International Entrepreneurship and Management Journal (2020) 16:739–781
https://doi.org/10.1007/s11365-019-00567-8

Risk-taking for entrepreneurial new entry: risk-taking dimensions and contingencies

Zhaoyang Guo[1] · Wei Jiang[1]

Published online: 23 February 2019

Abstract

Ambiguity remains in the literature regarding risk-taking conceptualisation and its association with the firm performance of new product entry. We unpack risk-taking into two dimensions: sensing risk-taking that manifests in a firm's activities to identify and/or create new opportunities and seizing risk-taking that reflects activities of development and commercialisation to address identified opportunities. We argue that the two dimensions are conceptually distinct but interrelated. Using multi-sourced survey data for 186 Chinese manufacturing firms, we find that a focal firm's new product success benefits most from adopting a concurrently high level of sensing risk-taking and seizing risk-taking when market growth is high but a high level of sensing risk-taking with a low level of seizing risk-taking when market growth is low.

Keywords Risk-taking · Opportunity sensing · Opportunity seizing · New product success · Entrepreneurial orientation · New entry

Introduction

The entrepreneurship literature indicates that risk-taking is a core element of entrepreneurial orientation (EO), which refers to the "processes, practices, and decision-making activities that lead to new entry" (Lumpkin and Dess 1996, p. 136). Risk-taking refers to a firm's willingness to engage in calculated business-related risks, which are typically characterised by making large resource commitments to entrepreneurial activities that involve a higher likelihood of high payoff and costly failure, embracing uncertainties and breaking away from the tried and true (Alvarez 2007; Brockhaus 1980; Covin and

✉ Wei Jiang
wei.jiang@xmu.edu.cn

Zhaoyang Guo
zyguo@xmu.edu.cn

[1] School of Management, Xiamen University, 422 Siming South Road, Xiamen 361005 Fujian Province, China

Slevin 1989; Miller 1983). Prior studies show that risk-taking is fundamental to a firm's strategic development (Eisenhardt 1989), competitive position (Zahra et al. 2004), survival and superior performance (Bromiley 1991; Covin and Slevin 1989; McGrath 2001; Sanders and Hambrick 2007).

Risk-taking has long been recognised as a typical trait of entrepreneurs, but questions remain for both academics and practitioners on how to adopt the risk-taking posture in business processes for new entry. Entrepreneurs often face risk-taking dilemmas. For example, in high-tech industries, firms develop new technologies to gain a first-mover advantage that generates substantial profits while risking a high likelihood of failing to capitalise significant investments (Cabrales et al. 2008). When facing high levels of uncertainty, making a large investment helps increase the success rates of new projects while, at the same time, may also spur the disruption of and instability in firms' existing operations given that firms are often restrained by finite resources (Burgers and Covin 2016).

Theoretical findings also vary significantly regarding the association between risk-taking and the firm performance of new entry such as in relation to new products. Specifically, risk-taking is found to have a positive effect on exploratory product innovation (Kollmann and Stockmann 2014) and on new product development (NPD) speed and performance (Calantone et al. 2003; Wang and Juan 2016), and, accordingly, it enhances firm profitability (Tan and Tan 2005). Furthermore, risk-taking is also found to have a negative effect on innovation speed (Shan et al. 2016) and on the competitive advantage of new products (Lechner and Gudmundsson 2014), thereby compromising firm profitability (Naldi et al. 2007; Venkatraman 1989). Taken together, ambiguous practical implications and inconsistent theoretical findings related to risk-taking for new product performance call for a more comprehensive investigation of the conceptualisation, operationalisation and potential contingencies of risk-taking.

Following Zahra (Wales 2016; Zahra 2005), we assert that risk-taking is a complex and multifaceted construct; thus, it may have multiple manifestations in different entrepreneurial processes and behaviours. The essence of entrepreneurial processes and behaviours centres on recognising and exploiting opportunities in the external environment (Ireland et al. 2009). Considering this, a firm's risk-taking posture might manifest in its opportunity recognition behaviours (opportunity sensing), in its opportunity exploitation behaviours (opportunity seizing), or in both types of behaviours. However, few EO studies have explored the impact of different risk-taking manifestations on firm performance or interrelationships that might exist among these manifestations. The current lack of investigation of different manifestations of risk-taking may lead to conceptual ambiguity regarding the underlying construct. This further gives rise to the use of a variety of different measures to operationalise the risk-taking construct, contributing to varying and inconsistent results across studies. Moreover, such ambiguity has limited the utility of risk-taking as an important EO element for academics and practitioners. In particular, the varying interpretation of risk-taking leaves it unclear as to what extent and how entrepreneurs should adopt the risk-taking posture in their business processes and behaviours.

With this study, we seek to bring greater conceptual clarity to the risk-taking construct, and we aim to provide a more solid understanding of the construct for future entrepreneurship theorising and empirical examination and for the discernment of implications for entrepreneurs. We unpack the construct of risk-taking into two related

but distinct dimensions: risk-taking in opportunity-sensing behaviours (sensing risk-taking) and risk-taking in opportunity-seizing behaviours (seizing risk-taking). We highlight that both sensing risk-taking and seizing risk-taking are integral to the risk-taking construct, but we distinguish between them conceptually, operationally, and empirically by examining the independent and joint effects of risk-taking dimensions on new product performance. We further explore an important industrial contingency: effects of market growth on the joint effect of risk-taking dimensions. We chose Chinese manufacturing industries as our empirical context and focus on new product success in this study as an important aspect of new entry (Wales et al. 2015).

Our findings reveal that the relationship between risk-taking and new product success is more complex than previously understood in that sensing risk-taking and seizing risk-taking influence new product success through distinct causal mechanisms. Specifically, sensing risk-taking enhances a firm's new product success but seizing risk-taking impairs new product performance. We also find that over and above their unique independent effects, when integrated, a concurrently high level of sensing risk-taking and seizing risk-taking is beneficial for new product success when market growth is high, while high levels of sensing risk-taking accompanied by low levels of seizing risk-taking are important for new product innovation when market growth is low.

Our study makes contributions to the extant literature in several ways. First, this study enriches the EO literature by providing greater clarity on the conceptualisation and operationalisation of risk-taking and in also empirically examining main and joint effects of risk-taking dimensions on new product performance. As multiple dimensions of the risk-taking construct help reveal potential complementarity and trade-offs that might exist among different risk-taking manifestations (Zahra 2005), the present work sheds light on the complex and ambiguous relationship between risk-taking and new product performance.

Second, the majority of EO studies have treated EO as a unidimensional (composite) construct and have focused on the shared variance between EO dimensions (i.e., risk-taking, innovativeness, and proactiveness) (Covin and Miller 2014; Covin and Wales 2012). However, recent studies have begun to emphasise the differential relationships that may exist between the individual dimensions of EO and firm performance (Das and Joshi 2007; Hughes and Morgan 2007; Kreiser et al. 2013; Naldi et al. 2007). As stated in Miller (2011, p. 880), "sometimes, however, the components of EO are more telling than the aggregate index." Therefore, this study also echoes a call for more investigation on the unique role played by each EO dimension in support of providing a more comprehensive understanding of specific entrepreneurial behaviours (Covin and Miller 2014; Lumpkin and Dess 1996; Miller 2011; Wales 2016).

