e-commerce management failures, attributable to non-commitment, is the lack of digital marketing and technical expertise. For example, Royle and Laing (2014) point out that companies are too often incapable of processing and interpreting information regarding their online shoppers' consumption. Therefore, given that e-commerce commitment is an antecedent of consumer knowledge generation (H1a), which is in turn an antecedent of e-commerce performance (H2a), we expect to find that consumer knowledge generation mediates the relationship between e-commerce commitment and e-commerce performance:

H3a. Actualizing the consumer knowledge generation affordance mediates the relationship between e-commerce commitment and e-commerce performance.

Another cause of e-commerce failures in the internationalization context again leads to factors attributable to a lack of commitment. Tolstoy et al. (2021) highlights that only companies that put the online

channel at the center of their internationalization strategy have seen satisfactory results. It is no coincidence that the initial acceleration of online sales development in target foreign markets is a determinant for the long-term retention of that channel (Deng et al., 2022). In addition, online sales are determined by service quality (Ma et al., 2022), which minimizes the perceived distance of customers to the foreign seller, and by the quality of shipping, which must be handled to the highest standard (Gregory et al., 2019). Given that e-commerce commitment is an antecedent of internationalization (H1b), which is itself an antecedent of e-commerce performance (H2b), we expect that internationalization mediates the relationship between e-commerce commitment and e-commerce performance:

H3b. Actualizing the internationalization affordance mediates the relationship between e-commerce commitment and e-commerce performance.

Ultimately, actualizing customer diversification through the online channel seems complicated to achieve without the necessary commitment. Managing a more significant number of accounts per se requires commitment. The prioritization of accounts is then unavoidable, especially for manufacturers with limited resources (Homburg et al., 2008). The danger is that if the necessary commitment to focus on e-commerce does not persist, accounts specialized in e-commerce distribution will risk being treated as bottom-tier accounts or simply managements will not even consider the opportunity to establish relationships with them. Therefore, a non-committed e-commerce management would not ascribe its affordance nor recognize its worthiness. Given that e-commerce commitment is an antecedent of customer diversification (H1c), which is in turn an antecedent of e-commerce performance (H2c), we expect that customer diversification mediates the relationship between e-commerce commitment and e-commerce performance:

H3c. Actualizing the customer diversification affordance mediates the relationship between e-commerce commitment and e-commerce performance.

3.4. E-commerce platforms and e-commerce affordances

Moreover, it is known that characteristics of the object may facilitate or hinder the subject's actualizing of affordances (Strong et al., 2014). Indeed, there are multiple ways to approach the online channel, such as *direct selling*, *agency selling* and *indirect selling* (C. Chen et al., 2021; Pu et al., 2020), and we expect that specific features of different e-commerce options can favor or disfavor the actualization of the consumer knowledge generation, internationalization, and customer diversification affordances.

3.4.1. Direct selling

Assuming that consumer knowledge generation is ascribable as an e-commerce-specific affordance, different approaches to the online sales channel can certainly impact it. The direct selling approach, in which a manufacturer directly sells to end consumers through their website, allows it to directly access a multitude of structured and unstructured data (Akter & Wamba, 2016). In fact, directly managing a proprietary site allows owners to handle all data accessible via Google Analytics (Lehrer et al., 2018). This permits intuitive access to the demographic nature of consumers in terms of location, age, gender, and other characteristics. Therefore, the following hypothesis can be formulated:

H4a. Direct selling via an own e-commerce website is positively related to consumer knowledge generation affordance actualization.

Regarding the actualization of the internationalization affordance, the rationale behind this is also that e-commerce is generally a preferred route, as it is less costly and cumbersome than traditional methods. Direct selling in this respect would be no exception. New content management system technologies nowadays allow businesses to build websites at a low cost without necessarily contracting developers and coders (Engert et al., 2022). In addition, the scalability of an e-commerce platform allows firms to reach manifold markets simultaneously by simply translating their catalogue into multiple languages. For example, an empirical study by Tolstoy et al. (2016) revealed that Swedish companies with e-commerce websites achieve a greater coverage of international markets than those without. Therefore, the following hypothesis can be formulated:

H4b. Direct selling via an own e-commerce website is positively related to internationalization affordance actualization.

According to the reasoning that was used for the earlier hypothesis (H1c), e-commerce commitment is the mechanism that enables the customer diversification affordance actualization. However, direct sales are not the approach that is going to be the most successful in this particular scenario. By definition, direct selling involves skipping the middlemen and going straight from the manufacturer to the end user, cutting out the distribution chain entirely. Sometimes, behavior of this nature even creates a channel conflict with the company's distributors (Du et al., 2018; Tsay & Agrawal, 2004). Because of this, it may be inconceivable for the manufacturer to consider the possibility of using e-commerce as a weapon to broaden its portfolio of distributors, while on the other hand it could stimulate the manufacturer's willingness to concentrate its revenue sources. Therefore, the following hypothesis can be formulated:

H4c. Direct selling via an own e-commerce website is negatively related to customer diversification affordance actualization.

3.4.2. Agency selling

The practice of agency selling is spreading widely with the growth of third-party marketplace platforms. Agency selling also has peculiarities that would make it suitable for actualizing the consumer knowledge generation affordance. Although agency selling may disregard the existence of a manufacturer's website, and therefore not provide direct access to data analytics, third-party marketplaces allow for circumventing this problem. These platforms provide excellent tools to their vendors, enabling them to analyze consumer behavior thanks to their easy-to-read dashboards and reports (Li et al., 2018). In addition, they often offer accurate selling forecasts thanks to their artificial intelligence algorithms based on consumers' purchase history (Zhang et al., 2021). Therefore, the following hypothesis can be formulated:

H5a. : Agency selling via third-party platforms is positively related to consumer knowledge generation affordance actualization.

In the case of the internationalization affordance as well, agency selling presents characteristics that would make it suitable for its actualization. Indeed, its presence in many markets is known to be an important lever for gaining the trust of foreign consumers through brand awareness (Maier & Wieringa, 2021). In other words, a consumer is more likely to discover a foreign manufacturer's product on Amazon and trust buying it there, rather than becoming aware of it and deciding to purchase it directly from the manufacturer's site. Furthermore, third-party marketplaces adopt active strategies to encourage vendors, especially SMEs, to sell internationally as well, such as offering dedicated logistics services that lower their costs and shipping (Hui, 2020). Therefore, the following hypothesis can be formulated:

H5b. : Agency selling via third-party platforms is positively related to internationalization affordance actualization.

