Untangling the Performance Impact of E-marketplace Sellers' Deployment of Platform-based Functions: A Configurational Perspective

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Abstract

Previous studies have shown great interest in examining the performance impact of platform-based functions (PBFs) used by e-marketplace sellers and the contingent role of salient variables, such as seller reputation, in the e-marketplace. Their findings, however, are fragmented and inconsistent, as they generally focus on the net, separate effect of a single PBF with debatable findings. The theorization of how sellers should configure multiple types of PBFs as a whole to achieve high sales performance lags far behind the booming competition practice. To identify an effective PBF combination, this study takes a configurational perspective to identify appropriate PBF configurations that can achieve high sales performance for sellers with different product positions and reputations. A fuzzy-set qualitative comparative analysis (fsQCA) of a longitudinal dataset of over 3,300 apparel sellers in a large e-marketplace yields interesting findings. The configuration results reveal recipes for PBF combinations for achieving high sales performance that vary across different levels of seller reputation and product positioning strategies. Our configuration findings suggest that sellers should configure PBFs according to distinctive product strategies accompanied by seller reputation conditions, where the resulting PBF configurations play an essential and multifaceted role in achieving high sales performances. Interestingly, our configuration analysis uncovers that for reputable sellers offering high-priced products, the utilization of pricing and marketing functions is counterproductive. Additionally, we observe complex interplays between after-sales functions and online reputation, characterized by complementary, substitutive, and independent relationships. Furthermore, our results demonstrate an asymmetry relationship between high and low sales configurations. It contributes to the emergent investigation of causal complexity in competitive strategy studies of e-marketplace sellers and provides specific causal recipes and holistic guidelines for sellers and platform operators.

Keywords: *platform-based functions, sales performance, configurational approach, seller reputation, product positioning, e-marketplace, qualitative comparative analysis*

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1 Introduction

E-marketplace platforms, such as Taobao and eBay, are currently playing an increasingly important role in our daily lives. For instance, the gross merchandise volume (GMV) of China's online shopping market in 2022 reached 13.79 trillion CNY (approximately 1.95 trillion U.S. dollars) (Statista 2023). Researchers and sellers are keen on exploring the pathways to achieve high sales performance in the crowded e-marketplaces. To this end, a growing body of literature has focused on examining platform-based functions (PBFs), referred to as platform-based IT features – including functions to activate time-limited discounts, buy-it-now, money-back guarantees, and credit card payment – offered by the e-marketplace operator to help sellers appeal to their customers (Gallien and Gupta 2007; Li et al. 2009; Walia and Zahedi 2013). A systematic literature review suggests that prior research has focused on examining the performance impact of single functions, contingent factors that shape their influence with two-way or three-way interactions, and more recently, identifying five types of PBFs and examining their performance effects at the repertoire level by focusing on the structural characteristics of the repertoire, such as volume, complexity, and heterogeneity of the entire set of sellers' function usage Li et al. (2019) (Appendix A).

While this literature does offer valuable insights into the performance impact of PBFs at the repertoire level, it does not elaborate on the specific PBFs within a repertoire or how they work together to generate high sales performance. In practice, sellers, who routinely use a repertoire of PBFs, should not be just aware of the overall characteristics of the repertoire (i.e., large volume, wide range, high differentiation) (Li et al. 2019), or assume that use of one PBF could improve performance without consideration of all the other PBFs (Kirmani and Rao 2000; Li et al. 2009). They must clearly understand whether and how the five PBFs function interdependently as a repertoire to generate high performance. Furthermore, a PBF portfolio cannot be universally effective for all sellers. Instead, different PBF portfolios are suitable for different sellers who adopt varying strategies (Ou and Chan 2014; Sun et al. 2020; Tan et al. 2019). Hence, it is crucial for sellers to select a PBF portfolio that represents a strategic fit to them. Unfortunately, the prior e-commerce research as summarized above are silent on this issue.

The existing literature on the interdependence of strategies provides some insights, but it is still insufficient to address our specific problem, particularly in the e-marketplace context. The literature generally suggests that business strategies can be optimized through the integration or alignment of actions that reinforce each other, or by avoiding actions that counteract each other (Leiblein et al. 2018; Porter 1996; Porter 2008; Rivkin and Siggelkow 2007; Siggelkow 2011; Siggelkow 2017; Yang 2021), and that the performance impact of a business strategy is contingent on product-market contingencies (e.g., price position, market segment) and organizational contingencies (e.g., firm size, centralization, and culture) (Liu et al. 2016; Olson et al. 2005). However, this literature has been limited to individual interactions between strategies and contingencies, without considering complex interdependence of multiple strategies and their contingencies (Yang 2021), as demonstrated in Table B3 in Appendix B. This oversimplified approach fails to capture the complexity of real-world business practice, resulting in potentially inaccurate conclusions (Ganco and Hoetker 2009). Moreover, this literature does not address e-marketplace-specific actions set nor consider the unique e-marketplace context characterized by severe information asymmetry and intense competition across sellers. Given the research gap in both the e-marketplace and the business strategy literature, we aim to *understand how and under what conditions the various types of PBFs can work interdependently as a repertoire to yield high sales performance in the e-marketplace*.

To meet the research objective, we utilize the five types of PBFs (i.e., pricing-oriented functions, marketing-oriented functions, after-sales service-oriented functions, product presentation-oriented functions, and payment-oriented functions) and consider seller reputation as a distinctive contextual condition in the e-marketplace context. We do so by referring to the latest work on the PBF repertoire by Li et al. (2019), who analyse the structural characteristics of the PBF repertoire under varying levels of sell reputation while not addressing complex interdependencies among them. Then, we identify a seller's product positioning as an important contingency because strategic positioning theory suggests that it is essential for sellers to tailor their strategic actions according to their intended product positioning (Porter, 1985; 2004), a perspective also acknowledged in the e-marketplace literature (Ou and Chan 2014; Sun et al. 2020; Tan et al. 2019) but never formally examined in conjunction with the full set of PBFs.

To analyze complex interactions among the five types of PBF and the contextual conditions in our case, the existing methodologies deployed in prior research is not sufficient. As such, we utilize a configurational approach and employ fuzzy-set Qualitative Comparative Analysis (fsQCA) as the methodological tool. This approach is capable of generating holistic optimization of multiple focal elements by handling complex interactions and allowing for empirical analysis of how multiple factors combine in configurations to explain desired outcomes (Fiss 2011; Park et al. 2020; Ragin 2008). Using this tool, we analyse a unique dataset of over 3,300 apparel sellers across 10 months from a large e-marketplace platform in China, where the five PBFs are routinely used by sellers to improve sales performance. The configuration results reveal four recipes for high-performing PBF repertoires that vary across different levels of seller reputation and product positioning strategies. Our configuration indicates that: 1) in situations where reputable sellers offer high-priced products, pricing and marketing functions play opposing roles, 2) there are complex interactions (complementary, substitutive, and independent) between after-sales functions and online reputation, and 3) there is an asymmetrical relationship between high sales and low sales PBF configurations. These results provide intriguing insights that were not revealed by the dominant variance-based approach employed in previous e-marketplace research.

This study makes four contributions to the literature. First, it contributes to the e-marketplace literature by identifying four high-performing repertoires with specific PBFs, and theorizing their underlying influencing mechanisms through the configurational causal logic (Li et al. 2019; Park et al. 2020). In doing so, it also provides a better understanding of the multifaceted role of after-sales service functions, a key PBF, in different high-performing PBF repertoires. Second, our study contributes to the online reputation literature by challenging the indispensable role of seller reputation and revealing the configuration of a high sales PBF repertoire even when seller reputation is low (Dewally and Ederington 2006; Li et al. 2019; Wang et al. 2018). Third, this study uncovers two types of asymmetric relationships, highlighting the causal complexity that challenges previous literature on the interdependence of strategies (Leiblein et al. 2018; Porter 1996; Porter 2008; Rivkin and Siggelkow 2007; Siggelkow 2011; Siggelkow 2017; Yang 2021). Fourth, it contributes to the competitive action literature (Chen and Miller 2012; Chen and Miller 2015; Smith et al. 2001) – particularly the stream at the repertoire level of analysis – by examining complex interactions

among multiple competitive actions within a repertoire from a configuration perspective. Moreover, the findings provide not only prescriptive configurational recipes for sellers to better formulate competitive strategies, but also configuration-based insights for platform operators to design PBFs and corresponding operational policies.

2 Theoretical Background

2.1 Platform-based Functions and Sales Performance

Platform-based functions (PBFs) refer to the IT-enabled options embedded in e-market platforms that are activated by sellers to attract consumers and compete against rivals in the e-marketplace (Li et al. 2019). Li et al. (2019) classified PBFs in e-marketplaces into five types (Table 1) by building on a well-established classification of competitive actions (Ferrier et al. 1999) and integrating it with the customer service life cycle (CSLC) model unique to the e-commerce context (Tan et al. 2013). These five types of PBFs are based on function orientations related to pricing, marketing, after-sales service, product-present, and payment, and reflect the major and core competitive actions of sellers in the e-marketplace.