Third, this study extends the entrepreneurial opportunity literature by exploring strategic and environmental effects on the emergence and development of new opportunities. The study of opportunities is the most unique domain of entrepreneurship research and significantly facilitates the development and maturation of entrepreneurship as a field of research (Busenitz et al. 2014). Thus, our study also responds to the gap in current entrepreneurship research for more opportunities studies (Busenitz et al. 2014).

The remainder of the paper is structured as follows. We first provide a brief overview of the risk-taking concept given in extant literature based on which we summarise its three key features. We further explicitly explain two dimensions of

risk-taking (sensing risk-taking and seizing risk-taking) as well as their distinct manifestations. We then propose our research model and develop hypotheses to explore the independent and joint effects of risk-taking dimensions on new product performance and the contingent role of market growth. Following this, we introduce the research methods and analysis results. Finally, we discuss our findings and contributions to theories and practical implications, and we conclude with an acknowledgement of the limitations of this study.

Theoretical foundations

Two dominant conceptualisations of EO are used in the literature (Covin and Wales 2019; George and Marino 2011). One views EO as referring to an organisational attribute reflecting how "being entrepreneurial" is manifested in organisations or business units, and EO is a composite construct that is represented by the qualities that risk-taking, innovative and proactive behaviours have in common (Covin and Slevin 1989; Miller 1983). The other views EO as the processes, practices, and decision-making activities that lead to new entry, and EO is a multidimensional construct according to which innovativeness, risk-taking, proactiveness, autonomy, and competitive aggressiveness are treated as independent behavioural dimensions that define EO's conceptual space (Lumpkin and Dess 1996). Recent theorising suggests that the two conceptualisations of EO are fundamentally different with each providing unique insights, and both are appropriate for study (Covin and Lumpkin 2011; Covin and Wales 2019; Miller 2011; Wales 2016). In this study, we ground our discussion in Lumpkin and Dess' view, which suggests that individual dimensions are combined to form EO and EO should be assessed as a formative measure (Anderson et al. 2015; George and Marino 2011). This implies that investigating the role of individual dimensions contributes to EO knowledge; therefore, recent literature calls for "considerable advancement in understanding the individual influence of dimensions of EO" (Wales et al. 2013, p. 375). Anderson et al. (2015, p. 1593) specifically state that "retrospective summated scales may be inadequate in capturing the conceptual domain of EO, and particularly in assessing managerial attitude towards risks."

The recent literature also emphasises that many studies have investigated the long-linked EO—firm performance relationship, with little consideration being given to more immediate outcomes of EO through which subsequent performance occurs (Covin and Wales 2019). According to Lumpkin and Dess (1996), EO and new entry represent a causally adjacent phenomenon through which new entry is a strategic outcome of EO. However, scant attention so far has been paid to demonstrate close causal adjacency between EO and its consequences of firms' new entry (Wales et al. 2015). New entry is a multifaceted concept involving one or several forms: launching new products, entering new markets and establishing new ventures (Wales et al. 2015). The effects of EO processes on different forms of new entry may vary (Miller 2011). This study focuses on risk-taking dimensions of EO and on their relationship to a specific form of new entry—new products.

The extant entrepreneurship and strategy literature has acknowledged the importance of risk-taking by investigating its effect on various firm-level outcomes (Bromiley 1991; Eisenhardt 1989). However, the empirical findings are rather

inconsistent (see literature summarised in Table 1). For example, some studies find that risk-taking positively relates to a firm's new product performance (Calantone et al. 2003; Wang and Juan 2016) whereas others indicate negative effects of such relationships (Lechner and Gudmundsson 2014; Shan et al. 2016). In terms of firm financial performance, risk-taking is found to have a positive (Tan and Tan 2005), negative (Naldi et al. 2007; Venkatraman 1989) or curvilinear (inverted-U relationship) (Begley and Boyd 1987) impact. Moreover, Kreiser et al. (2013) find a U-shaped relationship between the risk-taking and sales growth of firms, where a low level of risk-taking associates with higher sales growth, whereas Casillas and Moreno (2010) show a non-significant effect of risk-taking on sales growth.

Based on the above, the mixed findings on effects of risk-taking on the firm performance of new entry and financial and market outcomes essentially signify a need for a more comprehensive understanding of risk-taking and effects of boundary conditions on the association between risk-taking and firm performance.

Risk-taking conceptualisation

Extant research has provided several definitions of risk-taking, each of which captures some important features of risk-taking (see Table 2 for some examples). This further indicates a need to further clarify risk-taking concept (George and Marino 2011). According to the previous research, risk-taking has three major features that distinguish it from other EO dimensions: 1) a willingness to commit large amounts of resources to projects with high returns and high risks of costly failure; 2) undertaking initiatives for projects with uncertain outcomes; and 3) breaking away from tried-and-true paths of operation and venturing into the unknown (e.g., Kollmann and Stockmann 2014; Miller and Friesen 1982; Wiklund and Shepherd 2003). Firm behaviours can be considered as involving risk-taking when demonstrating any of the three features above or a combination of these features.

Specifically, the first feature of risk-taking, making large resource commitments or incurring heavy debt into projects involving high returns and high risks of failure, typically reflects the context of risk-return trade-offs considered in financial analyses (Lumpkin and Dess 1996). Research finds that businesses facing considerable risks have higher average rates of return than businesses facing fewer risks (Aaker and Jacobson 1987). This decision-making style indicates that mangers exhibit an intense commitment to achievement and to prospects for positive outcomes by tolerating high levels of costly failure.

The second feature of risk-taking pertains to taking initiative when outcomes are uncertain (Hughes and Morgan 2007). Uncertain investment differs from risky investment as it is defined according to the first feature. Uncertainty denotes that the probability of various possible outcomes are unknown whereas risk indicates that the probability of an outcome (mostly negative) is known (Alvarez 2007). As such, uncertainty results from information imperfection, while risk deals with the probability of failure. Risk-taking firms are more willing to tolerate uncertain situations than risk-averse firms, and they tend to initiate actions or commit resources without being aware of all potential consequences.

The third feature of risk-taking emphasises a firm's willingness to depart from tried-and-true approaches, to challenge the existing order of business and to venture into

unknown fields to pursue an enhanced performance (Dai et al. 2014; Venkatraman 1989). Firms with this feature are willing to embrace different and/or new ways of doing business that deviate from established operations and systems adopted by existing market players proven to be useful. Embracing the new also implies that firms actively participate in learning activities to tap into fields previously unexplored such as investing in unexplored technologies or bringing new products into new markets (Lumpkin and Dess 1996). While tried-and-true strategies may lead to high mean performance, risky strategies resulting in considerable performance variation may be more profitable over the long run (McGrath 2001).[1]

Shane and Venkataraman (2000) assert that firms adopting EO are more likely to focus their attention and efforts on opportunities driven by market changes and uncertainties. By pursuing entrepreneurial strategies, firms must regularly and systematically recognise and exploit entrepreneurial opportunities; thus, entrepreneurship is defined as the identification and exploitation of previously unexploited opportunities (Hitt et al. 2001). Successful entrepreneurs are able to notice the possibilities that many other competitors seem to miss; more importantly, they are then able to find ways to turn these possibilities into actions: to bring to the market something novel and useful (Ireland et al. 2003, 2009). Thus, opportunity sensing (or recognition) and seizing (or exploitation) are the two main entrepreneurial processes and behaviours.