In contrast to direct selling, agency selling possesses characteristics that may render it appropriate for the actualization of the customer diversification affordance. It is still the manufacturer who retains sovereignty over its products, since it remains the proprietary vendor retailing them via third-party platforms; however, it is possible that the manufacturer can sell simultaneously via more than one of these

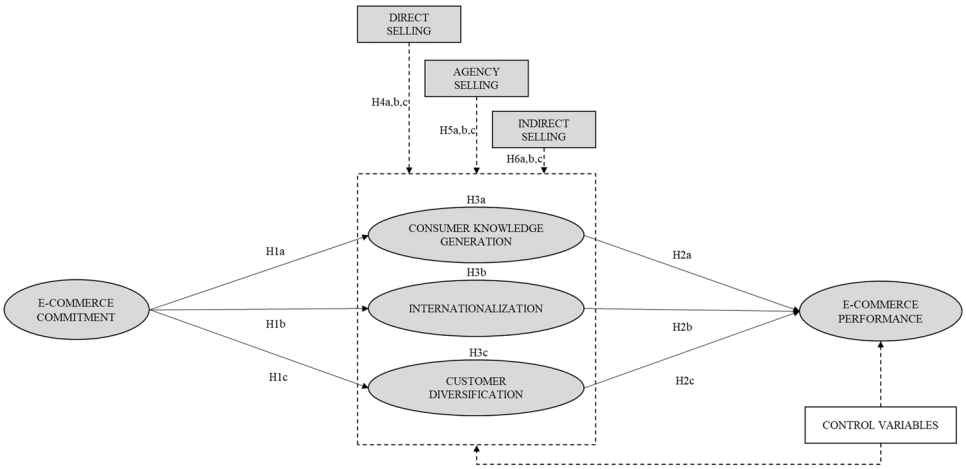


Fig. 1. Research Model.

platforms. A manufacturer selling their products on Amazon might also offer them on Alibaba, eBay, and a variety of other third-party platforms, which would result in diversified revenue streams. In addition, third-party platforms work tirelessly to bring in as many different vendors as they can in order to achieve a critical mass (Johnson, 2013). Therefore, the following hypothesis can be formulated:

H5c. : Agency selling via third-party platforms is positively related to customer diversification affordance actualization.

3.4.3. Indirect selling

The assumption that direct selling and agency selling are more likely to facilitate the actualization of consumer knowledge generation is grounded on the premise that direct selling and agency selling enable manufacturers to have direct access to consumer demographic and purchasing data (H4a, H5a). However, this is not the case when dealing with indirect sales. A manufacturer engaging in indirect sales does not have any direct information regarding the shopping patterns of the end customers who purchase their products online. Any information the manufacturer might have comes from the resellers willing to provide it. Unfortunately, this is not always the case. In addition, resellers are frequently under the impression that they will not benefit from information sharing with suppliers unless it is done to an extremely high relational degree (Villena & Craighead, 2017). Therefore, the following hypothesis can be formulated:

H6a. : Indirect selling via third-party resellers is negatively related to consumer knowledge generation affordance actualization.

The logic behind the idea that direct selling and agency selling can be an effective approach when opening up new markets implies that online commerce requires less upfront investment and risks than traditional strategies (H4c, H5b). The case of indirect selling should be no exception. Many countries have several specialized or generalist e-tailers working online. For example, Amazon itself, or Zalando in the clothing sector, are called hybrid platforms because they present the opportunity to manufacturers to either sell via agency selling in the marketplace or, like a normal e-tailer, buy items from suppliers and resell them in a classic B2B2C model (Aversa et al., 2021). E-tailers, seen as foreign distributors, are also familiar with their target market and vice versa and are well recognized by customers (Sharma & Blomstermo, 2003). Therefore, we could assume that relying on indirect selling can contribute to actualizing the internationalization affordance. Thus, the following hypothesis can be formulated:

H6b. : Indirect selling via third-party resellers is positively related to internationalization affordance actualization.

In line with the agency selling approach and its predisposition to actualizing customer diversification affordance, we consider that indirect selling follows a comparable logic. When a manufacturer decides to engage in selling through an online channel via indirect selling, this implies that it can approach several e-tailers in the same market, who can then bring in additional sources of revenue (Abhishek et al., 2016; C. Chen et al., 2021). Although cannibalization between channels would take place, this would only favor the process of revenue diversification. Therefore, it can be envisaged that manufacturers adopting indirect selling would begin to sense the possibility of diversifying their business entries. Thus, the following hypothesis can be formulated:

H6c. : Indirect selling via third-party resellers is positively related to customer diversification affordance actualization.

Fig. 1 summarizes our research model. We examine this model with an explanatory mixed-method research design recently adopted by other IS and management studies (e.g., Wong et al., 2022). Our sequential design is divided into two phases: First, we use quantitative data to test the research hypotheses. Second, we use qualitative data to illustrate the quantitative findings acquired in the first phase, thus providing an in-depth understanding of the research subject. Mixed methodologies are suggested practices when the preliminary quantitative study relies on cross-sectional data (C. Maier et al., 2023).

4. Quantitative study

4.1. Methodology of the quantitative study

4.1.1. Data collection

We collected data on Prolific (Bawack et al., 2023), and to ensure that the respondents qualified for our study we applied the following pre-screen filters: respondents (i) had to be classified as “having managerial experience,” (ii) leading at least two direct subordinates in (iii) a seniority level corresponding at least to middle manager, (iv) working for a SME in (v) a manufacturing industry. In addition, the respondents were screened out if they disagreed with the statement: “Our company manufactures products aimed at consumption by end consumers which, among other channels, are also marketed through the online distribution channel.” The data were collected in December 2021. After eliminating respondents based on the screening question and those with missing data (n = 101), we obtained a sample of 165 valid replies (62% of all respondents). Our sample is diverse, including 64% males and 36% females, with 45% under 35 years and 55% over 35 years old, in addition to 32% originating from European Union (EU) member countries and 68% from non-EU member countries.

Table 1
Measurement in the Quantitative Study.