Table 1. Classification Framework of Platform-based Functions

Functions	Definition
Pricing-oriented Functions (PROT)	Enables sellers to set the degree and timing of product discounts, e.g., time-limited discount, shop VIP, buy-it-now option, bounding, and coupons (Bockstedt and Goh 2011; Luo et al. 2012).
Marketing-oriented Functions (MKOT)	Enhances sellers' visibility, e.g., sponsored searching advertisements, hyperlink advertisement, and luxurious shop interface (Bockstedt and Goh 2011; Luo et al. 2012).
After-sales Service-oriented Functions (ASOT)	Supports customers during and after the transaction process, e.g., money-back guarantee within seven days, consumer protection scheme, three-time compensation for fake products, and free repair within 30 days (Ba 2001; Ba and Pavlou 2002; Fang et al. 2014).
Product Presentation-oriented Functions (PPOT)	Provides detailed information on products, e.g., zoom function and picture of real products (De et al. 2013).
Payment-oriented Functions (PAY)	Provides customers with various payment options, e.g., credit card and cash-on-delivery (supports payment by cash when buyers receive the goods).

Note: Adapted from Li et al. (2019).

Pricing-oriented functions (PROT) enable sellers to set the degree and timing for product discounts, such as time-limited discounts, buy-it-now options, and price bounding (Bockstedt and Goh 2011; Li et al. 2019; Luo et al. 2012). The usage of these functions indicates competitive pricing actions such as price cuts and sales incentives (Chi et al. 2010), which endow focal sellers with a competitive advantage in attracting customers and persuading them to buy (Li

et al. 2019). ***Marketing-oriented functions (MKOT)*** can enhance retailer visibility in the e-marketplace by sponsoring search advertisements and luxurious shop interfaces (Bockstedt and Goh 2011; Luo et al. 2012). Marketing campaigns launched by sellers allow consumers to learn more about the company's products or services in the short term, while also increasing products or services sales as well as the company's market share and revenues (Kashmiri and Mahajan 2014; Morgan et al. 2009; Steenkamp and Fang 2011). ***After-sales service-oriented functions (ASOT)*** provide support to customers during and after the sales process, such as money-back guarantees and repair services (Moorthy and Srinivasan 1995). This function repertoire offers various assurance mechanisms and direct protections against potential product failures (Kirmani and Rao 2000; Wang et al. 2018), thus largely mitigating consumers' perceived risk of product return and repair (Petersen and Kumar 2015).

Product presentation-oriented functions (PPOT) and ***payment-oriented functions (PAY)*** have not been conceptualized as competitive actions in traditional industries. Yet they are highly relevant and instrumental in e-commerce contexts, as they facilitate transactions by providing detailed product information and various payment options that are essential to attracting customers and obtaining a competitive advantage (Li et al. 2019). They also serve as important competitive actions for sellers in the e-marketplace. Specifically, PPOT provides detailed product information, such as zoom-in views of products and alternative photos (Dewally and Ederington 2006), while PAY offers online customers diverse payment options, such as credit cards and third-party payment methods (i.e., PayPal and Alipay).

While prior research that examined the performance impact of PBFs offers valuable insights (Bockstedt and Goh 2011; Li et al. 2015; Ou and Chan 2014; Walia and Zahedi 2013; Wang et al. 2018), the findings are still somewhat fragmented and divergent. A dominant research stream has concentrated on the "net effect" of individual PBFs on performance by conceptualizing them as "information cues" of product quality indicators from a signalling perspective (Wells et al. 2011, p. 375). While one study suggested that sellers' use of buy-it-now functions yields higher revenues by prompting consumers' purchase intentions (Gallien and Gupta 2007), subsequent research found a strong negative effect of this strategy, arguing that buy-it-now functions create product quality concerns and thus reduce consumers' incentives to participate in auctions (Walia and Zahedi 2013). Other studies have examined contingent factors, such

as seller reputation and product price, which shape the influence of individual PBFs with two-way or three-way interactions (Dewally and Ederington 2006; Li et al. 2009; Wang et al. 2018). Regardless of these research contributions, inconsistencies remain. For instance, Dewally and Ederington (2006) found a negative interaction between third-party certification (belonging to after-sales service) and reputation, where third-party certification benefits less-reputable sellers more than sellers with established reputations. In contrast, Li et al. (2009) showed that reputation amplifies the impact of money-back guarantees (belonging to after-sales service) on bidders' participation decisions.

A recent study drawing on competitive repertoire theory took a holistic viewpoint by treating sellers' PBF usage as a repertoire, and investigated the performance impacts of three structural characteristics, including PBF repertoire volume, complexity, and heterogeneity (Li et al. 2019). While this study advances the literature by accounting for the PBFs in a combined fashion, it assumes that all competitive actions in a repertoire are homogeneous when aggregated at the repertoire level (Chen and Miller 2012), thus failing to consider the complex interdependence among the repertoire's PBFs. Another noteworthy example is the unexpected findings regarding the non-significant relationship between repertoire complexity and sales performance (Li et al., 2019). This suggests that simply expanding or reducing the range of PBF categories in a configuration, without considering the differential effects of each PBF category and their interdependent nature, cannot improve sales performance. But theoretical consideration of potential complementary and substitutional effects among PBFs are critical for understanding seller performance (Li et al. 2015; Li et al. 2009). In practice, sellers are keen to identify cost-effective PBF portfolios, and are therefore in need of clear guidance on what PBFs should be used as a repertoire to enhance performance. Our study aims to close this literature gap by applying configurational approach to investigate how PBFs should be combined to achieve high sales performance in the e-marketplace.

2.2 *PBFs Repertoires, Seller, and Product Positioning in E-Marketplaces*

2.2.1 Combination of PBFs Repertoires and Sales Performance

E-marketplace sellers routinely utilize multiple types of PBFs to enhance sales, not just relying on a single function at any given time (Ou and Chan 2014). Unique to the e-marketplace platform context, the multiple platform functions are centrally displayed on a seller's online storefront, thereby allowing consumers to process its competitive offerings more holistically than in traditional brick-and-mortar settings. As such, the underlying interdependent relationships

among the platform functions and their ultimate impact on sales performance becomes more complex and diverse, begging for more in-depth understanding. The PBF literature has not thoroughly examined such complex interdependent relationships, although it has hinted the importance in understanding the effectiveness of PBFs repertoire as combinations or portfolio. For instance, the buy-it-now option, as an instance of pricing-oriented functions, may hurt sales if used alone, because deep discounts can cause consumer concerns about product quality. Follow-up research has suggested that the use of buy-it-now functions needs to be combined with functions such as third-party payment (an instance of PAY) to generate favourable outcomes. This implies that different types of PBFs might need to be jointly considered to satisfy customer needs and improve competitiveness (Kirmani and Rao 2000; Li et al. 2019; Li et al. 2009). Moreover, the impact of each PBF's repertoire on sales performance is often influenced by the presence or absence of other elements, highlighting the existence of complex interactions among multiple factors. For example, the effectiveness of various sets of institutional functions and online reputation in promoting sales is contingent on the product type regarding price (i.e., expensive versus budget products) (Ou and Chan 2014). A subsequent study also reported a substitution and complementary relationship between online reputation and platform guarantee, depending on the product type (i.e., search goods versus experience goods) (Wang et al. 2018). Different function set recommendations have been proposed for sellers with varying levels of online reputation (Guo et al. 2020).

Li et al. (2019) suggests that a thematic and synergistic configuration of a PBF portfolio is a crucial source of competitive advantage and serves as the basis for competitive differentiation in the e-marketplace. This is because an efficient PBF portfolio requires a higher ability to coordinate the corresponding back-end business operations, and the motivation and capability/resources to prevent imitations by rivals in a short period (Chen and Miller 2012; Li et al. 2019). Thus, these five types of PBFs, while distinct, are interrelated, which means that to reap the high sales, sellers frequently need to focus on more than one type of PBFs in conjunction with other seller or product positioning factors. However, less is known about how these five types of functions individually — or, more importantly, simultaneously — affect the ways to achieve high sales with other seller or product characteristics in different contexts. Furthermore, we posit that a PBF portfolio cannot be universally effective in all situations; instead, it needs to be aligned or “fit” with important contexts, in which different function portfolios may be required to achieve high sales performance.