The manifestation of EO likely distributes heterogeneously within organisations, as certain organisational areas, processes and behaviours benefit from a more conservative orientation (Wales 2016). In view of this, we consider that a firm may adopt a risk-taking posture when it senses new opportunities, or when it takes strategic actions to seize new opportunities, or both. We argue that risk-taking through opportunity sensing and seizing may have differential impacts on a firm's innovation performance since entrepreneurial behaviours influence firm performance through different paths. Sensing is about what a firm decides to do, while seizing refers to how a firm achieves its previously set objectives. However, extant research has not distinguished between these two forms of risk-taking, and the operationalisation of risk-taking seems to reflect more on sensing activities in some studies (e.g., Das and Joshi 2007), or more on seizing activities in others (e.g., Venkatraman 1989), or on the combination of the two (e.g., Covin and Slevin 1989; Kollmann and Stockmann 2014). This might be a primary problem leading to varying findings with respect to the effect of risk-taking given in the extant literature. Therefore, we explicitly unpack the concept of risk-taking into two distinct dimensions: risk-taking through opportunity-sensing (Sensing risk-taking) and risk-taking through opportunity-seizing (Seizing risk-taking).

[1] This feature of risk-taking is distinct from innovativeness, which is another dimension of EO. Innovativeness reflects a firm's tendency to engage in and support new ideas and creative processes to create new products, services or technological processes (Lumpkin and Dess 1996). Such new ideas or processes can be new to a firm but not necessarily new to the market or to other counterparts. Venturing into the unknown refers to a firm's efforts to explore fields and ways of doing things that diverge from the existing knowledge of firm, counterparts and market players, thereby entailing a high level of uncertainty and risk. Such a venture is not necessarily accompanied by the generation of new products, services and technologies (Nasution et al. 2011).

Table 1 Empirical studies on the relationship between risk-taking and firm-level performance

Authors	Measure of risk-taking	Research context	Method	Outcome variables	Key findings related to risk-taking
Begley and Boyd (1987)	Behaviour scale test entrepreneurial personality of founders and non-founders	239 English small business managers	Cross-sectional questionnaire survey	Financial performance: return on asset	A test for curvilinearity reveals a "threshold effect"; a psychological attribute (i.e. risk-taking propensity) associates with corporate performance only to a certain point. Beyond this optimal level, the psychological pattern appears to become dysfunctional and financial returns falter. In the founders, for example, moderate risk-taking is associated with increased ROA. However, the ROA of these firms decreases when risk-taking becomes excessive.
Cabrales et al. (2008)	A firm's encouragement to take risks • Risk taking is encouraged in the group. • The faults or errors made due to risk taking in the group are tolerated.	95 Spanish firms in 4 industry sectors considered innovative in terms of the number of patents	Questionnaire survey delivered via telephone	Radicalness of innovation	The encouragement to take risks within a work team is positively associated with the radicalness of innovation
Calantone et al. (2003)	Top management risk-taking • Top managers in this business unit (or division) consistently accept higher financial risks in order to obtain higher rewards. • Top managers in this business unit (or division) accept occasional new product failures as being normal. • Top managers in this business unit (or division) encourage the development of innovative marketing strategies, knowing some will fail.	453 U.S. firms in four diverse industries (automotive, electronics, publishing, and manufacturing/R&D laboratories)	Cross-sectional questionnaire survey	NPD speed, corporate strategic planning, NPD program performance	Firm innovativeness, market orientation and top management risk taking are antecedents to NPD speed and corporate strategic planning; these in turn are modelled as antecedents to NPD program (not project) performance. Such baseline model is moderated by environmental turbulence. In particular, the paths from innovativeness to strategic planning and from risk taking to

Table 1 (continued)

Authors	Measure of risk-taking	Research context	Method	Outcome variables	Key findings related to risk-taking
	• In this business unit (or division), bold wide ranging acts are common place.				NPD speed are significantly greater in highly turbulent environments.
Casillas and Moreno (2010)	Adapted from Colvin & Slevin (1989): • TMT has strong proclivity for high-risk projects • TMT believes that owing to the nature of the environment, bold, wide-ranging acts are necessary to achieve the firm's objectives • The firm typically adopts a bold posture in order to maximize the probability of exploiting opportunities	449 small and medium-sized family businesses in Spain	Cross-sectional questionnaire survey and archival data	Firm growth in sales	Risk-taking is not significantly related to firm growth (main effect); however, is positively related to firm growth when family involvement (moderator) is low.
Dai et al. (2014)	• My business is inclined toward: 1. Low risk projects with normal rates of return, OR; 2. High risk projects with a chance of very high returns; 3. Equally the same • Due to the nature of the business environment in which I operate, it is best to: 1. Explore potential opportunities gradually through cautious, incremental behaviour, OR; 2. Take bold, wide-ranging actions to achieve the firm's objectives; 3. Equally the same	500 SMEs in U.S.	Cross-sectional questionnaire survey via phone	Firm international scope(the number of foreign countries in which SMEs received sales during a three-year period)	Moderate risk-taking helps firms achieve higher levels of international scope (inverted-U shape relation-ship).
Das and Joshi (2007)	• My organisation has a strong proclivity for low risk projects with normal and certain rates of return.	102 U.S. technology service provider firms	Cross-sectional mail questionnaire survey	Process innovativeness	A firm's risk-taking propensity is not significantly related to its process innovativeness, nor does it moderates

Table 1 (continued)

Authors	Measure of risk-taking	Research context	Method	Outcome variables	Key findings related to risk-taking
	• My organisation has a strong proclivity for high-risk projects with chances of very high rates of return. • My organisation typically adopts a cautious posture in order to minimize the probability of making costly decisions. • My organisation has top management who believe in exploring their environment gradually via timid, incremental behaviour.				the strategy-process innovativeness relationship.
Hughes and Morgan (2007)	• The term 'risk taker' is considered a positive attribute for people in our business. • People in our business are encouraged to take calculated risks with new ideas. • Our business emphasizes both exploration and experimentation for opportunities.	211 U.K. young high-technology firms at an embryonic stage of development	Cross-sectional mail questionnaire survey	Customer performance; Product performance	Risk-taking negatively influences product performance.
Kollmann and Stöckmann (2014)	Adapted from Covin and Slevin (1989): • In general, the top managers of my firm have a strong proclivity for low-risk projects (with normal and certain rates of return) …… a strong proclivity for high-risk projects (with chances of very high returns). • In general, the top managers for my firm believe that owing to the nature of the environment, it is best to	228 firms with age between 2 and 12 years in information and communications technology sector in German	Cross-sectional mail questionnaire survey	Exploratory & exploitative innovation; firm performance	Risk-taking has a positive effect on exploratory innovation whereas non-significant effect on exploitative innovation; exploratory innovation partially mediates the relationship between risk-taking and firm performance where risk-taking still has a negatively direct effect on firm performance.