Construct	Definition	Derived from	Items questions	EFA	CFA
E-commerce commitment	The management's resource investments and explicit attribution of prominence communicated to employees concerning e-commerce.	Kowtha and Choon (2001)	Our company offers trainings (courses, literature, coaching) to improve the expertise on e-commerce of our team members	.813	.821
		Proksch et al. (2021)	Skills related to e-commerce are an important selection criterion in recruiting new team members	.783	.864
			Our team members for themselves adopt all online distribution services and products we approach as a company	.734	.813
Consumer knowledge generation	The affordance to deeply understand firm's consumers' characteristics, demographics and shopping habits.	De Luca et al. (2021)	Investing in online channel distribution affords our company to identify patterns of final consumers behavior	.736	.823
		Sutherland et al. (2004)	Investing in online channel distribution affords our company to identify patterns of competitive actions affecting our final consumers	.742	.871
			Investing in online channel distribution affords our company to increase knowledge on consumers' demographics	.795	.732
Internationalization	The affordance to expand a firm's operations in foreign markets	Thompson et al. (2019)	Investing in online channel distribution affords our company to increase sales into already present international markets	.706	.820
			Investing in online channel distribution affords our company to increase our foreign market knowledge	.655	.905
			Investing in online channel distribution affords our company to have more procurement inputs	.688	.800
Customer diversification	The affordance to diversify the sources of firms' revenues.	Fang et al. (2011)	Investing in online channel distribution affords our company to decrease our customer concentration (B2B, not final consumers)	.850	.763
		Styles et al. (2008)	Investing in online channel distribution affords our company to decrease our company dependency on major offline customers (B2B, not final consumers)	.772	.762
			Investing in online channel distribution affords our company to establish relationships with diverse channel members (B2B, not final consumers)	.690	.721
E-commerce performance	The degree of efficacy in achieving a firm's strategic goals that managers ascribe to the e-commerce of their firm.	De Luca et al. (2021)	Our online channel investment is an overall success	.773	.783
			Our online channel success exceeds expectations	.748	.737
			Our online channel adds substantial value to our products and services	.709	.927
			Online channel was a good idea to invest in	.664	.934
Direct selling	The manufacturer operates its own e-commerce website selling directly to its final consumers.	New item	Our company strongly relies on online direct selling through digital platform enabled site		
Agency selling	The manufacturer relies on third-party multisided platforms and sells directly to their end consumers via its account on the platforms.	New item	Our company strongly relies on agency selling through third-party digital platforms (for e.g., Amazon Marketplace, eBay, etc.)		
Indirect selling	The manufacturer sells its products to a distributor or retailer, whether a pure player or an omnichannel player who, in turn, sells to end customers.	New item	Our company strongly relies on its B2B resellers for selling online to its final consumers		

Note: EFA = Factor loadings from exploratory factor analysis, CFA = Factor loadings from confirmatory factor analysis.

4.1.2. Measurement

To measure the newly conceived e-commerce affordances, we followed the scale development procedure widely used in research (e.g., De Luca et al., 2021; Herhausen et al., 2022). First, after exploring the existing literature, we identified four items from Thompson et al. (2019) to measure internationalization affordance, three items for consumer knowledge generation from De Luca et al. (2021) and Sutherland et al. (2004), and three items for customer diversification from Fang et al. (2011) and Styles et al. (2008). We also adapted four items from Proksch et al. (2021) and Kowtha and Choon (2001) to assess e-commerce commitment, and four items from De Luca et al. (2021) to evaluate e-commerce performance. Second, we sent the preliminary questionnaire to three highly skilled managers working for international e-commerce companies and an academic expert who was not part of the research team. Following their feedback, we rephrased some questions and added six additional items. Direct, agency, and indirect selling were measured with the degree of importance the respondents' attributed to each online channel approach (all items of the final questionnaire are shown in Table 1). We included a number of potential control variables such as managers' age, seniority, companies' geographical region, and the type of industry. Age has been measured on a scale from one to five (1 < 25 years, 2 = >25 <35, 3 = >35 <45, 4 = >45 <55, 5 > 55 years) and seniority on a scale from one to three (1 = middle manager, 2 = senior manager, 3 = top executive). A dummy has been used for geographical region (EU vs. non-EU firms), and the different industries have been utilized as categorical variables (consumer electronics, fast-moving consumer goods, fashion, other manufacturing).

4.1.3. Exploratory and confirmatory factor analysis

For the verification of the constructs, we conducted an exploratory factor analysis (EFA) to verify the latent constructs of the proposed framework. In preparation for this analysis, we first checked whether the sample of 165 respondents contained potential outliers. The Mahalanobis test identified 10 outliers that were not considered in the main analysis to avoid providing misleading conclusions.[2] The preliminary EFA led us to retain 16 items out of the initial 24. The eight items not retained generated cross-loadings that were too high in different factors. The final item setup presented commonalities above.70, and the results of a Varimax rotation showed that all the components had a minimum load on their respective factor of.65 (details in Table 1). After the EFA, we conducted a confirmatory factor analysis (CFA). Every item had a load of at least.70 on the latent variables, and convergent validity was supported by average variance extracted (AVE) values above the.50

[2] We replicated all the analyses with the full sample of 165 respondents. All substantive conclusions remain the same. The results are available from the first author.

cutoff criterium. Discriminant validity was supported as the square root of the AVE for each construct was higher than all correlation coefficients (Table 2). The CFA showed a good fit to the data (X2/df) = 1.299; RMSEA = .044; TLI = .979; CFI = .984).

4.2. Results of the quantitative study

We used a structural equation model with 5000 bootstrap samples to calculate the bias-corrected confidence intervals (CIs). The structural model presents a good fit to the data (X2/df = 1.335; RMSEA =.047; TLI =.950; CFI =.967). The results displayed in Table 3 suggest that e-commerce commitment is positively related to all three e-commerce affordances: consumer knowledge generation (β = .533, p < .001; supporting H1a), internationalization (β = .545, p < .001; supporting H1b), and customer diversification (β = .287, p < .05; supporting H1c). Two of the three affordances are positively related to e-commerce performance: consumer knowledge generation (β = .306; p < .001) and internationalization (β = .316; p < .01), supporting H2a and H2b. Customer diversification does not have a statistically significant relationship with e-commerce performance (β = .134; p > .10), so we have to reject H2b. We next examined the three hypothesized indirect relationships with 95% CIs. Both the e-commerce commitment → consumer knowledge generation → e-commerce performance path (β = .163; CI =.042,.437) and the e-commerce commitment → internationalization → e-commerce performance path (β = .172; CI =.020,.537) are significant, while the path e-commerce commitment → customer diversification → e-commerce performance is not significant (β = .038; CI = −.012,.151). We also find a non-significant direct relationship between e-commerce commitment and e-commerce performance. Therefore, this relationship is fully mediated by the consumer knowledge generation and internationalization affordances (but not by the customer diversification affordance), thus supporting H3a and H3b but not H3c. Direct selling is positively related to internationalization (β = .128; p < .05) and consumer knowledge generation (β = .110; p < .10), but not customer diversification (β = .050; p > .10), supporting H4a and H4b but not H4c. Agency selling is positively related to internationalization (β = .109; p < .05), consumer knowledge generation (β = .146; p < .05), and customer diversification (β = .158; p < .01), therefore supporting H5a, H5b, and H5c. Finally, indirect selling is positively related to internationalization (β = .147; p < .001) and customer diversification (β = .141; p < .05), but not consumer knowledge generation (β = .007; p > .10), thus supporting H6b and H6c but not H6a.