2.2.2 Reputation as Unique Contextual Condition in the E-marketplace

Compared with traditional industries, e-marketplaces are more crowded and riskier because online transactions bring together more rivals without geographical boundaries (Li et al. 2019). This further amplifies the information asymmetry between sellers and buyers, creating uncertainty about product quality and sellers' credibility (Dimoka et al. 2012; Pavlou et al. 2007). Given the crowded and risky nature of online transactions, online reputation is widely recognized as a crucial factor for achieving high sales performance in e-marketplaces (Dewally and Ederington 2006; Li et al. 2019; Wang et al. 2018). Seller reputation, as a measure of a seller's past operations and business potential (Bockstedt and Goh 2011, p. 237), is manifested as the sellers' average rating across product description, delivery, and after-sales service in e-marketplaces (Wang et al. 2013). In contrast to offline reputation, which is built through personal interactions and word-of-mouth, online reputation is formed through digital transactions and feedback. Online reputation offers advantages such as wider reach, greater visibility, and persistence in terms of ongoing presence. Because of its unique effectiveness in credibility and visibility enhancement, reputation can significantly influence how consumers identify and interpret trust in sellers' PBF usage (Li et al. 2019). For instance, a superior reputation is one well recognized credibility signal and risk-reduction mechanism for sellers (Biswas and Biswas 2004; Li et al. 2015), as it reflects the fact that they have devoted a good deal of time and efforts to provide satisfactory services to buyers in past transactions (Wang et al. 2013). Reputation is also efficient in enhancing sellers' visibility when customers rank their search results by sellers' average ratings (Li et al. 2019), hence making sellers' PBFs more visible to consumers. Moreover, sellers with different reputations will require different solutions to gain competitive advantage, indicating that reputation will determine the actualization of certain mechanisms (Guo et al. 2020). For these reasons, we specify reputation as a contextual condition in our configurational model.

2.2.3 Product Positioning Factors as Contingency for High Sales Performance

Furthermore, it is crucial for sellers to customize their competitive activities based on the specific strategic positioning they aim to achieve (Porter 1985; Porter et al. 2001). Strategic positioning theory suggests that a firm's value or competitive activities should be tailored to a particular product-market segment it targets for (Porter 1985). A product-market segment is defined by product characteristics such as size, variety, inputs, performance, and by the characteristics of customer (price-sensitivity, size, geography) that the organization targets for in a specific product or

service industry (Porter 1985). In particular, we argue that two essential indicators of product-market positioning are e-marketplace sellers' product variety and price positioning. Both of these factors could be significant contingency factors in determining the pathways to achieve high sales through leveraging multiple types of PBFs, as suggested by previous e-marketplace PBFs literature (Ou and Chan 2014; Sun et al. 2020; Tan et al. 2019).

Product variety reflects the extent to which a firm implements a broadly focused strategy (offering a wide variety of products) or a narrowly focused strategy (offering a limited range of products). For example, an e-marketplace seller may offer clothing for men, women, and children or electronics for different age groups. A broadly focused strategy attracts a broad customer base, allowing sellers to meet diverse consumer needs, and benefit from economies of scope and scale, thereby generating substantial value (Sun et al. 2020). Product price positioning is another critical factor as customers use product price as one of the most significant decision-making cues during purchases as well as interpretation of function set (Ou and Chan 2014; Sun et al. 2020; Tan et al. 2019). For instance, an e-marketplace seller specializing in premium brands with higher prices may target high-end customers, while a seller focusing on budget items with lower prices may target price-sensitive customers (Ba and Pavlou 2002; Pavlou and Gefen 2004). Online consumers often perceive high levels of uncertainty and risk associated with expensive products, highlighting the need for consumer protection schemes such as product failure protection (Cao et al. 2018; Ou and Chan 2014). These differences across the strategic positioning require corresponding function set to fulfill consumers' unique needs and determine the pathways to achieve high sales.

2.2.4 A Configurational Perspective of PBF Repertoires and Research Process

We introduce the configurational perspective to identify the PBF portfolios that form a high-performing set of activities within the e-marketplace for sellers with varying online reputation and product positions. This perspective is based on the notion that organizations operate as an interconnected system of structures, processes, and practices that are best analysed in a comprehensive manner (El Sawy et al. 2010, p. 838; Meyer et al. 1993). Utilizing this approach, we can assess multiple linked aspects simultaneously by identifying specific combinations of individual elements as holistic integrated patterns that are jointly sufficient for outcomes of interest (Liu et al. 2017). Originally developed in the context of organizational research (Fiss 2007; Woodside 2013), the configuration perspective has been applied in IS study with a focus on organizational performance in IT innovations (Fichman 2004) and IS success

(Iannacci and Cornford 2018). Previous research has also reflected on the broader opportunities the theory can create for IS strategy research (El Sawy et al. 2010) and regression-based IS behavioural research (Liu et al. 2017).

We suggest that the configurational approach facilitates the assessment of the synergistic effect of multiple PBFs in addition to examining the interaction between PBF contingencies and seller positioning. Although sellers typically employ multiple functions in combination, and buyers consider various features before making purchase decisions (Li et al. 2015; Wang et al. 2018), investigating such intricate interactions is not feasible using a variance-based methodology (i.e., restricted to no more than three-way correlations) (Mintzberg 1979). There are trade-offs involved in different types of PBFs and sellers need not optimize all aspects to achieve high sales. Moreover, the configurational approach yields fresh insights due to equifinality (i.e., multiple solutions leading to the same results) and causal asymmetry (i.e., distinct mechanisms for high and low sales) (El Sawy et al. 2010, p. 838). In other words, there may be several pathways that e-marketplace sellers can take to achieve superior sales by using diverse PBFs, which is a more realistic theory. Unlike correlation mechanisms, the casual asymmetry reasoning suggests that attributes "found to be causally related in one configuration may be unrelated or even inversely related in another (Meyer et al. 1993, p. 1178)". These unique characteristics of the configurational approach provide deeper insights into the intricate relationships among variables in our research context.

More specifically, our theoretical framework focuses on examining how five types of PBFs interact with various seller and product factors and enable sellers to achieve high sales performance by incorporating the five PBFs, key contextual factors of sellers, and product positioning factors in the e-marketplace. This is achieved by building “fit” or alignment among IT-enabled competitive actions, resource allocation, and business model choice. Figure 1 depicts the overarching framework we applied to identify high-performing repertoire based on the five types of PBFs, which considers the unique contextual role of seller reputation and product positioning in terms of variety and average price. Of course, including all factors that would affect sales performance is neither possible nor applicable within the constraints of the configuration approach and our theorizing capability (Park et al. 2020; Ragin 2008).

---<Insert Figure 1 about here>---

Due to the novelty and complexity of our research question, we also adopt an abductive theory-building approach, utilizing both deductive (i.e., top-down conceptual) and inductive (i.e., bottom-up empirical) methods. Abductive reasoning, as a type of logical inference that links field observation and theory construction, seeks the simplest and most straight forward explanation. This abductive theory approach is particularly useful for us to reconcile the inconsistent and fragmented findings on PBFs in prior literature. It allows us to be unencumbered by entrenched knowledge and discover complex relationships of variables not covered in the literature. By using the abductive approach, we can provide a more comprehensive understanding of the intricate relationships among PBFs and seller performance in e-marketplaces. Another reason for this choice is that, "it is often difficult or infeasible to predict or forecast an optimal configuration to effectively produce the outcome (Park and Mithas 2020, p. 90)".

Using the overarching research framework organized earlier, we empirically analyse the data. Based on the results of the analysis, we then develop theoretical propositions in the form of configuration recipes that explain how and why the five types of PBFs can be configured with other seller and product positioning factors to achieve high sales performance. These theoretical propositions are characterized by having contingency rules and theoretical law-like statements; they also specify a set of conditions that are jointly sufficient for an outcome (Lee et al. 2019). Through use of the abductive approach, the proposition development section on configuration recipes offers explanations on how all the elements are integrated and why particular PBF sets can help sellers achieve high sales performance.

3 Methodology

3.1 Qualitative Comparative Analysis Method

Qualitative comparative analysis (QCA), a popular "case-driven" method, was first developed in comparison politics by Ragin in the late 1980s (Ragin 1987). Based on set theory (e.g., sufficient and necessary subset relations) and Boolean algebra (i.e., AND, OR, NOT), QCA enables reliable analyses of how causal conditions contribute to an outcome of interest, where the combination of causal conditions that are sufficient for the outcome is named the "configuration" (Ragin 2000; Rihoux and Ragin 2008). Compared with traditional methods, such as multiple regression analysis (MRA) and structural equation modelling (SEM), QCA has relaxed several major assumptions of classical

statistics and generated several unique merits (Liu et al. 2017). First, it breaks the additivity assumptions of MRA, which focus on detecting the net effect of independent variables (Rihoux and Ragin 2008). QCA enables high-order interaction of multiple causal conditions well beyond the three-way interactions in moderation analysis. Second, the equifinality among the configuration of QCA results means that there are multiple pathways (configurations) for the outcomes of interest. In other words, it challenges the assumption on the existence of best solution in the traditional analyses by suggesting multiple pathways. Third, QCA methods advocate causal asymmetry, which means that the presence or absence of a result (high sales performance versus low sales performance in our case) requires a different "cause combination" to explain the results separately (Fiss 2007; Rihoux and Ragin 2008). This asymmetry assumption is contrary to the traditional symmetry assumption of correlated analysis. QCA is thus complementary to traditional symmetric methods, enabling us to garner finer-grained findings of the performance effects of PBFs while providing convincing configuration results for our abduction reasoning process (Douglas et al. 2020). QCA methods include crisp-set QCA, multi-value QCA, and fuzzy-set qualitative comparative analysis (fsQCA) (Rihoux and Ragin 2008). Following previous research (Liu et al. 2017), we employed the most commonly used version, fsQCA, and employed FsQCA software (version 3.0) in data analyses. Particularly, QCA analysis involves four foundational steps: (a) conceptualizing cases as set-theoretic configurations, (b) calibrating case memberships into sets, (c) viewing causality in terms of necessity and sufficiency relations between sets and performing truth-table analysis, and (d) conducting counterfactual analyses of unobserved configurations (Misangyi et al. 2017). Detailed justifications of the analysis process and settings are provided in Appendix C.