Table 1 (continued)

Authors	Measure of risk-taking	Research context	Method	Outcome variables	Key findings related to risk-taking
	explore it gradually via timid, incremental behaviour…… bold, wide-ranging acts are necessary to achieve the firm's objectives. • When confronted with decision-making situations involving uncertainty, my firm typically adopts a cautions, "wait-and-see" posture in order to minimize the probability of making costly decisions……a bold, aggressive posture in order to maximize the probability of exploiting potential opportunities.				
Kreiser et al. (2002, 2013)	• There is a strong proclivity to low risk projects (with normal and certain rates of return)……a strong proclivity for high-risk projects (with chances of very high returns) • Owing to the nature of the environment, it is best to explore it gradually via timid, incremental behaviour…… bold, wide-ranging acts are viewed as useful and common practices	1668 SMEs in 9 countries across 13 different industry	Cross-sectional questionnaire survey	SME performance: sales growth	SMEs that are moderate in their risk-taking experience relatively low levels of performance; SMEs exhibiting very low level of risk-taking may be able to enjoy high levels of performance.
Larraza-Kintana et al. (2007)	CEO risk-taking (a composite variable) • R&D • Entry into a new product-market • Manufacturing or process innovation • Product innovating of an existing product	108 CEOs in IPO firms	Questionnaire survey and archival data	Risk-taking	Employment risk and variability in compensation each corresponds to greater risk taking, while downside risk and the intrinsic value of stock options correspond to lower risk taking.

Table 1 (continued)

Authors	Measure of risk-taking	Research context	Method	Outcome variables	Key findings related to risk-taking
	• Capital investment in property, plant, or equipments • Downsizing through lay-offs • Increasing long-term debt • Acquisition of a business in an unrelated industry • Increasing promotion and advertising				
Lechner and Gudmundsson (2014)	• Individual risk takers are often recognized for their willingness to champion new projects, whether eventually successful or not. • People are often encouraged to take calculated risks with new ideas around here. • The term "risk taker" is considered a positive attribute for people in my work area. • This organization supports many small and experimental projects realizing that some will undoubtedly fail.	117 firms in Iceland	Cross-sectional questionnaire survey	Differentiation; Cost leadership	Risk-taking has a negative and significant influence on both competitive strategies of differentiation and cost leadership.
Li and Tang (2010)	Firm risk-taking • Whether your firm had invested in projects involving "high and new" technologies (1 for "have invested" and 0 otherwise) (risk-taking proxy)	2790 Chinese manufacturing firms	Cross-sectional questionnaire survey	Firm risk-taking	The positive relationship between CEO hubris and firm risk taking is found to be stronger when CEO managerial discretion is stronger.
Naldi et al. (2007)	3 items adapted from Covin and Slevin (1989) (same as above items in Kollmann and Stockmann (2014))	265 Swedish family firms and 435 non-family firms (SMEs)	Cross-sectional questionnaire survey	Firm performance (profit, sales growth, cash flow, and growth of net worth)	Risk-taking it is positively associated with proactiveness and innovation. Family firms take risk to a lesser extent than nonfamily firms while engaged in entrepreneurial activities.

Table 1 (continued)

Authors	Measure of risk-taking	Research context	Method	Outcome variables	Key findings related to risk-taking
					Risk-taking in family firms is negatively related to performance.
Palmer and Wiseman (1999)	• R&D expenses/firm sales • Diversification 1: five years average number of industry segments • Diversification 2: entropy measure of industry segments (taking into consideration the relative importance of each segment to the firm's total sale)	235 U.S. manufacturing firms in 5-years time frame	Secondary panel data	Organisational risk: income stream uncertainty.	Authors disaggregated risk into two distinct components, managerial risk taking and income stream uncertainty, or organisational risk. Both organisational (ownership, slack, previous risk taking, attainment discrepancy) and environmental (dynamism) factors promote risk taking, and managerial risk taking positively correlates with organisational risk.
Sanders and Hambrick (2007)	• The sum of R&D investment, capital investment and acquisition investment	950 firms listed on Standard & Poor's 500, Mid-Cap, small-cap indexes in 1998	Panel data over the period 1993–2000	Company risk taking and performance	CEO stock options engender high levels of investment outlays and bring about extreme corporate performance (big gains and big losses), suggesting that stock options prompt CEOs to make high-variance bets, not simply larger bets. Further, option loaded CEOs deliver more big losses than big gains.
Shan et al. (2016)	3 items same as Hughes and Morgan (2007)	153 US new firms started in 2007	Cross-sectional questionnaire survey	Innovation speed; Firm performance	Risk-taking has a negatively effect on innovation speed; innovation speed fully mediates the relationship between risk-taking and firm performance.
Tan and Tan (2005)	Riskiness measure adopted from Venkatraman (1989)	104 Chinese State-owned Enterprises (SOE) in	A longitudinal design including two stages of questionnaire	Firm profitability	The business environment in China had become more conducive to entrepreneurial activities, and

Table 1 (continued)

Authors	Measure of risk-taking	Research context	Method	Outcome variables	Key findings related to risk-taking
		the Chinese electronics industry	survey to compare the changes in the last 12 years		managers of SOE have responded favorably with more willingness to commit to risk-oriented decisions. Such strategic adaptation (i.e. being more risk-taking) is positively related to firm performance.
Venkatraman (1989)	Riskiness strategic orientation • Our operations can be generally characterized as high-risk. • We seem to adopt a rather conservative view when making major decisions. • New projects are approved on a "stage-by-stage" basis rather than with "blanket" approval. • A tendency to support projects where the expected returns are certain. • Operations have generally followed the "tried and true" paths.	202 U.S. strategic business units	Two-stage questionnaire survey	Firm growth Profitability	The operational measures developed largely satisfy the criteria for unidimensionality, convergent, discriminant, and predictive validity. Riskiness has a negative and insignificant effect on growth but a negative and significant effect on profitability
Wang and Juan (2016)	• In this organization uncertainty is treated as a challenge • Employees are encouraged to venture into unexplored territories • Management accept that certain suggestions may fail when implemented • Our organization emphasises opportunity for successes rather than chances for failure • In this organization new venture failure is viewed as a learning experience	401 pairs of dyadic data incorporating both the B&B innkeepers and the corresponding consumers in B&B inn industry in Taiwan	Cross-sectional questionnaire survey	Service innovative performance	Risk-taking has a positive effect on service innovative performance.

Table 1 (continued)

Authors	Measure of risk-taking	Research context	Method	Outcome variables	Key findings related to risk-taking
Zhu and Matsuno (2016)	• We value the orderly and risk-reducing management process much more highly than leadership initiatives for change • Top managers in this business unit like to "play it safe. • Top managers around here like to implement plans only if they are very certain that they will work	207 large strategic business units in manufacturing industry in Japan	Cross-sectional questionnaire survey	Market expansion; Market sustention	Risk-taking does not significantly affect either market expansion or market sustention.