4.3. Discussion of the quantitative study

Our quantitative results suggest that e-commerce commitment favors the actualization of all three identified affordances: consumer knowledge generation, internationalization, and customer diversification. However, only consumer knowledge generation and internationalization mediate the relationship between e-commerce commitment and e-commerce performance. Moreover, our analysis highlights that all three e-commerce approaches significantly contribute to actualizing internationalization. This means that e-commerce, regardless of the utilized approach, is a suitable practice for pursuing the internationalization of manufacturing SMEs. However, only direct selling through owned digital platforms and agency selling through third-party platforms contribute to actualizing consumer knowledge generation. Although the hypothesis of the negative relationship between indirect selling and consumer knowledge generation (H6a) is not supported, in any case we find a null and nonsignificant relationship among these two variables. Hence, only approaches involving the adoption of digital platforms can provide adequate direct data access for raising manufacturing SMEs' knowledge of their consumers' purchasing behavior. On the other hand, customer diversification affordance actualization is only related to indirect selling and agency selling. Despite the unsupported negative

Table 2
Construct Reliability and Correlation Matrix.

N.	Variable name	CR	AVE	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	E-commerce commitment	.872	.694	4.37	1.53	**.833**													
2	Consumer knowledge generation	.851	.657	4.85	1.33	.593	**.811**												
3	Internationalization	.880	.710	4.73	1.47	.689	.657	**.843**											
4	Customer diversification	.793	.561	4.03	1.32	.491	.457	.581	**.749**										
5	E-commerce performance	.911	.722	4.91	1.39	.679	.688	.754	.551	**.850**									
6	Direct selling			4.74	1.68	.511	.471	.553	.397	.613									
7	Agency selling			3.83	1.76	.480	.468	.542	.486	.502	.354								
8	Indirect selling			4.40	1.52	.496	.451	.592	.507	.485	.447	.523							
9	European country			.33	.47	.093	.029	.112	.142	.036	.168	.200	.168						
10	Seniority			1.30	.60	-.103	.018	-.063	-.033	-.121	-.010	.024	.009	.128					
11	Age			2.73	.97	-.108	-.002	-.052	.056	-.077	-.060	-.198	.056	-.102	.053				
12	Consumer electronics			.25	.44	.219	.027	.105	.094	.111	.118	.183	.072	.164	.029	-.161			
13	FMCG			.17	.38	.103	.046	.144	.078	.095	.052	.054	.069	-.032	-.120	-.153	-.266		
14	Fashion			.07	.26	.163	.163	.200	.101	.204	.059	.084	.076	-.033	.028	-.001	-.160	-.127	
15	Other manufacturers			.50	.50	-.352	-.142	-.303	-.193	-.272	-.172	-.242	-.155	-.101	.051	.256	-.584	-.462	-.278

Note: CR = composite reliability, AVE = average variance extracted. The square root of the AVE is reported on the diagonal.

Table 3
Structural Equation Model Results.

	Relationship	β	S.E.	C.R.	Result
H1a	E-commerce commitment → Consumer knowledge generation	.533***	.11	5.003	Supported
H1b	E-commerce commitment → Internationalization	.545**	.10	5.528	Supported
H1c	E-commerce commitment → Customer diversification	.287**	.10	2.878	Supported
H2a	Consumer knowledge generation → E-commerce performance	.306**	.09	3.531	Supported
H2b	Internationalization → E-commerce performance	.316**	.11	2.982	Supported
H2c	Customer diversification → E-commerce performance	.134	.09	1.575	Not supported
H4a	Direct selling → Consumer knowledge generation	.110*	.06	1.786	Supported
H4b	Direct selling → Internationalization	.128**	.05	2.387	Supported
H4c	Direct selling → Customer diversification	.050	.06	.833	Not supported
H5a	Agency selling → Consumer knowledge generation	.146**	.06	2.427	Supported
H5b	Agency selling → Internationalization	.109**	.05	2.071	Supported
H5c	Agency selling → Customer diversification	.158***	.06	2.657	Supported
H6a	Indirect selling → Consumer knowledge generation	.007	.07	.097	Not supported
H6b	Indirect selling → Internationalization	.147**	.06	2.301	Supported
H6c	Indirect selling → Customer diversification	.141**	.07	2.041	Supported
	E-commerce commitment → E-commerce performance	.029	.10	.290	
	Indirect selling → E-commerce performance	-.035	.05	-.741	
	Direct selling → E-commerce performance	.159**	.04	3.885	
	Agency selling → E-commerce performance	-.004	.04	-.098	
	Consumer electronics → Consumer knowledge generation	-.180	.19	-.942	
	Consumer electronics → Internationalization	-.055	.21	-.259	
	Consumer electronics → Customer diversification	-.461**	.22	-2.147	
	FMCG → Consumer knowledge generation	-.183	.23	-.788	
	FMCG → Internationalization	.225	.21	1.088	
	FMCG → Customer diversification	.113	.23	.491	
	Fashion → Consumer knowledge generation	.033	.33	.098	
	Fashion → Internationalization	.434	.30	1.465	
	Fashion → Customer diversification	.08	.33	.244	
	European country → Consumer knowledge generation	-.164	.18	-.928	
	European country → Internationalization	-.013	.16	-.086	
	European country → Customer diversification	.112	.18	.637	
	Seniority → Consumer knowledge generation	.191	.14	1.389	
	Seniority → Internationalization	-.010	.12	-.081	
	Seniority → Customer diversification	-.026	.14	-.192	
	Age → Consumer knowledge generation	.092	.09	1.047	
	Age → Internationalization	.027	.08	.342	
	Age → Customer diversification	.181**	.09	2.072	
	FMCG → E-commerce performance	.035	.15	.230	
	Fashion → E-commerce performance	.154	.22	.713	
	Consumer electronics → E-commerce performance	.034	.15	.233	
	European country → E-commerce performance	-.131	.12	-1.142	
	Seniority → E-commerce performance	-.147	.09	-1.627	
	Age → E-commerce performance	-.046	.06	-.773	

Note: * ** = p < .01; * * = p < .05; * = p < .10.

relationship hypothesis (H4c), direct selling again exhibits in any case a non-significant relationship supporting the inappropriateness of this approach for increasing customer diversification. We next use a qualitative study to illustrate these findings and to uncover the underlying motivations that lead to the observed relationships (C. Maier et al., 2023).

5. Qualitative study

In accordance with the sequential exploratory research design, the qualitative part of the research is conducted following the quantitative element. As an initial step in the qualitative study, we opted to conduct a fsQCA analysis. This analysis has recently been used to support quantitative studies, such as SEM, to help shed light on the intricate relationships between variables (Bawack et al., 2023; Kang & Shao, 2023). Specifically, the qualitative study aims to explore the configurations of different online channel approaches and firms' e-commerce commitment, which could lead to the actualization of e-commerce affordances. Although no predefined protocols indicate how to select respondents for qualitative interviews, research studies employing this design often select interviewees from the sample of the prior survey (Ferraris et al., 2021; Ivankova et al., 2006). Therefore, we proceeded to interview part of the surveyed population. Before that, we classified different interviewees' configurations identified by the fsQCA, seeking to short-list at least one interviewee fitting each configuration in line with the purposeful stratified sampling criterion. This stratified sample criterion is well suited to capturing variations in the manifestation of a single phenomenon (Patton, 2014).