3.2 Data Collection

To identify configurations for achieving high sales performance, we collected a longitudinal data of e-marketplace sellers' use of PBFs in the apparel industry from Taobao.com. We chose Taobao.com as the context of our research because it is a highly competitive and dominant e-marketplace platform in China, where sellers use various PBFs to obtain competitive advantages (Li et al. 2019). Moreover, as the apparel industry is a major business on Taobao, it faces intense competition and high transaction uncertainty, which motivates sellers to adopt multiple PBFs to attract business. For this study, Alibaba, Taobao's parent company, collaborated with us to collect a sample of sellers from

their central database using a random sampling approach with weekly observations spanning 39 weeks. After ruling out the observations with missing values, we obtain a final sample of 3,333 sellers with key variables including sales performance, weekly function usage, detailed seller ratings, and some registration information.

3.3 Measurement and Calibration

For this study, each variable in the empirical dataset was measured based on relevant components. Descriptive statistics of sales performance, five types of PBFs, and seller reputation are shown in Table 2, where the mean, minimum, and maximum values are noted. Unlike traditional analysis using raw data, fsQCA requires calibration, which refers to the process of transforming the value of original variables (i.e., causal condition variables and outcome variables) into a membership score that represents the degree to which the target case belongs to the set (e.g., high sales performance). Specifically, the calibration process requires setting three anchors for causal conditions (i.e., five types of PBFs, sellers reputation, product variety, and average price) and outcome (i.e., sales performance) based on relevant theory, practical criteria, or domain knowledge, including full membership, full non-membership, and crossover set (Rihoux and Ragin 2008). A detailed description of the analysis calibration processes is shown in Appendix C.

Table 2. Descriptive Statistics and Calibration Anchors

Variables	Mean	S.D.	Min	Max	Calibration Anchors		
					Full Membership	Crossover	Full Non-Membership
Sales performance	2335.14	382.14	0.00	684860.82	485.16	277.98	70.80
Pricing	0.68	1.27	0.00	8.05	0.87	0.43	0.00
Marketing	1.38	0.75	0.00	3.67	2.00	1.50	1.00
Product-present	0.72	0.37	0.00	2.00	1.00	0.72	0.43
Payment	0.40	0.53	0.00	2.00	0.96	0.48	0.00
After-sales service	0.70	0.82	0.00	3.00	1.46	0.73	0.00
Seller reputation	4.61	0.46	1.67	5.00	4.87	4.73	4.58
Product variety	188.90	245.56	1.00	5906.00	241.00	139.50	38.00
Product price	143.60	137.58	0.83	6000.00	164.72	114.60	63.40

Notes: The number of observations is 3,333; Pricing = Pricing-oriented Functions; Marketing = Marketing-oriented Functions; After-sales service = After-sales Service-oriented Functions; Product-present = Product Presentation-oriented Functions; Payment = Payment-oriented Functions. These five variables on type of functions are measured by the number of functions used in each type of PBF in the seller-week level. The other two variables are product variety positioning and product price positioning. Sales performance captures the average daily revenue in the past week.

Sales performance. We measured the outcome variable of sales performance based on sellers' daily revenue over a week during the observation period. In the 39-week observation window, we took the average daily revenue as

sales performance. Additionally, we calibrated this outcome variable based on performance criteria suggested by previous research that used the 60th percentile as full membership anchor, 50th percentile as crossover set, and 20th percentile as full non-members (Lee et al. 2019; Park and Mithas 2020). This indicates that sellers who outperform 60 percent of the sellers in the same marketplace are identified as high-performance sellers in the current study. Similarly, sellers who fell below the 20th percentile, compared to other sellers in the same marketplace, were classified as low-performance sellers. Table 2 shows the calibration anchors of the variables.

Five types of PBFs. We adopted the 22 functions and their categorization from the established literature (i.e., Li et al. 2019), where platform-based functions specific to e-marketplaces were identified and categorized by integrating the competitive action literature with the e-commerce literature. The functions and categories are listed in Appendix D. In the data, if a seller takes a particular function in a given week, the value will be "1"; otherwise, it will be "0". Sellers' usage of functions for each type is thus aggregated as the total usage of functions in a particular week. For instance, if a seller subscribes to three price-oriented functions, the value for pricing will be three for that particular week. As we had a 39-week observation period, we compressed the sellers' usage volume of each type of PBF as an average value in the recorded time window. Following the guidelines from previous research (Fiss 2011), we used distribution statistics for calibration, which is a well-accepted practice when no apparent external criterion is available (Ragin 2008). The second reason for using such a calibration method is that the distribution statistic can capture the sellers' relative usage of each platform-based function compared with that of rivals. This means that such function types be treated as present only when sellers' use of target-type functions is more frequent than the industry average. Particularly, the three anchors of calibration are set as the upper quartile, mean of upper and lower quartiles, and lower quartile, respectively. The calibration anchors of the variables are shown in Table 2.

Reputation. Seller reputation was measured using a customer-generated rating that averaged the values of three types of detailed seller ratings (DSR) commonly used by Taobao customers to rate sellers, including product quality DSR, distribution DSR, and service DSR (Li et al. 2019; Wang et al. 2013). The statistical results show that sellers' average reputation is 4.609, with the lowest reputation 1.667 and the highest reputation 5.0. Seller reputation is salient in Taobao store webpages compared with rivals in the same industry. The calibration of sellers' reputation was set according to the statistics of 4.87, 4.73, and 4.58, which means the reputation level beyond 4.87 refers to high

reputation, while the reputation level below 4.58 refers to low reputation, and 4.73 represents the largest crossover set for high reputation versus low reputation. A screen shot of a seller's reputation presentation is shown in figure C1 of Appendix C.

Product positioning factors. The sellers' average price was measured as the average of prices of all products for sale. We calibrated this indicator based on the quartile statistic distribution, which suggests that an average price above CNY 164 is considered a high price, and below CNY 63 is thought of as a low price. Furthermore, product variety, measured by the number of unique products for sale, represents the range of products offered by sellers in a given week (Sun et al. 2020). Based on the statistical distribution, we considered sellers with product counts greater than 163 as having high product variety, and sellers with products counts below 38 as having low product variety.

4 Results

4.1 Configuration Results and Necessary Condition Analysis

4.1.1 Configurations of High Sales Performance

The results show multiple configurations or "solutions" that consistently display high sales performance (Park and Mithas 2020). The configuration results include two types of conditions, that of core and peripheral conditions. Core conditions refer to elements that appear in both parsimonious solutions and intermediate solutions, where they have a stronger causal relationship with the outcome. Peripheral conditions refer to those that only appear in the intermediate solution, where they have a weaker relationship with the outcome compared to that of core conditions (Park et al. 2020). Complex solutions, parsimony solutions, and intermediate solutions are generated when utilizing truth-table analysis with different analysis strategies (Rihoux and Ragin 2008). Each configuration shows how different combinations of PBFs produce high sales performance under the contingency condition of seller reputation. Thus, the comparison between configuration results allows us to identify the configuration recipes for sellers to achieve high sales performance, with the substitutional or complementary role of different configuration elements.

The five configurations of high sales performance are shown in Figure 2. Each column represents a configuration of eight elements that achieve high sales performance, using notions suggested by previous configuration studies (Fiss 2011; Park et al. 2020). For instance, in C1, pricing and marketing functions appear as core conditions, payment and

after-sales service functions are present as peripheral conditions, and the role of high reputation, product variety, and average price are “do not care” for achieving high sales performance. The coverage reflects the relevance and effectiveness of a configuration in explaining cases with the outcome, which is similar to the coefficient of determination (R^2) in regression analysis (Park and Mithas 2020). The raw coverage indicates the proportion that a configuration covers among cases associated with outcome, while the unique coverage captures how uniquely (without overlapping with other configurations) a configuration covers the cases (Ragin 2008). C1 has raw coverage of 0.332 and unique coverage of 0.244, suggesting that this configuration covers 33.2 percent of cases in general, which results in high sales performance, while uniquely covering 24.4 percent of such cases. Furthermore, the consistency for this solution is 0.918, indicating its significance in producing high sales performance (Fiss 2007). This is analogous to the significance level in regression analysis, where consistency higher than 0.75 indicates good consistency (Fiss 2011; Ragin 2008). Last, the overall solution consistency is 0.901, suggesting that the joint consistency of all four configurations in generating high sales performance is satisfactory (Rihoux and Ragin 2008). Similar explanations apply to overall solution coverage.