Table 2 Selected definitions of risk-taking

Authors	Definition
Alarape (2013)	Risk-taking reflects the firm's proclivity for risky projects, risk-handling style for example risk-taking is powered by intuition, actions are taken without recourse to forethought and research
Dai et al. (2014)	Risk-taking refers to the willingness to depart from tried-and-true paths and undertake initiatives with uncertain outcomes.
Eshima and Anderson (2017)	Risk-taking element reflects senior managers' willingness to pursue opportunities with uncertain outcomes.
Kollmann and Stockmann (2014)	Risk taking refers to a company's proclivity for high-risk projects with chances of high returns or high losses and implies a willingness to act boldly even without knowing all potential consequences.
Lumpkin and Dess (1996)	In the context of strategy, Baird and Thomas (1985) identified three types of strategic risk: (a) "venturing into the unknown," (b) "committing a relatively large portion of assets," and (c) "borrowing heavily". Typified risk-taking behaviours are incurring heavy debt or making large resource commitments, in the interest of obtaining high returns by seizing opportunities in the marketplace, borrowing heavily, investing in unexplored technologies, or bringing new products into new markets.
Miller and Friesen (1982)	Risk-taking reflects the degree to which managers are willing to make large and risky resource commitments, that is, those which have a reasonable chance of costly failures.
Hughes and Morgan (2007)	Risk-taking reflects an acceptance of uncertainty and risk inherent in original activity and is typically characterized by resource commitment to uncertain outcomes and activities.
Venkatraman (1989)	Riskiness is reflected in criteria for decisions such as resource allocation and the overall pattern of decision-making.
Wiklund and Shepherd (2003)	Risk-taking is associated with a willingness to commit large amounts of resources to projects where the cost of failure may be high. It also implies committing resources to projects where the outcomes are unknown. It largely reflects the organization's willingness to break away from the tried-and-true and venture into the unknown.
Zhu and Matsuno (2016)	Risk-taking refers to a firm's willingness to tolerate or accept the unknowns or the unknowable when it makes strategic or tactic moves.

Sensing risk-taking

Sensing risk-taking refers to the extent of a firm's willingness to take risks when it constantly scans for, searches for, identifies and interprets new opportunities. The literature has shown that opportunities can be detected or sensed through two different paths. First, entrepreneurs have differential access to existing information. Adopting entrepreneurial functions is important in recognising any disequilibrium and in taking advantage of this (Kirzner 1973). In this sense, opportunities are to be identified or recognised. Second, new information and new knowledge (exogenous or endogenous) can create opportunities (Schumpeter 1934). Upsetting the equilibrium is important for new opportunities, which often drive industrial revolutions. In this sense, opportunities are to be created or shaped. These two classes of factors represent the mechanisms underlying continuous industrial evolution and revolution (Teece 2007).

In identifying opportunities, firms must constantly be involved in the act of scanning, searching for, monitoring and detecting to identify latent demand, the structural evolution of industries, and likely marketplace responses. After accumulating and filtering information, firms need to make conjectures or hypotheses based on the information obtained. This requires proactive learning, analysis, interpretation and creativeness to make sense of the large amounts of information collected (Hambrick 1982; Teece 2007). In generating opportunities, firms need to engage in research and development (R&D), to explore activities and to probe and re-probe for customers' needs and technological possibilities. Open innovation integrating customers, suppliers and complementors (i.e., research institutes) serves as a viable way of acquiring new skills (Chesbrough 2003; Chesbrough and Rosenbloom 2002). Searching for external innovations and/or creatively combining internal complementary innovations helps firms create sophisticated and new solutions to customers' problems.

Risk-taking attitudes can manifest in the underlying activities a firm engages in when identifying and creating opportunities. In view of the unique features of risk-taking (positive attitudes towards riskiness, uncertainty, and the unknown), sensing risk-taking reflects a firm's willingness to engage in behaviours such as dedicating considerable resources to internal R&D; to taking bold action and making considerable investments in searching for, scanning and monitoring business environments for distant knowledge; to assessing and interpreting market information in unique ways distinct from those of counterparts to embrace uncertainties; and to tapping into or learning about unexplored markets or technologies. These behaviours have risky outcomes (high returns and a possibility of costly failure), a great degree of uncertainty and a deviation from tried-and-true operations.[2]

Seizing risk-taking

Seizing risk-taking refers to a firm's risk proclivity when making investment decisions on development and commercialisation activities to exploit identified (technological or market) opportunities. Major processes and activities for seizing opportunities include delineating a business model, developing mechanisms and competencies required for a new business model, gathering and investing (reallocating) resources into a new project, designing and selecting complements and platforms for commercialisation strategies, and managing to reduce internal resistance to new projects when necessary (Teece 2007). Specifically, delineating a business model involves articulating the value proposition, selecting appropriate technologies, identifying targeted market segments, defining the structure of the value chain, and estimating cost structures and profit potential (Chesbrough and Rosenbloom 2002). Resources for initiating

[2] Sensing risk-taking relates to but differs from a firm's explorative behaviours, which refer to the acquisition and/or development of new knowledge in the pursuit of new opportunities in both existing and new product/markets (Jansen et al. 2012; March 1991). Sensing risk-taking and exploration relate closely in that sensing risk-taking can be a predictor but not a direct measure of explorative behaviours. Previous research defines EO as a firm's willingness to engage in (rather than its actual involvement in) entrepreneurial behaviour (Kollmann and Stockmann 2014). For example, EO refers to "the policies and practices that provide a basis for entrepreneurial decisions and actions" (Rauch et al. 2009, p. 763) and EO reflects "how a firm is organised in order to discover and exploit opportunities" (Wiklund and Shepherd 2003, p. 1310). Therefore, sensing risk-taking refers to the methods, practices and decision-making styles managers use to act entrepreneurially (e.g., exploration) (Lumpkin and Dess 1996).

new projects may come from slack resources available internally, from shedding established capabilities to free resources for reallocation, through allying and through borrowing from external sources. Designing complements and platforms aims to ensure this initiation is more likely to benefit the firm itself rather than imitators and other competitors. This involves selection of appropriability regime, design and development of complementary assets in value chain, prediction of industry development.

When adopting a risk-taking attitude on seizing opportunities, firms may engage in behaviours such as designing new business models to capitalise opportunities, making large resource investments into new projects; shedding or cannibalising existing capabilities and processes to support new projects; establishing new collaborators and value chain partners; deviating from established operational paths by developing new systems and competences; and making early initiative decisions and resource commitments when uncertainty levels are still high.

The design, adjustment and/or improvement of business models are the main investment decisions of opportunity-seizing. Usually, multiple investment paths can be followed to seize an opportunity. The strategic literature has indicated that to successfully address opportunities, one can maintain and improve fundamental competencies and assets and then, when the opportunity is ripe, invest heavily in the particular technologies and business designs most likely to achieve marketplace success (Teece 2007). However, risk-taking firms are likely to make early entry and resource commitments before the proved-winning design turns up rather than wait and see tried and true paths.[3]

Risk-taking firms are also likely to deviate from established decision rules and resource allocation processes and to invest heavily in new business/projects with uncertain outcomes. Venturing into new projects with considerable resource investment sometimes involves the need to cannibalise current and more comfortable investments for which future cash flows can be confidently projected (Danneels 2008). As such, risk-taking firms may need to shed established capabilities and assets and/or administrative routines to support new initiatives. Usually, the investments are irreversible. When new initiatives involve potential extreme losses, managers of established product lines can be biased and resist supporting new initiatives (Kahneman and Lovallo 1993). Accordingly, firms pursuing seizing risk-taking may need to manage internal resistance to change that inhibits innovation.