5.1. Method for the qualitative study

5.1.1. Selecting participants through fsQCA methodology

Fuzzy sets were created using interval scale variables from fsQCA 3.0. The variables required recalibration to identify high-performing setups. Using the fsQCA program for calibration, the suggested breakpoints for full membership, non-membership, and crossover points were 0.95, 0.05, and 0.5 (Ragin, 2017). The authors then employed the fsQCA's truth table algorithm to examine the calibrated fuzzy sets. This approach entails generating a truth table based on fuzzy data to outline configurations to be investigated and, second, identifying causal criteria and outcomes (Ott et al., 2018). A first, the investigation of the truth tables was conducted with a frequency threshold at five and with consistency set to the standard.80 threshold (Ragin, 2017). This preliminary outcome provided four equivalent configurations applicable to the actualization of all three affordances: e-commerce commitment*direct selling, e-commerce commitment*agency selling, direct

selling* ~agency selling* ~indirect selling, ~direct selling*agency selling* ~indirect selling (~ stands for absence and * stands for "and"). Nonetheless, to achieve more granularity and emphasize the peculiarities regarding the actualization of each affordance, we opted for more selective parameters, setting the consistency at a.95 cutoff and including all frequencies above the single observation (Ott et al., 2018).

Table 4 shows the different possible configurations enabling the actualization of the three different e-commerce affordances. Three different configurations can actualize consumer knowledge generation. The first requires the presence of indirect and agency selling and the absence of direct selling (CNKa). The second requires the presence of agency and indirect selling adoption and does not require any specific e-commerce commitment (CKNb). The third configuration requires the adoption of both types of digital platforms, backed by a strong e-commerce commitment and no indirect selling (CNKc). Three other configurations can actualize internationalization affordance. The first configuration, comparable with CKNb, requires both agency and indirect selling and no specific e-commerce commitment (INTa). The configurations INTb and INTc instead require both a strong e-commerce commitment and direct selling, the former paired with agency selling and the latter with indirect selling. Finally, customer diversification is actualized in one possible scenario characterized by no e-commerce commitment and direct selling and the presence of agency and indirect selling (DIVa).

5.1.2. Interview methodology

We therefore opted to qualitatively interview members belonging to the sample of previously surveyed managers. Drawing on the methodology adopted by other recent studies, we addressed open-ended questions to each of them and asked them to respond in a written and anonymous form (Roberson & Perry, 2022; Whelpley et al., 2021). The open-ended questions were submitted to respondents via Prolific in October and November 2022, and we received 24 replies. Considering the seven different configurations of the actualization of the three affordances resulting from the fsQCA, the authors used a stratified purposeful sampling criterion for selection among the previous survey's respondents (Patton, 2014). The authors classified the interviewees among the quantitative survey respondents based on the matching with the identified configurations. To do so, the scores in the questionnaire were classified into four quartiles (Q1, Q2, Q3, Q4). We attributed the presence of the studied variables to the higher quartiles (Q1, Q2) and their absence to the lower ones (Q3, Q4). Finally, 20 out of the 24 respondents matched the fsQCA final configurations (respondents' profiles in the Appendix).

5.2. Results of the qualitative study

The written responses were analyzed with the word frequency query offered by Nvivo 3.0 software and we settled for recognizing stemmed words longer than three characters. The results are divided into three subsections corresponding to the three affordances.

5.2.1. Results regarding consumer knowledge generation

The frequency query helped us to capture the relevant keywords that emerged when the respondents were asked why they thought e-commerce allows them to obtain knowledge about consumers. Among the most cited stemmed keywords, in the first place (excluding the common terms such as "online," "commerce," "consumers," and "products") is the word "data," immediately preceded by verbs such as "allow," "better," and then followed by the verb "provide." In the second order, we find keywords such as "contact," "feedback," and "knowledge," followed in the ranking by verbs like "make," "create," "deal," and "increase." A total of 14 respondents fitted within the consumer knowledge generation affordance actualization configurations. Mirroring the total respondents, this subgroup expresses a high presence of the words "data" and "knowledge." It also to a greater extent uses the term "analyses" which, if added to the synonyms "reports," "analytics," and "summaries," would be the second expression mentioned, only below the word "consumers." However, the keyword "feedback" is no longer present.

5.2.2. Results regarding internationalization

As with the previous affordance, respondents were asked whether and how the online channel affords them the opportunity to internationalize their business operations. In line with what we witnessed previously, among the first identifiable keywords we find, as usual, "online," "commerce," and "company." It should be noted, however, that in the keyword ranking, preceding the word commerce, is the word "sales." In the first 10th percentile of keywords, we also find the word "cost." Finally, it is also noteworthy that the word "platform" and the names of the platforms themselves such as "AliExpress," "Amazon" and "eBay" are expressly mentioned, and added together would also be tied as the third keyword in the ranking. In total, 13 respondents correspond to the subgroups of the configurations involving a high actualization of internationalization affordance. Their responses further increase the ranking of the word "sales" to second place. In addition, when combined, the word "platforms" and the explicit mentions of third-party platforms also gain the second place ex aequo. In contrast to the overall cluster, the word "cost" is much less frequently used, dropping out from the top 10 percentile.

5.2.3. Results regarding customer diversification

Finally, in line with the analyses of the two previous affordances, respondents were asked whether and how selling online allowed them to diversify their sources of income. Unsurprisingly, as with the previous results, keywords such as "online," "commerce," "company," "products"

Table 4
Configurations for Achieving High Affordance Actualization Levels.

	Consumer knowledge generation			Internationalization			Customer diversification
	CKNa	CKNb	CKNc	INTa	INTb	INTc	DIVa
E-commerce commitment		○	●	○	●	●	○
Direct selling	○		●		●	●	○
Agency selling	●	●	●	●	●		●
Indirect Selling	●	●	○	●		●	●
Raw Coverage	.396	.202	.379	.203	.632	.687	.180
Consistency	.945	.965	.945	.970	.934	.943	.958
Solution Coverage	.514			.772			
Solution Consistency	.927			.919			

Note: Black circle = presence of the variable; White circle = absence of the variable; Blank = not influent in the solution

and "customer" also stand out among the most frequently used words. In this latest analysis, a term that had not previously emerged appears in the form of "distributors." Immediately afterwards, we find another unheard term, namely the synonym "resellers." If both terms were taken into account as a single one, they would be ranked second, immediately behind the term "online." The words "foreign" and "international," which are both in the top 10 percentile of terms used, are also noteworthy. Finally, in the top 10 percentile we again identify the word "platforms." When combined with the explicitly named platforms (again AliExpress, eBay, and Amazon), this would reach third place as the most mentioned word. As the actualization of the customer diversification affordance is given by a single configuration, only two respondents were found likely to fit within this specific setup.