---<Insert Figure 2 about here>---

We then discuss the results based on patterns that can be extracted by comparing the similarities and differences among configurations of high sales performance (Park et al. 2020). These configuration results imply that multiple pathways for sellers to achieve high sales performance coexist, although the pathways may differ in terms of their empirical importance and effectiveness. Four first-order configurations (C1-C4) were identified based on the presence of different core elements, while C4 contains two subsets of equifinal configurations (C4a, C4b) in which the same core conditions are payment and high average price (Fiss 2011; Park et al. 2020). These configurations represent two broad solutions: C1 and C2 contain the same core element of marketing and can be considered similar first-order configurations, while C3, C4a, and C4b include the core element of high average price in pursuit of high sales performance. Each first-order configuration also contains various peripheral conditions, including product-present, after-sales service, and high reputation. Overall, the results of the four configurations C1-C4 show a complementary

role between the two core elements of payment function and after-sales service, with an interchangeable role of peripheral conditions for sellers to acquire high sales performance.

These two broad solutions demonstrate the multiplicity of PBFs and their substitutional role as the underlying mechanism for pursuing high sales performance (Park and Mithas 2020; Park et al. 2020). For the first broad solution (C1 and C2), a high average price does not matter (C1) or should be avoided (C2), suggesting that in such configurations, these elements are irrelevant or dysfunctional in terms of sales performance. The C1 and C2 configurations represent the extensive use of pricing, marketing promotion, or after-sales service functions to promote high sales performance through economies of scale by selling medium- or low-priced products. Furthermore, these configuration results provide contingency solutions for sellers with and without established reputation, indicating a somewhat surprising relationship between high reputation and marketing-oriented functions or after-sales service functions: C1 does not require the presence of high reputation while C2 is workable with the absence of high reputation. These observations suggest that pricing, product-present, and payment functions constitute a high-performing PBF repertoire with moderate or low reputation in the presence of sellers' extensive use of marketing and after-sales service elements. In contrast, configurations C3, C4a, and C4b suggest that high sales performance can be achieved for sellers with high reputation by focusing on expensive products. Particularly, in these configurations, the pricing and marketing function may be counterproductive and prevent reputable sellers from achieving high sales performance. Reputable sellers can pursue high sales performance by making extensive use of product-present, payment, or after-sales service functions with high or low product variety. Particularly, for sellers with high product variety, payment functions are core elements, while for sellers with low product variety, the presence of after-sales service functions is essential, in which case the relationship between reputation and after-sales service is complementary.

4.1.2 Configurations of Low Sales Performance

Based on the counterfactual analysis, we also identified a few configurations that consistently lead to low sales performance (Figure 2). In contrast to the four configurations of high sales performance, which are different combinations of multiple functions, the configurations of low sales performance are associated with limited use of functions. In specific, the configurations N1 and N2 indicate that the absence of high product variety, high price, and

high reputation – which corresponds to infrequent usage of PBFs or the presence of product-present alone – is likely to be associated with low sales performance. Moreover, configuration N3 indicates that reputable sellers may experience low sales despite implementing high levels of product presentation and after-sales service functions, if they offer low-priced products. This confirms that the configuration structure of high sales performance is clearly different from that of low sales performance, demonstrating the existence of causal asymmetry between PBF repertoire and e-marketplace sales performance.

4.1.3 Necessary Conditions Analysis

Finally, we conducted necessary condition analysis to investigate whether certain conditions are necessary for sellers to achieve high sales performance, especially considering the important role of high reputation, which is evident in the previous literature (Bockstedt and Goh 2011). The results show that the after-sales service function has the highest consistency score of 0.647, while the consistency for the condition of high reputation is 0.575, which is far less than 0.9, the threshold of necessary conditions (Appendix E) (Ragin 2008). This suggests that none of the elements serve as necessary conditions for high sales performance. Although the after-sales service function is not a necessary condition to achieve high sales performance, it is an essential element in most configurations, and its role varies across configurations. As discussed earlier, the complementary effects with payment functions and product-present are efficient functional combinations. In addition, in the absence of a high reputation condition, after-sale service functions complement marketing functions as a solution for medium- or low-reputation sellers to achieve high sales performance. Additionally, for configurations C4a and C4b, the presence of high reputation is associated with the absence or "do not care" in the condition of after-sales service functions, indicating potential substitutional effects between these two conditions. Taken together, these results confirm the multifaceted role of the after-sales service functions.

4.2 Sensitivity Analysis and Integrating fsQCA Results with Panel Regression

4.2.1 Sensitivity Analysis

To ensure the robustness of our configuration results, we conducted two main types of robustness checks: different calibration criteria of focal conditions and reduced threshold (Jiang et al. 2021; Park et al. 2017). First, following previous studies, we changed the crossover point upwards and downwards by 25 percent for our focal conditions

during the calibration process (Fiss 2011). The results generated the same four configurations for high sales performance, with a slight change in coverage and consistency. Furthermore, we take alternative calibration criteria of causal conditions according to the 20/80 percentile (Laut et al. 2021; Park et al. 2017) across focal conditions of the five types of PBFs, contingency factors, and outcomes. High sales performance is defined as performance above the 80th percentile (Lee et al. 2019; Park and Mithas 2020). The configuration results only show a small difference in a subset configuration of C2, in which the "do not care" of payment functions changes to presence of this condition (Appendix E). This difference only has a marginal impact on our theorizing of the main results. Second, we conducted a robustness check by reducing the threshold in truth-table analysis. The analysis results suggested no major changes, and our results remained robust. Detailed information on the robustness checks is shown in Appendix E.

4.2.2 Integrating fsQCA Results with Panel Regression

To cross-validate the configuration results, we incorporate panel data regression to predict sellers' performance outcomes using configurations identified by fsQCA. Fiss (2013) proposed a method to integrate a large-number QCA study with regression analysis, which allows researchers to test for robustness, addresses the issues of unaccounted variables, and estimates effect sizes of the identified configuration results (Fiss 2011; Fiss et al. 2013; Frösén et al. 2016). This integration is achieved by calculating "membership scores for each case in each configuration as minimum across each of the conditions involved (Fiss et al. 2013, p. 198)". For instance, for each seller, the minimum calibrated value of (pricing * marketing * payment * service) would be the membership score of C1. The maximum value of two subset configurations is treated as a proxy for the first-order configurations (Configurations 4a and 4b). In addition, the highest membership scores of the variables for the four identified configurations are constructed as membership of high-performance configurations for each case (Frösén et al. 2016; Jaworski et al. 1993). The positive and significant regression coefficient results for these variables provide evidence that configuration membership predicts high performance (Fiss 2011; Frösén et al. 2016; Vorhies and Morgan 2003). Membership of low performance for each case is constructed in the same way.

We further extended the previous application of regression analysis by leveraging the panel dataset nature of the current study. In particular, we utilized a fuzzy program for conducting QCA in Stata to help calibrate the panel dataset

(Longest and Vaisey 2008). To control for the confounding of various seller attributes, we included sellers' tenure (i.e., the number of days since the seller registered in the platform), delivery time (the average time between paying and delivering), and response speed of instant message (i.e., Ali-Wang Wang) in the observation window as control variables (Li et al. 2019; Ou and Chan 2014; Wang et al. 2013). Individual fixed effect estimation with robust standard error (clustering by seller identify) was further employed to control for time-invariant confounding factors (Li et al. 2019). Specifically, the individual (i.e., seller) fixed effects control for time-invariant unobserved heterogeneity (e.g., operational capability and management skills) across individual units. Accordingly, the following econometric model is specified:

$$y_{it} = \alpha_i + \beta_{1,2,3,4} MC1,2,3,4_{it} + \beta_{5,6,7} MN1,2,3_{it} + \beta_8 MHC_{it} + \beta_9 MLC_{it} + \Sigma_{(k=10,11,12)} \beta_k X_{k,it} + \varepsilon_{it} \quad (1)$$

In the econometric model specified, y_{it} represents the logarithm of the sales performance of seller *i* at time *t*. The α_i is the unknown intercept for each entity (3310 seller-specific intercepts); The variables MC1-4 represent memberships of configuration MC1-MC4, MN1-3 represent memberships of configuration MN1-Mn3, respectively. MHC is the membership of high-sales performance configuration while MLC is membership of low-sales performance configuration. The $X_{k,it}$ contains all the control variables including seller tenue, instant message response speed, and delivery time. The error term is represented by ε_{it}. The membership of low sales performance of MN1-MN3 are prepared accordingly.

As shown in Table 3, in the panel regression results for configuration membership, the coefficients for MC1 (β = 0.727, p < 0.01), MC2 (β = 0.561, p < 0.01), MC3 (β = 0.196, p < 0.1), and MC4 (β = 0.207, p < 0.05) are positive and significant, indicating that these four configurations predict high sales performance. The membership of each configuration is different in coefficient and significance levels. The membership scores for three configurations of low performance, MN1 (β = -0.362, p < 0.01), MN2 (β = -0.221, p < 0.01), and MN3 (β = -0.452, p < 0.01), provide evidence that these three low-performance configurations predict low sales performance. Regarding the overall effects on memberships of high performance and low performance, the results are significantly positive (β = 0.681, p < 0.01) and significantly negative (β = -0.409, p < 0.01). Taken together, the results indicate that configuration membership predicts high sales performance or low sales performance, which is consistent with the fsQCA analysis. We further utilized

instrumental regression (see results tables at Appendix F) to mitigate potential endogeneity concerns for the potential omitted variables (such as sellers' operational capabilities), and the supplementary estimations demonstrate the robustness of our findings.