Figure 1 depicts the research model used in this study. We examine the independent and interactive effects of sensing and seizing risk-taking on a firm's new product success and the moderating role of market growth in such a relationship.

[3] Seizing risk-taking is essentially different from proactiveness. Early decision-making emphasises bold actions embracing uncertainties and a willingness to take action before securing enough information to limit uncertainties of consequences. Proactiveness involves anticipating and acting on future needs, highlighting a firm's willingness and foresight to shape the business environment (Lumpkin and Dess 2001).

Seizing risk-taking also differs from competitive aggressiveness in its ultimate objectives. Competitive aggressiveness reflects a willingness to be unconventional rather than relying on traditional methods of competition, and aggressive firms often tend to be fast-followers who compete with the breadth and speed of new entry and who engage in other bold actions (Lumpkin and Dess 1996). Seizing risk-taking involves adopting risky, uncertain and unknown investments with the objective of achieving positive firm outcomes whereas competitive aggressiveness reflects how firms respond to trends and demands that already exist in the marketplace to directly and intensely challenge and outperform competitors (Lumpkin and Dess 1996).

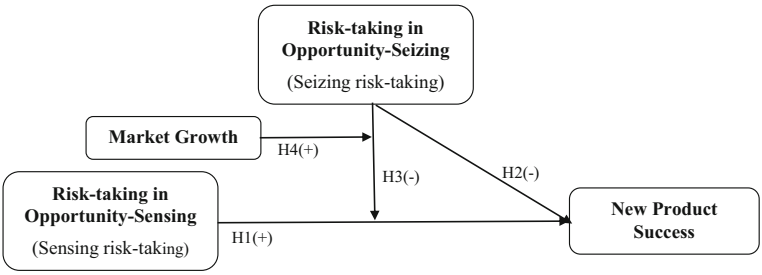

Fig. 1 Two dimensions of risk-taking construct

Distinguishing between these two dimensions at the conceptual level and examining their interrelationship allow us to provide greater clarity on the construct and a basis for understanding why inconsistent findings of risk-taking exist in previous studies. Moreover, the examination of moderators (i.e., market growth) helps evaluate the effect of risk-taking on new product performance in varying environmental contexts.

Hypothesis development

The effect of sensing risk-taking on new product success

In fast-paced and globally competitive environments, firms have been experiencing constant market changes in terms of consumer needs, technological opportunities, and competitor activities. Opportunities open up for both newcomers and incumbents, placing profit streams of incumbents at risk. Clearly, the ability to sense opportunities is not uniformly distributed amongst firms. We posit that a high level of risk-taking in sensing opportunities (sensing risk-taking) contributes to firms' new product success. First, sensing risk-taking helps firms overcome the problem of a narrow search horizon, which enhances their responsiveness to external market changes and their boldness in innovation (Hormiga and Bolívar-Cruz 2014). To the extent that firms create market and technological opportunities, they have a broader means of commercialising new products. However, as firms grow older and larger, they tend to "become prisoners of the deeply ingrained assumptions and problem-solving strategies that made up their world views, turning the solutions that once made them great into strategic straitjackets" (Teece 2007, p. 1322). Risk-aversion intensifies such a competence trap and innovation inertia (Leonard-Barton 1992) and may result in 'missing out' or delaying the identification of valuable emerging market opportunities (Hughes and Morgan 2007). Thus risk-aversion has high opportunity costs and/or reduces the value of sensed opportunities. Heavy R&D investment serves a typical form of risk-taking in technological opportunity-sensing. R&D investments are highly uncertain because their outcomes are distant and frequently do not produce the intended payoffs. The literature has provided solid evidence that R&D investments positively contribute to a firm's innovation performance (Krasnikov and Jayachandran 2008).

Second, sensing risk-taking helps firms generate more creative and unique products that enhance the success of new product development. As sensing risk-taking broadens the search horizon boldly, firms are able to access a large amount of distant knowledge, leading to the generation of new perspectives and ideas in solving customer problems and in exploring new demands (Voss and Voss 2013). Furthermore, the integration of internal and external knowledge can spur the creative recombination of knowledge and new idiosyncratic resources which substantially drive product innovation. Moreover, sensing risk-taking encourages firms to assess and interpret market information with a positive frame and to move away from tried-and-true wisdom. Consequently, firms embrace more unique and creative insights compared to their less risk-taking counterparts, thereby achieving enhanced new product success (Teece 2007).

Third, sensing risk-taking motivates a firm's strategic repositioning into new product/market domains, facilitating product innovation. Under Chinese business contexts, due to fast changing institutional and market environments, competitive advantages in existing product/market domains do not typically last long (Fang 2011). This pushes firms to continuously redirect their strategic direction by looking for new customer solutions for tapping into emerging market opportunities. The market potential of overall the Chinese market has been considered to be enormous and multifarious. Firms adopting a risk-taking posture often reposition their strategies to reactivate or boost their innovation (Li and Tang 2010). In summary, sensing risk-taking enhances a firm's new product success by broadening opportunity search horizons through the increased creativeness and uniqueness of new products and through a willingness to refresh and/or reposition the foundations of competitive advantages. Thus, we hypothesise that:

> ***Hypothesis 1 (H_1):*** *A firm's risk-taking in opportunity-sensing behaviours (sensing risk-taking) is positively associated with its new product success.*

The effect of seizing risk-taking on new product success

We argue that adopting a risk-taking posture in seizing new opportunities (seizing risk-taking) negatively affects a firm's new product success, as such a firm is likely to be subject to high risks of investment design errors, internal operation disruptions, and costs of being a first-mover in the Chinese business context.

First, seizing risk-taking encourages a firm to undertake initiation when uncertainty levels are high and to design and create a new business model to seize opportunities because risk-taking favours breaking away from the tried-and-true and accepting high levels of uncertainty (Wiklund and Shepherd 2003). This tendency may be prejudicial to selecting correct investment designs, subsequently curtailing firms' abilities to capture value from new opportunities. Successfully seizing opportunities requires business models to be cautiously and appropriately crafted to fit with the internal business system and with external market conditions (Chesbrough and Rosenbloom 2002). In designing business models, entrepreneurs are forced to make, implement and validate many revenue-related and behavioural assumptions based on an understanding of multiple choices available and an analysis of alternatives. This is a complex process that usually involves detailed fact-specific research and making cautious judgements on

alternative business models (Mitchell 1991). However, firms that take risks are more decisive and tend to make strategic decisions more quickly (Eisenhardt 1989), which increases the probability of exposing decision errors. Flawed investment designs can largely reduce firms' abilities to appropriately and/or fully exploit value from new opportunities detrimental to new product success.

Second, seizing risk-taking likely results in internal confusion and the disruption of established operations and systems, which can inhibit collaboration across different functions within a firm, thereby negatively affecting new product success. Rather, seizing risk-taking promotes heavy resource commitment to new projects with high returns and potential for costly failure and as this often involves behaviours such as heavy investment and borrowing, cannibalising existing operations, and shedding established capabilities in support of new projects (Rauch et al. 2009; Teece 2007). In the long run, such disruptive construction aids firms' survival in dynamic environments (Danneels 2008). However, in terms of intermediate firm outcomes such as new product success, such disruption leads to operational inefficiency, great internal resistance and confusion among employees and subsequently impairs cross-functional coordination and knowledge sharing, which considerably affects a firm's ability to unify all strengths to successfully commercialise new and sophisticated products (Jansen et al. 2012).