5.3. Discussion of the qualitative study

This discussion section presents three separate subsections discussing the results of each affordance in detail. For this purpose, it draws upon certain quotations extracted from the respondents' answers.

5.3.1. Discussion regarding consumer knowledge generation

The findings regarding consumer knowledge diversification suggest that the crucial peculiarity of e-commerce lies in the ability to directly access large amounts of data. It is no coincidence that #R15, who unsurprisingly works in a company that used both direct and agency selling, summarizes that e-commerce "*allows you to acquire customer data more easily and quickly."* Beyond access to data, it is also crucial to have clear ideas on how to use the information. #R11 states that "*the Internet allows you to create various analyses, summaries and consumer profiles*." By defining consumers' profiles, it is possible to boost both consumer service and improve the effectiveness of marketing campaigns. Indeed, #R16 states that *"integrating e-commerce into our CRM would provide more actionable data to tailor our marketing towards specific audiences";* #R14, instead, refers to how his company's e-shop is able to identify which spares and consumables customers associate with their main purchases, and that it *"gave us a better indication towards the expected service requests*." By contrast, the opportunity to receive consumer feedback turns out to be an ancillary feature not identified amongst those who use ecommerce directly, and is only mentioned by those who are not among the consumer knowledge generation affordance actualization configurations. Notably, #R4, who is in the last quartile of the e-commerce commitment and does not belong to any of the identified configurations, claims that e-commerce "*allow customers to leave feedback. However, they have that option available through other means so we don't see it as a necessity. We email end users with a link to leave feedback and we send questionnaires to major developers annually asking for feedback*."

5.3.2. Discussion regarding internationalization

The results that emerged regarding the actualization of the internationalization affordance suggest the centrality of the "sales" and commercial side in its actualization. In fact, almost all of the interviewees belonging to the internationalization configurations remarked that the benefit is above all of an economic nature. Moreover, the significant role of "platforms" is highlighted to a great extent. For example, #R12 states that "*e-commerce could allow your company to increase its internationalization by increasing the number of foreign online trading platforms (*e.g., *eBay*)." The great divide that seems to emerge between managers who actualize the internationalization affordance and those who do not often lies in the ability to see value and cost savings, or vice versa. In support of this, #R3 states "*It [e-commerce] helps branch the brands out into Europe without the need for a large investment in salespeople*," while #R6 notes how "*opening more branches because [of] exports. is costly*." In addition, some believe that the online channel is also an advertising vector for conducting campaigns "*marketing worldwide at lower costs*," according to #R1. Conversely, those who do not actualize the internationalization affordance often define ecommerce as a "costly investment" (#R8) so firms *"'do not want to invest in this channel yet"* (#R16). Furthermore, *"More e-commerce would require more resources. [our firm,] a small company with a small staff, would reduce the time they have available to work in their existing roles,"* claims #R21. It is no coincidence that both #R16 and #R21 work for Q4 companies in e-commerce commitment.

5.3.3. Discussion regarding customer diversification

Customer diversification results are the most difficult e-commerce affordance to be actualized, presenting only one possible configuration with a low frequency. In it, agency selling via third-party platforms and indirect selling discard direct selling. This is backed by a low e-commerce commitment level. Here, managers emphasize the manufacturer-reseller relationship and doubtless employ it for e-commerce. #R22 states: *"Before Covid I was not much for e-commerce because of high returns, but after Covid, I am glad that our distributors had a way to still sell our products. Keep your eggs separate."* #R22 emphasizes his reliance on resellers and how customer diversification is an e-commerce affordance he can realize through omnichannel resellers. #R8 says his traditional distributor "*does not always have contacts with the most attractive foreign consumers and through online commerce we could reach them much easier*." So, selling through third-party platforms like Amazon could be a diversification and internationalization opportunity. Not surprisingly, most managers, who do not perforce fit the fsQCA configuration, still attribute a diversification role to third-party platforms, albeit associating it largely with the possibility of internationalization instance. #R11 states, "*e-commerce could allow my company to expand and diversify its client portfolio by internationalizing sales through international trading platforms (*e.g. *Ebay, Amazon, Alliexpress*)."

6. Overall discussion

By combining SEM results with interview and fsQCA findings, it is possible to assemble clues that allow for a deeper interpretation of the statistical findings. The first two configurations of consumer knowledge generation actualization (CKNa, CKNb) counterintuitively do not necessarily require a high degree of commitment. At the same time, these do not require the adoption of the direct selling approach. This outcome yields possible interpretations in line with the current literature that identifies direct selling as a possible conflict motive between the manufacturers and their distributors (Du et al., 2018; Tsay & Agrawal, 2004). Indeed, the latter are rather reluctant to pass on information, such as consumer and consumption data (Villena & Craighead, 2017), and this is strengthened when the former decide to undertake a disintermediation strategy by selling directly to final consumers online, bypassing the distribution chain. It is therefore insightful that, in the absence of strong commitment, manufacturers who manage to get information from their reseller network are those who will not then threaten them with direct selling practices. A statement from #R18, whose company sells only through agency and indirect selling, supports this point: *"We are able to use metrics and tools provided by our online retailers. Things such as churn, reach and retention are things we use to make future decisions in sales."* On the other hand, the third configuration for actualizing consumer knowledge generation affordance involves strong commitment and the use of both platform-enabled approaches such as agency and direct selling (CKNc). Here, in a more straightforward manner, it is understandable how ecommerce commitment plays a crucial role in actualizing this type of affordance. In fact, the two approaches present in this configuration in each case require skills and expertise to manage and interpret the amount accessed data. This result remains in line with the literature that argues that the use of new ecommerce or IT technologies in general must necessarily be supported by adequate commitment (Abebe, 2014; Tolstoy et al., 2021). Such practices in fact go hand in hand with a commitment to new digital technologies, specifically digital ecommerce platforms, as argued by Dicuonzo et al. (2022) and Ratten (2022) in their investigations into transformational entrepreneurship practices.