Furthermore, we conducted additional regression analysis by incorporating individual PBF components and their potential interactions (Slager et al. 2023), and the outcomes are presented in Appendix F. The additional regression results reveal three noteworthy observations. First, while the regression results identify potentially useful two- and three-way interactions, they fail to fully capture the nuances of the complex interactions. For example, the regression analysis reveals the negative interactions between pricing and marketing, as well as marketing and after-sales performance, but it is unable to uncover the potential combinations where these functions complement each other under specific situations, represented by C1 and C2. Second, although the payment function repertoire plays a significant role in C1 and C4, the regression results indicate that it is non-significant and does not appear to contribute to sales performance. The potential positive effects may depend on the presence of pricing functions that can help alleviate concerns about deep price discounts and improve sales. Third, the individual product price condition shows a negative association with sales performance, suggesting that relatively low-priced products are more appealing in this e-marketplace platform. Taken together, such observations support the argument that it is crucial to consider how these attributes collectively influence sales performance, rather than solely relying on individual condition. By incorporating the findings from our fsQCA analysis into the regression models, we demonstrate that identifying attribute configurations can provide valuable insights that may not be apparent when only examining the overall effects of individual elements.

Table 3. Estimation of Configurations for High and Low Sales Performance

Variables	M1	M2	M3	M4
Ln (Tenure)	0.224***	0.284***	0.274***	0.333***
	(0.040)	(0.039)	(0.041)	(0.040)
Ln (Delivery Time)	0.271	0.272	0.278	0.279
	(0.210)	(0.208)	(0.211)	(0.210)
Ln (Response Speed of	0.032***	0.031***	0.032***	0.031***
Instant Message)	(0.008)	(0.008)	(0.007)	(0.008)
MC1		0.727***		
		(0.076)		
MC2		0.561***		
		(0.125)		
MC3		0.196*		
		(0.119)		
MC4		0.207**		
		(0.092)		
MN1			-0.362***	
			(0.089)	
MN2			-0.221***	
			(0.070)	
MN3			-0.452***	
			(0.037)	
Membership of High-sales				0.681***
performance Configuration				(0.068)
Membership of low-sales				-0.409***
performance Configuration				(0.071)
Constant	5.295***	5.497***	5.602***	5.853***
	(0.267)	(0.260)	(0.279)	(0.269)
R^2	0.093	0.107	0.095	0.108
F	338.354	167.300	213.924	246.276

Notes: The dependent variable is Ln (Daily Revenue) across past week; MC1-MC4 = Membership of configuration of high performance; MN1-NH2 = membership of non-high-performance configuration; Seller-individual fixed effects are included in each model. Number of observations = 108,720; Number of sellers = 2,718; Robust standard error is in parentheses. *p < 0.1, **p < 0.05, ***p < 0.01.

4.3 Recipes for Achieving High Sales Performance with PBFs

Based on two contingency patterns of sellers' product positioning – including sellers without established reputations selling low -priced products versus sellers with established reputations selling high -priced products – and high product variety versus low product variety, we first propose a contingency framework to summarize the configuration results (Figure 3). This allows us to interpret the configuration results in a systematic way (Park et al. 2020) and clarify how sellers configure IT-enabled competitive actions to achieve high sales performance under different contingency conditions.

---<Insert Figure 3 about here>---

There are two main ways for sellers to achieve high sales performance: one is by utilizing an economy of scale approach, which involves concentrating on low-priced items with high sales volume, while the other is through a differentiation strategy, focusing on high-priced items with lower sales volume (Porter 1980). The unique coverage of each configuration suggests that C1, which emphasizes low-priced products alongside extensive usage of pricing and marketing functions, constitutes a dominant pathway towards achieving high sales performance in the e-marketplace. Furthermore, the configuration results imply that the high-priced solution is exclusively applicable to sellers with high reputation, while the low-priced solution only suits non-reputable sellers. For non-reputable sellers, the low-priced solution corresponds to a low-cost strategy, which involves offering the lowest prices or best value in the market to attract price-sensitive customers.

To reveal a more fine-grained configurational pattern regarding the significant role of sellers' product variety, we conducted a one-on-one comparison of the results from C1-C4, noted in Figure 3. We identified the similarity and linkage between the contingency and the co-presence or co-absence of functions for each solution (a visual representation is also provided in Figure C3 in Appendix C, which showcases the visualization of configurational results through the radar chart). This intersection analysis provides valuable insights into key patterns under different contingency conditions, as demonstrated in Figure 4. First, the results indicate that non-reputable sellers must configure a high level of marketing and after-sales service functions while selling low-priced products. Additionally, a high level of payment and pricing functions is required under the condition of high product variety, whereas payment is considered "don't care," and the product-present function is valuable under low product variety. Second, for reputable sellers selling high-priced products, they should implement a low level of pricing and marketing functions. Additionally, a high level of payment and product-present functions is required if the seller offers high product variety, whereas a low level of payment function and a high level of after-sales service function are recommended under the low product variety condition.

---<Insert Figure 4 about here>---

5 Discussion and Conclusion

5.1 Theoretical Propositions

We put forward theoretical propositions for each of the four identified PBF configuration solutions by theorizing why each configuration is related to high sales performance, based on our interpretation of the fsQCA results and according to the strategy literature in general and e-marketplace literature in particular (Li et al. 2019; Miller and Whitney 1999). Our study brings to the fore two pivotal mechanisms, synchronization and synergy, to shed light on the intricate relationship between the four identified configurations and high sales performance in e-marketplaces. First, we underscore the pivotal role of synchronizing product pricing with specific online reputation, a fundamental aspect for achieving success and effective coordination in the e-marketplace. To achieve synchronicity, sellers need to possess a corresponding level of reputation in their respective product price positioning to leverage potential competitive advantages. For instance, reputable sellers can offer distinctive differentiation mechanisms in promoting high-priced products. Second, for each combination of product pricing and variety positioning, our results unveil a distinctive PBF configuration for sellers to achieve the synergistic effects. Specifically, synergistic effects demand that sellers utilize the combinations of PBFs in their product variety positioning to meet consumer needs and sustain competitive advantages. Synergistic effects emphasize the utilization of positive amplification effects between functionalities while avoiding potential dysfunctional and redundant impacts. For instance, if a seller solely focuses on pricing without considering other relevant factors such as payment options and marketing functions, they may fail to leverage the synergy effects of these PBFs and miss out on potential sales opportunities.

The summary of our key findings in Section 4.3 reveals that for non-reputable sellers selling low-priced products, a high level of marketing and after-sales service is required to achieve high sales performance. Non-reputable sellers produce a low level of visibility and credibility (Bockstedt and Goh 2011; Wells et al. 2011), and from the customer perspective, buying low-price products is associated with a low level of certainty and potential risk in online transactions (Raju 1992; Russell and Bolton 1988). To stand out in the crowded e-marketplace, implementation of aggressive marketing-promotion functions can directly reach consumers and attract their attention (Bockstedt and Goh 2011; Luo et al. 2012). Compliance with the after-sales service function plays an important complementary role by providing consumers with a direct protection scheme endorsed by the platform (Wang et al. 2018; Wang et al. 2013), which also serves as an institutional mechanism to transfer the trust on the platform to the trust of particular sellers (Pavlou and Gefen 2004). Therefore, this combination of marketing and after-sales service functions compensates for the lack of

high reputation. These visibility- and credibility-enhancing mechanisms are essential for non-reputable sellers selling low-priced products to achieve high sales.

Furthermore, when non-reputable sellers sell low-priced products, the configuration recipes differ across high and low product variety. For sellers offering high product variety, a high level of pricing and payment functions is required to improve sales. That is, high product variety indicates that sellers have rich resources and reach a wide range of customers compared with sellers who offer low product variety. A broad variety of payment options and functionalities can be helpful by making online transactions easier to this diverse group of consumers who unavoidably demand different payment options. The pricing function can then effectively arouse consumer interests and help sellers compete for market share (Chi et al. 2010; Li et al. 2019; Yu and Cannella Jr 2007). Moreover, as discussed earlier, implementation of marketing functions can further amplify this positive effect by increasing the visibility of sellers' price-cut actions (Bockstedt and Goh 2011; Luo et al. 2012). While pricing functions are found to have a potentially negative effect on customers' perception of product quality, compliance with after-sales service functions can mitigate potential negative concerns by serving as credibility signals.