Furthermore, seizing risk-taking involving decisive actions and venturing into the unknown helps firms move fast and to be responsive, through which firms can obtain first-mover advantages. However, getting ahead involves making significant upfront investments, particularly in the Chinese business context, due to dysfunctional competition and widespread imitations derived from weak technological protections and institutional environments (Peng 2003). Ways of obtaining a competitive advantage tend to be very short-lived. Hence, seizing risk-taking in this sense increases the risks (i.e., risks of expropriation) and costs (i.e., formal and informal protection mechanisms) of new product innovation. Gao et al. (2007) find that in a transitional economy such as China, competitor orientation appears to be a wise choice for firms to survive and succeed since with unpredictable customer trends and limited resources, most firms choose to follow the decisions of competitors rather than challenging current "good" methods. In view of the above we thus draw the following hypothesis:

> ***Hypothesis 2 (H_2):*** *A firm's risk-taking in opportunity-seizing behaviours (seizing risk-taking) is negatively associated with its new product success.*

The interactive effect of sensing and seizing risk-taking

Business success depends as much on seizing and implementing opportunities as it does on sensing high-potential opportunities. In reality, activities of sensing and seizing are operated with different functions, but they must be integrated within a single firm. Thus, one could imagine transactions between entities that develop opportunities and those that execute based on them. In other words, new product development often involves several functions (e.g., R&D, financing, and marketing) teaming up to work towards a mutual objective (Troy et al. 2008). In this respect we expect to find an

interrelationship between sensing risk-taking and seizing risk-taking and we argue that a concurrently high level of sensing risk-taking and seizing risk-taking will have a negative effect on new product success.

First, a high level of risk-taking in both sensing and seizing may trigger internal conflicts across different functions, suppressing a firm's new product performance. Functional competition or conflicts come from direct comparisons drawn between functional units to obtain a firm's tangible (e.g., organisational capital and personnel) and intangible resources (e.g., top executive support and time) and the divergent goals and strategic priorities of each function (Houston et al. 2001; Luo et al. 2006). Sensing and seizing risk-taking both require considerable levels of resource commitment and strong backup resources to bear the probability of extreme loss. However, a firm possesses finite resources, which means that in most situations it is difficult to provide all resources needed for risk-taking in identifying and exploiting opportunities simultaneously. As such, adopting a risk-taking posture in both sensing and seizing activities creates internal resource competition, giving rise to conflicts jeopardising coordination and knowledge sharing across functions. Subsequently, new product performance will be compromised if sensing and seizing activities cannot be effectively integrated when working towards mutual goals (Burgers and Covin 2016). Such conflicts and their negative impacts can be intensified when resource allocation strategies involve the cannibalisation and shedding of established operations and capabilities.

Second, simultaneous sensing and seizing risk-taking may result in excessive overall risks that lead to high levels of performance variability harmful to new product success. When firms adopt sensing risk-taking, they need to manage risks and considerable uncertainties resulting from external market environments shaped by fast changing customer needs, the rapid development of new technologies, intense competition with increasing numbers of new entries from other disciplines, etc. (Gao et al. 2007). Furthermore, when firms adopt seizing risk-taking, they must address high levels of risk and uncertainty from internal operations attributable to decision errors, operational disruptions and instability. In facing both internal and external risks, firms are exposed to a high probability of failure in new product development, rendering large resource investments in risk-taking highly vulnerable (Andersen et al. 2007). Especially in fast-changing environments in China such vulnerability to error can be very damaging, as investments are irreversible and there is less opportunity to recover from mistakes.

Third, risk-taking in both sensing and seizing activities simultaneously inhibits a firm's entrepreneurial learning in developing capabilities in managing risks and uncertainties, consequently constraining the potential to capitalise upon new opportunities. The entrepreneurship literature suggests that firms generate experiential knowledge and firm-specific insights by engaging in various entrepreneurial activities (Zahra and George 1999). As knowledge bases and insights expand, firms are better able to effectively read market changes and initiate appropriate actions accordingly. As such, entrepreneurial learning can help firms effectively manage risks and uncertainties, reduce the probability of failure and enhance chances of success in future new initiatives (Shepherd et al. 2009). When investments are small and made frequently, there are many chances to learn from previous actions. However, risk-taking typically involves making large resource investments and/or the adoption of new business

models, and these investments are usually occasional, which means less opportunities for entrepreneurial learning. Accordingly, adopting a risk-taking posture in both sensing and seizing activities constrains a firm's ability to achieve superior product innovation performance due to the lack of an adequate level of risk management developed from entrepreneurial learning. Based on the above arguments, we develop the following hypothesis:

> ***Hypothesis 3 (H_3):*** *The interactive effect of sensing risk-taking and seizing risk-taking is negatively associated with a firm's new product success. Specifically, the positive relation between sensing risk-taking and new product success is weaker with a high level of seizing risk-taking.*

The contingency of the interactive effect of sensing and seizing risk-taking

The contingency perspective of organisational strategy is rooted in the concept of matching organisational strategies with the corresponding environmental context (Ginsberg and Venkatraman 1985). Firms that properly adapt their strategies to their environmental contexts can achieve optimal performance. The entrepreneurship literature indicates that the emergence of new opportunities appears to be driven by periods of flux rather than by stable environments (Eckhardt and Shane 2003; Ireland et al. 2003).

Market growth, as one of the most fundamental environmental forces, indicates the volume of market demand and opportunity, the extent of competition intensity and resource munificence in specific markets (Dess and Beard 1984; Tang et al. 2009). We argue that the negative effect of concurrently high levels of sensing risk-taking and seizing risk-taking will be mitigated (i.e., becoming less negative or positive) in a high-growing market rather than a slow-growing (or declining) market.

First, in growing markets, high levels of resource munificence can alleviate tensions of resource competition and internal conflicts across functions within a firm resulting from risk-taking in sensing and seizing. External resource munificence is enhanced with market growth (Cao et al. 2009). This implies that firms can reach out for resources to support risk-taking activities such as by borrowing and allying, diminishing the need to cannibalise and shed existing operations. Moreover, as the market grows, new intermediate institutions such as venture capital and private investors increasingly emerge (Yang et al. 2018), which further expands external resources that firms can access. More accessible resources also provide a buffer that mitigates the negative effects of risk-taking (i.e., probability of loss). As such, internal competition and conflicts can be largely reduced by impairing cross-function coordination and knowledge sharing across functions when firms adopt risk-taking in sensing and seizing opportunities. Therefore, market growth may suppress the undesirable effect of concurrently high levels of sensing risk-taking and seizing risk-taking and enhance benefits of risk-taking for new product success.