SEM supports all hypotheses projecting that all types of e-commerce approaches can enhance internationalization affordance actualization. SEM also attributes a relevant role to e-commerce commitment in actualizing the aforementioned affordance. This relevance is also supported by the fsQCA, which in two out of three configurations (INTb, INTc) reiterates its unavoidableness. In these two configurations, e-commerce commitment is always coupled with direct selling. Direct selling through one's own platform requires a higher commitment than the other approaches (Kowtha & Choon, 2001). This method requires the manufacturer to manage every aspect of online transactions without any third-party support. Moreover, direct selling alone is still not enough; it can be accompanied by either agency or indirect selling. If e-commerce commitment is not high enough, it is not possible to have sufficient business agility to handle e-commerce both nationally and internationally, as well as using a dual approach. This is in line with Ciampi et al. (2022), who advocate the existence of a bivalent correlation between corporate ambidexterity and digitization. In this case, while it is true that e-commerce allows for selling in both domestic and foreign markets, the company must have a suitable commitment to operating in both areas with multiple approaches. The missing configuration (INTa) indicates that even without specific commitment, coupling agency selling and indirect selling is sufficient to actualize the internationalization affordance. This reiterates that relying wholly or partially on third-party services to sell online still creates benefits in terms of initialization costs and reaching foreign markets (Deng et al., 2022; Hui, 2020).

Customer diversification, the most controversial e-commerce affordance, presents one configuration (DIVa), which includes agency selling via third-party platforms and indirect selling, but no direct selling or e-commerce commitment. The fsQCA configuration appears seemingly inconsistent to the SEM, supporting instead that e-commerce commitment actualizes customer diversification affordance. First, it should be pointed out that the preliminary fsQCA analyses with standards at 0.8 provided four different configurations, two of which compulsorily required a high commitment level accompanying at least one of the two platform-enabled approaches, while the other two in any case did not preclude it. It is not erroneous to argue therefore that having a high commitment level accompanied by at least one platform-enabled approach can actualize this affordance in most cases (.800 consistency), while only the aforementioned configuration (DIVa) can guarantee a very high probability (.958 consistency). In this regard, interviews show how a low commitment level drives managers to envision merely a passive role for their company in the online marketplace. For instance, #R22 claims *"The more visible you are online the bigger the chance of a new distributor finding you."* This view, resulting from surrender and stationariness, is certainly not attributable to managers adopting transformational entrepreneurship practices. It is safe to argue that the absence of direct selling strengthens the relationship with distributors (Tsay & Agrawal, 2004), and prompts the seeking of new ones, or at least implies that it is a viable avenue. However, the customer diversification affordance, with the DIVa configuration, remains the only one actualizable exclusively in the absence of commitment. Arguably, this configuration does not lead managers to attribute successful performances to their online channel, as is in fact evidenced by the non-significant SEM results. Therefore, it can be inferred that the customer diversification affordance appears as a viable e-commerce affordance, but it exhibits background relevance with respect to consumer knowledge generation and internationalization.

Analyzing the totals infers that e-commerce platforms are always necessary to actualize affordances, while indirect selling alone is unable to do so. It is also evinced how agency selling presents itself as indicated and pursuable even by companies that have not yet undertaken a definitive commitment to online commerce. Conversely, direct selling appears effective, but requires a consistently high level of commitment to enable the actualization of related affordances. These findings are aligned with the recent literature that associates transformational entrepreneurship practices with digital platforms, considering them a very valuable tool to drive change in manufacturing firms toward online trade in response to market crises and uncertainties (Dicuonzo et al., 2022; Ratten, 2022). #R7's quote ultimately matches this: *"In an age where things like a pandemic brought havoc to the stability of business[es]… it's always wise to delve into online commerce and setting up the business to have stability of online marketing and sales so as to have a steadiness that makes your [business] prosper even when other traditional brick and mortar businesses will struggle."*.

6.1. Theoretical contributions

We contribute to the transformational entrepreneurship literature by providing a breakdown of the increasingly popular transformational entrepreneurship construct and its relationship to digital platforms, particularly e-commerce platforms. After outlining that the considered transformational entrepreneurship context of interest consists of entrepreneurial practices leading innovation and change to create long-term value (Marmer, 2012), this study focuses on non-digitally native manufacturing SMEs that are adapting the way they sell their products in the uncertain post-pandemic global scenario. The major contribution to the transformational entrepreneurship literature is the identification of e-commerce affordances that can contribute to the business success of manufacturing SMEs. Furthermore, this assessment provides empirical support to the most recent qualitative works investigating the relationship between transformational entrepreneurship and digital e-commerce platforms. Indeed, Ratten (2022) asserted that third-party platforms have helped Australian agricultural producers to diversify their revenue in uncertain or risky times, such as movement restrictions due to anti-COVID-19 measures. This paper supports this argument by showing that manufacturing SMEs from different countries committed to the e-commerce channel enable their managers to recognize its usefulness in diversifying their portfolios (customer diversification affordance actualization). On the other hand, the interviews by Dicuonzo et al. (2022) argued that transformational entrepreneurship practices were helpful in internationalizing businesses and offering customized services due to the knowledge gained about consumers. Again, this article empirically supports these arguments. In addition, the same papers (Dicuonzo et al., 2022; Ratten, 2022) suggest how an increase in the use of digital platforms leads to a growth in digital viewing and awareness. This research provides further support to this idea, as the outcomes show that the use of digital platforms, whether owned or third-party platforms, results in the actualization of each mentioned affordance. Moreover, the consumer knowledge generation and internationalization affordances enhance e-commerce performances from managers' perspectives.

In addition, this study contributes to the literature associating affordance theory with e-commerce. First, the originality of this analysis lies in the selection of a survey population working in manufacturing SMEs and not digitally native business models as in previous studies (Califf et al., 2020; Lehrer et al., 2018; Wang, Sun et al., 2022; Yan & Gong, 2022). This peculiar sample selection entails another substantial originality, as this work focuses on affordances that can be actualized from the business managers' perspective and not from that of the consumers, as recently undertaken (Bayer et al., 2021; Sun et al., 2019; Wang, Luo et al., 2022). Furthermore, this paper ascribes a mediating role to the identified affordances, as it first focuses on understanding which factors make them evolve from potential to actualized (Chemero, 2003; De Luca et al., 2021). Second, this article investigates how affordances lead to other possible outcomes. So far, research in e-commerce affordances has often focused on crediting affordances as antecedents and not mediators of an existing relationship (Dong & Wang, 2018; Sun et al., 2019; Wang, Luo et al., 2022; Wang, Sun et al., 2022), despite the indication provided by IS research that applies the affordance lens (De Luca et al., 2021; Strong et al., 2014). Nevertheless, this investigation adds to the literature on e-commerce affordances, having

identified factors such as the level of commitment and the adoption of three different approaches that contribute to the actualization of three different affordances.