In contrast, deployment of a high level of product-present is recommended for non-reputable sellers who offer low product variety. Offering low product variety indicates that sellers are implementing fewer resources and reaching a comparatively narrow range of consumers. Sellers can focus on providing a highly targeted/customized product-present that engages consumers in a cost-effective manner, rather than implementing a high level of pricing and payment functions that require more operational effort while generating less performance impact. In summary, non-reputable sellers can focus on low-priced products while selecting an effective PBF portfolio that matches their product variety offering to improve sales performance. Based on the configuration logic that non-reputable sellers achieve high sale performance by selling low-price products, and considering the role of product variety, we propose the following:

> ***Proposition 1****: Non-reputable sellers can achieve high sales performance by implementing a high level of pricing, marketing, payment, and after-sales service functions when they sell low-priced products and offer high product variety.*
>
> ***Proposition 2****: Non-reputable sellers can achieve high sales performance by implementing a high level of marketing, product-present, and after-sales service functions when they sell low-priced products and offer low product variety.*

Reputable sellers have a different competitive logic than non-reputable sellers to achieve high sales performance by focusing on expensive products. Consumers of high-priced products will more likely face considerable uncertainty in online transactions (Ba and Pavlou 2002) compared to that of low-priced products, as they face a higher risk of loss. Reputable sellers are endowed with distinctive differentiation mechanisms because they enjoy high customer loyalty and strong assurance of product value, as reflected by past successful transactions (Wang et al. 2018; Wells et al. 2011). We argue that pricing and marketing functions play dysfunctional or counterproductive roles for reputable sellers of high-priced products, so it is recommended that these two functions be avoided for these sellers. The underlying reasons for this are twofold. First, inappropriate use of the pricing function could offend or disrupt status-conscious buyers, thereby damaging the sales or even the reputations of reputable sellers. These consumers typically perceive a premium above the industry average price as a signal of quality and are willing to pay for it (Ba and Pavlou 2002; Pavlou and Gefen 2004). Second, since reputable sellers are already publicly present in the e-marketplace, there is no need to implement additional marketing strategies with similar functionality while generating less performance impact. Previous literature has also demonstrated a negative interaction between marketing functions (i.e., sponsored search advertising) and seller reputation in terms of improving online visits (Sun et al. 2020). Thus, reputable sellers do not need to implement extensive pricing functions and marketing functions, which can lead to misalignment between their strategic positioning and competitive actions while wasting important resources.

In addition, for reputable sellers offering high product variety, a high level of payment functions and product-present is required to increase sales. Offering high product variety implies that sellers can reach a wide range of consumers, while payment functions can facilitate online transactions for high-priced products by providing various payment options and a smooth payment experience, which is critical for sellers to satisfy the demands of consumers they are targeting. Implementing product display capabilities is cost effective under conditions of high product price and high product variety, as potential costs and resource allocation requirements increase with product price and decrease with product variety through economies of scale. In contrast, reputable sellers offering low product variety should employ a high level of after-sales service and a low level of payment functions to achieve high sales performance. Offering low product variety indicates that sellers focus on niche market segments and reach a narrow range of consumers. Particularly, they can attract consumers by delivering high quality services. A strong protective mechanism

arises from a combination of high reputation and after-sales service functions. High reputation provides indirect protection by reflecting the fact that sellers have provided satisfactory services for buyers in past transactions, while after-sales services provide buyer protection (e.g., money-back guarantee) when transactions go wrong (Kirmani and Rao 2000; Wang et al. 2018). Moreover, to serve a narrow range of consumers, sellers do not need to implement high levels of payment functionality, which is associated with additional costs in terms of transaction fees and cash flow delays (Li et al. 2009). Combining the configuration results with our theoretical interpretations, we propose the following:

Proposition 3*: Reputable sellers can achieve high sales performance by implementing a high level of product-present and payment functions and by avoiding a high level of pricing and marketing functions when they sell high-priced products and offer high product variety.*

Proposition 4: *Reputable sellers can achieve high sales performance by implementing a high level of after-sales service function and by avoiding a high level of pricing, payment, and marketing functions when they sell high-priced products and offer low product variety.*

5.2 Discussion of Key Findings

This study reveals three interesting findings based on the configurational approach advanced herein compared with the previous PBF literature, which has mainly been based on the variance approach. First, C1 and C2 illustrate those effective combinations of PBFs, such as pricing, marketing, payment, and after-sales service, can generate high sales for sellers. This outcome accords with prior literature based on variance-based perspective, which established the positive effects of various PBFs like pricing function (Gallien and Gupta 2007), marketing functions (Sun et al. 2020), and after-sales service (Li et al. 2009) on sales. In particular, C1 delineates a predominant pathway to attain high sales performance in the e-marketplace by leveraging a comprehensive set of PBFs. By integrating pricing and marketing functions, this configuration establishes a positive amplification mechanism that enhances purchase intention, which can attract and convert customers. Additionally, the coordination of payment and after-sales functions helps address potential negative concerns by lending credibility to the products. Both C3 and C4 demonstrate a higher level of contextual specificity within the e-marketplace environment, in which that sellers with high reputation can attain high sales by offering high-priced products while leveraging a limited set of PBFs. Our configurational findings on reputation suggest that sellers with varying reputations should employ differing PBFs, which is consistent with previous studies in recognizing the contingent role of seller reputation (Guo et al. 2020; Li et al. 2019) but going beyond them by accounting for more complex interactions among PBFs and product positioning. It is worth noting that reputable sellers who sell

high-priced products may benefit from low levels of pricing and marketing functions, suggesting that such functions should be avoided by these sellers. These results offer insights that can reconcile the conflicting outcomes on the performance impacts of single PBFs in existing research (Walia and Zahedi 2013; Cao et al. 2018; Sun et al. 2020). This is achieved by highlighting the importance of the interplay between reputation, PBFs repertoires, and product positioning as well as identifying the synergistic effects of these factors on seller performance. In addition, sellers offering high product variety noted in C4 can benefit from a high level of product presentation and payment functions to reach a broad customer base and accommodate diverse payment preferences (Chi et al. 2010; Li et al. 2019; Yu and Cannella Jr 2007). This understanding deviates from the general guideline that high-priced sellers should leverage marketing actions in brick-and-mortar settings (Barney 1991; Porter 1996). These configurations thus provide new insights into how e-commerce sellers can strategically position themselves and deviate from traditional approaches.

Second, our configuration results suggest a multi-faced role of after-sales function and it has complex relationship with online reputation, including complementary, substitute, and independency. This complex relationship is contingent on seller's overall product positioning strategies of product variety and price positioning. As seen in C3, reputable sellers offering a limited product variety should prioritize after-sales service functions to serve niche market segments and deliver high-quality services. For higher-priced products, customers may have greater expectations of quality and be more selective in their choice of a seller (Bockstedt and Goh 2011; Luo et al. 2012). This combination of a strong reputation and excellent after-sales service can reinforce each other and build customer confidence, particularly for high-priced products. An excellent reputation indicates that the seller consistently provides top-notch products while good after-sales service ensures that customers receive support if they experience any problems (Bockstedt and Goh 2011; Luo et al. 2012). Conversely, buyers of lower-priced products may not have high expectations of quality and may give more importance to exemplary after-sales service rather than the seller's reputation. In essence, superior after-sales service may suffice in building customer confidence even if the seller's reputation is not high. Furthermore, in situations where a seller offers a wide range of products, online reputation and after-sales service function may have an independent (i.e., don’t care) relationship. Customers may have varied standards of quality, value, and service for different types of products (Wang et al. 2018; Wang et al. 2013). Hence, it becomes essential for sellers to recognize

the specific requirements and preferences of customers and prioritize the appropriate condition of either reputation or after-sales service.

Third, our study suggests that asynchronicity and overemphasizing a single functionality are the main reasons for low performance. Such asynchronicity between sellers' reputation and product price positioning prevents them from attaining foundational competitive advantages. Overemphasis on a single functionality while neglecting the overall integration of platform functionalities weakens competitiveness. Neglecting the possibility of integrating multiple relevant factors may further indicate a lack of recognition of complementarities and synergies, which are often essential for achieving fit in complex systems (Grandori and Furnari 2008). For low sales, N1 and N2 show that the absence of PBF repertoire and ineffective product positioning can result in low sales, and just use the product-present function repertoire is meaningless. Interestingly, N3 suggests that reputable sellers offering low-priced products may have low sales despite using high product-presentation and after-sales functions. These findings challenge prior studies that emphasize the roles of seller reputation as the most significant component affecting buyers' perception of product quality, perception of risk, and purchase intention (Kim and Choi 2012). In other words, a misfit of reputation and product positioning is harmful for sales, and additional usage of payment and after-sales functions is not helpful. These findings also confirm the asymmetric relationship between PBF configuration and sales, indicating that solutions for low revenue are not mirror images of high-performing solutions (Fang et al. 2014; Wang et al. 2016). In particular, we also provide a detailed summary comparing our configurative findings with previous literature, as show in Appendix G1, highlighting major differences across the PBFs interdependency, positioning contingencies, and causal asymmetry.

5.3 Theoretical Contributions

This study makes several major theoretical contributions. First, it contributes to the e-marketplace literature by taking the configurational perspective to examine how platform-based functions can be used as a repertoire to achieve high sales performance. This configurational approach highlights the interdependence among platform-based functions influencing sales performance through configurational causal logic, representing a departure from prior e-marketplace research that either focused on the net effect of individual platform-based functions (Bockstedt and Goh 2011; Dewally and Ederington 2006; Ou and Chan 2014) or the structural characteristics of the function repertoire (Li et al. 2019)

using variance-based causal logic. These research findings and theoretical perspectives can not only help reconcile the inconclusive results on the impact of individual functions on sales performance (Bockstedt and Goh 2011; Gallien and Gupta 2007; Ou and Chan 2014; Walia and Zahedi 2013), but also offer a plausible explanation as to why the complexity of the platform-based function repertoire has not been found to affect sales performance under different levels of seller reputation (Li et al. 2019).