6.2. Implications for practice

This study offers relevant practical implications for practitioners and policymakers. First, this inquiry empirically confirms that adopting different online selling approaches can facilitate SMEs' internationalization, the acquisition of knowledge on their consumers, and the portfolio diversification of their distributors and, thus, their revenues. In particular, this work provides entrepreneurs with seven possible configurations combining the level of corporate commitment and the online selling approaches that allow for ascribing the actualization of three affordances to e-commerce. This paper outlines the manifold ways to sell online (Abhishek et al., 2016; Pu et al., 2020), confirming that generically referring to e-commerce remains reductive. Specifically, SME managers to actualize internationalization, and consumer knowledge generation and customer diversification require the combination of at least two sales approaches to be successful. Therefore, all transformational entrepreneurship practices and tools that can assist business agility to manage e-commerce on multiple fronts are welcomed. For example, centralizing all data collection through a single data warehouse proves to be a major contributor to increasing e-commerce organizational agility (Huang et al., 2021). Collecting information about orders from different sources could, for instance, foster delivery management and also decrease the risk that merchandise will become out of stock.

Furthermore, e-commerce commitment is a critical element in affordance actualization. It is advisable, for entrepreneurs, where the financial conditions are present, to implement practices that increase the company's and its employees' overall commitment to e-commerce. Entrepreneurs interested in activating e-commerce transformational practices can train their current employees in various ways (Maier & Nair-Reichert, 2008; Rolland et al., 2018). For instance, internal game-like and e-commerce-related competitions may lead to the stimulation of e-commerce commitment (Gerdenitsch et al., 2020; Prasad et al., 2019). Finally, the recruitment of new employees should change to take into account the potential employees' e-commerce skills, regardless of the business unit, as the activities and peculiarities of online commerce have grown to impact every business unit, and not only sales and marketing (M. Chen & Bashir, 2022).

Regarding policymakers, instead of posing the question of identifying transformational entrepreneurs to facilitate access to credit (Beck, 2013), this study suggests how they can effectively put in place active policies that trigger transformational entrepreneurship behavior in the entrepreneurial landscape. Indeed, we find well-established examples of virtuous government policies that have focused on fostering their national e-commerce ecosystem. Helpful governmental policies could facilitate the security of online transactions, enhance logistical infrastructure coverage, and create dedicated governmental agencies that could help to train companies and personnel for online selling (Ariansyah et al., 2021). Thanks to online commerce, transformational entrepreneurs and governments can create value and jobs for the population. As an example, the Democratic Republic of China has now almost doubled the number of people employed in e-commerce roles since 2014, and both high- and low-skilled individuals working for e-commerce-related jobs earn approximately double the amount compared to their peers (Haji, 2021).

6.3. Limitations and future research direction

It must be noted that this research presents some limitations. First, we acknowledge that employing cross-sectional data to compile the SEM brings with it biases due to respondent selection as well as limitations in statistically attributing causality to relationships between variables (C. Maier et al., 2023). Following the indications of C. Maier et. al., (2023) the complementation of the quantitative study with qualitative analyses partially mitigates this problem. The fsQCA succeeds in establishing levels of equifinal complexity to the identified affordances, enabling to understand from which combinations between variables these are composed. The analysis of open ended questions, on the other hand, makes it possible to interpret the directionality of the relationships between identified variables, albeit not with the support of empirical data. Possible future research attempts using longitudinal analyses to verify causality between the relationships of the proposed framework would definitely be valuable. Moreover, this paper identifies strong interconnections between different affordances that were not directly addressed in the quantitative framework. Future investigations could identify possible relationships and subordinations between the different e-commerce-related achievable strategic goals. Finally, although the contribution of this investigation presents three crucial e-commerce affordances, it would be interesting to identify and test other kinds of affordances, such as the development of brand awareness through online sales.

7. Conclusion

This inquiry has been developed with the aim of understanding why and how manufacturing SMEs should commit to online selling. This study identifies e-commerce as a valuable transformational entrepreneurship practice as well as an innovative business policy, apt for facing uncertain periods of crisis and change just like the one our society is experiencing at this post-pandemic juncture. To establish why manufacturing SMEs should commit to e-commerce, this work, availing affordance theory, proposes three strategic business goals that e-commerce can afford. Finally, the question of how e-commerce should be implemented is addressed by offering seven different configurations combining the corporate commitment level and different approaches actualizing the identified e-commerce affordances.

CRediT authorship contribution statement

Jacopo Ballerini: Conceptualization, Methodology, Investigation, Formal analysis, Data curation, Writing – original draft. **Dennis Herhausen:** Validation, Visualization, Supervision, Writing - review & editing. **Alberto Ferraris:** Validation, Funding acquisition, Supervision.

Declaration of Competing Interest

The authors declare no conflict of interest.

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Appendix: Respondents' profiles

	E-commerce commitment	Direct Selling	Agency Selling	Indirect Selling	Country	Gender	Age	Seniority
#R1	Q1	Q2	Q1	Q4	USA	Male	35	Mid Manager
#R2	Q1	Q2	Q4	Q1	UK	Male	31	Sr Manager
#R3	Q1	Q1	Q1	Q1	Spain	Male	43	Mid Manager
#R4	Q4	Q1	Q1	Q4	UK	Male	33	Mid Manager
#R5	Q2	Q1	Q1	Q3	USA	Male	40	Mid Manager
#R6	Q1	Q2	Q1	Q1	South Africa	Male	29	Mid Manager
#R7	Q2	Q1	Q1	Q4	South Africa	Male	48	Sr Manager
#R8	Q2	Q4	Q1	Q1	Poland	Male	34	Mid Manager
#R9	Q1	Q4	Q3	Q1	UK	Female	61	Sr Manager
#R10	Q1	Q3	Q1	Q1	Canada	Male	45	Mid Manager
#R11	Q1	Q1	Q1	Q4	Poland	Female	30	Sr Manager
#R12	Q2	Q1	Q1	Q4	Poland	Male	40	Sr Manager
#R13	Q1	Q4	Q4	Q1	UK	Female	59	Sr Manager
#R14	Q1	Q1	Q2	Q1	Netherlands	Male	29	Mid Manager
#R15	Q1	Q1	Q1	Q4	France	Male	47	Mid Manager
#R16	Q4	Q2	Q1	Q1	Italy	Male	31	Mid Manager
#R17	Q1	Q4	Q1	Q4	Mexico	Female	32	Mid Manager
#R18	Q4	Q4	Q1	Q1	USA	Male	40	Sr Manager
#R19	Q1	Q1	Q3	Q1	Czech Republic	Male	37	Mid Manager
#R20	Q2	Q3	Q1	Q1	Austria	Female	31	Mid Manager
#R21	Q4	Q1	Q1	Q4	Poland	Male	42	Mid Manager
#R22	Q3	Q4	Q1	Q1	UK	Male	45	Mid Manager
#R23	Q1	Q2	Q3	Q1	Portugal	Male	24	Mid Manager
#R24	Q2	Q1	Q1	Q4	South Africa	Female	31	Mid Manager

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