Second, this research contributes to the online reputation literature by challenging the indispensable role of seller reputation and offering alternative high-performance solutions for sellers without high reputation. Although reputation is widely acknowledged as a key performance differentiation mechanism for sellers in crowded e-marketplaces due to its essential role in reducing uncertainty (Bockstedt and Goh 2011; Dewally and Ederington 2006; Li et al. 2019; Li et al. 2009; Ou and Chan 2014; Wells et al. 2011), our configuration results suggest that it is neither a sufficient nor necessary condition for high sales performance. Furthermore, the configuration findings provide unique, fine-grained details for sellers with different reputation levels to achieve high sales performance by strategically utilizing different combinations of PBFs. The study also contributes to the discussion on whether seller reputation complements or substitutes for the assurance mechanism enacted through the after-sales service functions in the e-marketplace setting (Dewally and Ederington 2006; Kirmani and Rao 2000; Li et al. 2009; Wang et al. 2018) by offering evidence that this effect is either substitutional or complementary depending on sellers' product positioning.

Third, our study contributes unique insights beyond the existing literature on the interdependence of strategies (Table B1-B2 in Appendix B) in brick-and-mortar settings (Leiblein et al. 2018; Porter 1996; Porter 2008; Rivkin and Siggelkow 2007; Siggelkow 2011; Siggelkow 2017; Yang 2021). We offer three key findings in this regard: the distinct role of online reputation in determining pricing position and sales, the complexity of platform function interactions, and recommendations for firms to avoid certain dysfunctional actions. First, while previous studies have identified various factors influencing firms' positioning decisions (such as organizational size, cost structure, and market competition) (Kienzler and Kowalkowski 2017; Steen 2017), our study adds to the current body of knowledge by demonstrating that online reputation is a distinctive and significant factor in determining a seller's pricing position and the paths to achieving high sales in the e-marketplace context. In particular, synchronizing product price positioning with the level of online

reputation can provide sellers with distinct anchors to attain competitive advantages. Second, the existing literature in brick-and-mortar settings suggests that a firm's decision to position its product offerings (such as low-price and cost leadership or high price and differentiation) can have significant implications for management practices, including pricing, marketing, quality monitoring, product design, and supply chain decisions (Porter 1996; Siggelkow 2011; Yang 2021). Our findings demonstrate that the choice of product variety positioning, in conjunction with online reputation (synchronized with product price positioning), plays a crucial role in determining the sellers' configuration of product presentation and payment function. These two functions are specifically developed in the e-marketplace to facilitate online transactions, which has not yet been documented in findings from traditional settings. We find that the identified configurations of the five type of PBF repertoires enhance sales performance through synergistic mechanisms, utilizing positive amplification effects between functionalities while avoiding potential dysfunctional and redundant impacts. Third, the extant literature has primarily focused on the complementary adoption of multiple specific activities and generally assumes that the functional set is beneficial for retailers' operations. In contrast, our study not only prescribes actions that firms should take but also advises on what they should avoid to reduce costs and improve sales. For example, our study reveals that pricing and marketing functions can play dysfunctional or counterproductive roles for reputable sellers selling high-priced products. Specifically, our configurational results show asymmetry between combinations of elements related to high and low performance; essentially, a low sales configuration is not a mirror image of a high sales configuration. The asynchronicity and overfocus on a single condition during the configuration process can result in sales losses when competing with sellers who are better positioned to meet customer preferences.

Finally, our study contributes to the literature on competitive actions, specifically at the repertoire level of analysis, by utilizing the configurational approach to uncover intricate interactions among platform-based functions in the e-marketplace setting. Prior research has focused on comprehending the antecedents and outcomes of competitive actions at various levels of analysis, involving action-response dyads between rivals' competitive interactions and competitive action repertoires that capture the structural characteristics of function portfolios (Chen and Miller 2012; Chen and Miller 2015; Smith et al. 2001). However, our approach considers specific competitive actions as heterogeneous and examines their complementary and substitutional effects to identify high-performance

configurations. Moreover, we incorporate seller reputation and product positioning as crucial contextual conditions based on previous online reputation and e-commerce literature (Bockstedt and Goh 2011; Li et al. 2015; Ou and Chan 2014; Walia and Zahedi 2013; Wang et al. 2018). Configurations of competitive actions are executed within a coherent competitive strategy of firms, ultimately leading them to gain competitive advantages. By examining micro-competitive actions, our study complements macro-competitive strategies and provides an informed viewpoint for comprehending strategy as actions.

5.4 Practical Implications

Beyond the theoretical contributions, our findings have two novel practical implications. The results indicate that sellers should take a holistic viewpoint when engaging in competitive actions (i.e., PBFs in the e-marketplace), with special care given to the complementary and substitutional effects among multiple actions, rather than focusing on individual actions in isolation. These findings provide prescriptive causal recipes for sellers to better understand their competitive strategy decisions (as displayed in Figure 4). For example, detailed configuration recipes on PBF portfolios are identified and suggested for sellers with different average prices, product variety, and reputation levels. Multiple configurations are identified to provide alternative solutions in contrast to insights from previous variance-based approaches that emphasize the positive or negative effects of single functions on sales performance. The emergence of configuration recipes of PBFs confirms the existence of multiple solutions to achieve high performance. For sellers at the early stage of their e-commerce endeavour, who may find it difficult to build a reputation, our configurational insights point to multiple or alternative solutions available to them for achieving high performance effectively.

Specifically, sellers at an early stage or with medium/low reputations can leverage a combination of after-sales service functions and marketing functions to add credibility and visibility, and to remedy the lack of high reputation; the specific configuration option can be chosen based on resources or strategic intent. This study also has implications for platform operators. In particular, based on our multiple configurations to achieve high sales performance, platform operators may provide recommendations on sellers' configurations of PBFs in addition to individual functions to help them achieve better performance.

5.5 Limitations and Future Research

Despite its theoretical contributions and practical implications, this study has several limitations that call for future research. First, since our dataset only covers sellers in the apparel industry on the Taobao platform, there is a need to test the generalizability of the four configurations identified in the current study in other industries (e.g., mobile phones as search products) and other e-commerce platforms (e.g., eBay and Amazon), where different competitive actions or competitive strategies are taken by sellers. Second, regarding the outcome variables, we use revenue to measure sales performance, rather than net profits or return on assets, because the cost data are unavailable. Future research could leverage more crucial performance indicators or consider the configurations for other dimensions of seller performance, such as consumer satisfaction, product return rate, store traffic, and repurchasing rate (Sun et al. 2020), which are the outcomes of interest for sellers in e-commerce. Additionally, our research mainly focuses on the complex interactions among types of PBFs. Future research could extend such configuration logic to examine the configurations of other focal elements, such as a detailed subset of specific functions (Li et al. 2019), while considering the important contextual factors that will impact the effectiveness of focal elements. Third, our approach would allow sellers to take advantage of technological advances and better respond to environmental changes. This study showed that solution of selling high-price products and low-price products are substitutes to each other and depend on sellers' reputation level. However, sellers in the e-marketing might gradually shift to other approaches through operational management, reputation level upgrading, and PBFs implementation. Future research can investigate how sellers achieve such temporality and transformation through the re-configuration of essential elements (e.g., environmental factors, industry competition). Moreover, pioneering sellers in nascent market often begin with a vague idea on how to coordinate multiple dimensions of factors to achieve high sales. This raises the question of how to develop a high-sales performance configuration with limited resources while adapting it to the dynamics of the competitive environment on the e-marketplace platform. Finally, whether the identified configurations and causal relationships are sustainable over time remains an open question. Although this study does not consider dynamic adjustments and sequences based on sellers' usage of PBFs, the empirical data show that this kind of behavior pattern is relevant. Future research could employ temporal qualitative comparative analysis (TQCA) (Caren and Panofsky 2005) to identify the time-evolving configurations in different periods of market evolution (Aversa et al. 2015) and incorporate methods that can articulate how PBF patterns sequentially exert performance effects.

5.6 Conclusion

Although sellers usually take multiple PBFs to gain a competitive edge, there are limited insights on how to effectively configure PBFs to achieve high sales performance. Drawing upon configuration theory accompanied by fsQCA analysis, this study conceptualizes the five types of PBFs as causal factors, and reputation and product positing as contextual conditions. Our analysis uncovered three key findings: 1) pricing and marketing functions have opposing effects when reputable sellers offer high-priced products, 2) after-sales functions and online reputation exhibit complex interactions that can be complementary, substitutive, or independent, and 3) there is an asymmetrical relationship between high and low sales configurations. The configurational findings further enrich our understanding of the performance impact of PBFs by providing fresh insights into the ways that different configurations of PBFs impact performance. This study encourages future research to take a configurational approach to investigate the complex and dynamic competitions in the e-marketplace.

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