By contrast, in a slow-growing or declining market, there are fewer growth opportunities to pursue and importantly fewer resources with which to pursue them (Dess and Beard 1984). Thus, it is more difficult and costly for firms to obtain needed resources

externally, including financial capital and human resources (Cao et al. 2009; Jiang et al. 2015). Therefore, resource scarcity in a market downturn would increase the functions' dependence on critical resources and resource competition and conflicts across functions, hence intensifying the negative effects of concurrently high sensing risk-taking and seizing risk-taking on new product success.

Second, risk-taking is likely to offer the possibility of higher payoffs and more positive performance implications when market growth is high, thus reducing the negative effects of excessive overall risk on new product success when firms adopt risk-taking in both sensing and seizing activities. Market growth raises market demand and expands opportunities available, which positively rewards both sensing risk-taking and seizing risk-taking (Hughes and Morgan 2007). Growing demands and ample opportunities reduce a firm's risk of failure in predicting market needs and in commercializing new products, enhancing the success rate of new product development. Growing demands and opportunities also create various niche markets that can be filled with new products or technologies, thereby encouraging risk-taking behaviours such as venturing into unexplored market segments (sensing) and adopting differentiation strategies (seizing), subsequently enhancing the positive effect of risk-taking on new product success.

On the opposite end, when market growth is low or even declines, market demands shrink and competition rivalries intensify. Firms are more likely to hedge against rivalries and to defend their competitive positions by maximising the utilisation of their existing resources to enhance their short-term profit viability (Thanos et al. 2016). In other words, firms tend to be conservative and rigid in the midst of competitive threats rather than taking risks to invest heavily in uncertainties and a high probability of costly failure (Staw et al. 1981). Risk-taking is considered to be unnecessary (Zahra and Garvis 2000). Therefore, in such environments, excessive overall risks resulting from concurrently high levels of sensing risk-taking and seizing risk-taking can be more harmful for new product success.

Third, market growth also gives rise to a higher level of market dynamism and uncertainty, which provides firms with more opportunities and with greater motivation to engage in entrepreneurial learning, thereby enhancing the interactive effect of sensing and seizing risk-taking on new product success. Growing markets are characterised by rapidly changing customer needs, technological development and an increasing number of new firms that are likely to bring into disruptive innovation making existing competitive advantages that are short-lived (Gao et al. 2007). All of these factors encourage firms to compete entrepreneurially in every possible area of business operations to survive and prosper (Naldi et al. 2007), through which firms accumulate experiential knowledge and unique insights valuable to new initiatives. Moreover, market dynamism makes entrepreneurial learning more salient for firms' superior outcomes, hence motivating firms to engage in stronger efforts to learn and develop necessary competencies and skills for handling risks and uncertainties (Fang 2011). Accordingly, firms are more able to benefit from risk-taking in sensing and seizing for new product success.

In slow-growing or declining markets, firms have fewer opportunities and motivations to engage in entrepreneurial learning because of the less effective role of

entrepreneurial activities in enhancing firm performance outcomes (Teece 2007; Zahra and Garvis 2000). Therefore, engagement in sensing risk-taking and seizing risk-taking simultaneously is riskier and more difficult to apply for firms to achieve new product success.

In summary, adverse impacts of internal conflicts, excessive overall risk, and inhibited entrepreneurial learning derived from a concurrently high level of sensing and seizing risk-taking may be diminished in a high-growing market. Thus, we make the following hypothesis:

> ***Hypothesis 4 (H_4):*** *There is a three-way interaction among sensing risk-taking, seizing risk-taking and market growth. Specifically, the negative interaction between concurrently high levels of sensing risk-taking and seizing risk-taking is mitigated when market growth is high rather than low.*

Methods

Research design and data collection

We chose manufacturing industries in China as our study context for several reasons. First, product innovation is becoming an increasingly important strategy used by firms of Chinese manufacturing industries because manufacturing firms in China are currently in the process of manufacturing upgrades in the global value chain through own equipment manufacturing (OEM), original design manufacturing (ODM) and own brand manufacturing (OBM), for instance. Second, an entrepreneurial posture is widely recognised by manufacturing firms as necessary for facilitating innovation in a transitional economy with rapid economic growth (Li and Tang 2010). Third, China has served as a popular context for examining entrepreneurship and innovation due to its dynamic market environment and growing innovation activities (Zhou and Li 2012).

For our sampling procedure, we used the Directory of Enterprise Associations[4] in the Fujian Province of China. The initial sample consisted of 600 manufacturing firms randomly selected from the directory (e.g., electronics, chemicals, and communication equipment). Although gathering firms from a single province presents limitations, manufacturing firms in Fujian province are representative those in China overall in terms of industry varieties, economic growth and scales (Xia and Walker 2015).

We adopted a multiple-sourced key informant approach for data collection. We first made telephone calls to the general managers or chief executive officers (hereafter first respondents) of the 600 firms included in our initial sample to explain the purpose of the study and to invite them to participate. When respondents agreed to participate, we asked whether they had led product innovation projects with at least one new product on the market over at least six months. In addition, we asked our first respondents to provide the contact information of another senior executive (hereafter second respondents) knowledgeable of the corresponding firm's strategic decision processes and

[4] This directory is an internally circulated document of the Fujian Enterprise Association that includes the names and addresses of registered enterprises as well as contact information for the president(s) of each enterprise. The website of the Fujian Enterprise Association can be found at www.fjec.org.cn.

product innovation activities. Second respondents included vice general managers, CEOs, and branch managers of sales and marketing among others. We also ensured the confidentiality of responses and agreed to offer a summary of the aggregate results and customised analyses of each firm in return for participation. We then personally distributed questionnaire surveys, after two weeks made a follow-up phone call, and after another two weeks collected the completed questionnaires. After excluding questionnaires with invalid or illegible data, we finally carried 186 paired responses forward for data analysis. Descriptive statistics for the respondents and their organisations are shown in Appendix 1.

Measures

We developed the questionnaire in English, translated it into Chinese and finally back-translated it into English. This procedure ensured that the English and Chinese versions contained identical measures (Douglas and Craig 1983). We pre-tested the questionnaire for instrument validity with 11 manufacturing managers. In our interviews, we asked managers to respond to items measuring the theoretical constructs and describing the nature of risk-taking in opportunity sensing and seizing. We also asked them to identify any ambiguous terms, concepts or issues with the draft questionnaire, and we then made minor wording changes based on their feedback. Please see Appendix 2 for all measurement items used to assess each key variable.

New product success Consistent with previous innovation research (Im and Workman 2004; Song and Parry 1997), we used a 7-item measure to assess different perspectives on new product success covering market measures (e.g., sales and the ratio of sales to all products), financial measures (e.g., profitability), and innovation measures (e.g., lead time, success rates, and frequency). We used a subjective measure because objective measures of new product success are often unavailable for SMEs in China.

Risk-taking Based on pioneer EO works (Covin and Slevin 1989; Matsuno et al. 2002; Miller and Friesen 1982; Venkatraman 1989), we developed eleven candidate items for risk-taking in both opportunity sensing and seizing behaviours, including five items related to sensing risk-taking and six items on seizing risk-taking. To collect data for these measures, we asked the respondents to indicate, on a one-seven Likert scale, the extent to which eleven different statements were true regarding their firms' risk-taking posture when sensing or seizing new technological and market opportunities.

Market growth We measure market growth as the average overall sales growth in the main operating industry of the responding firms for the past three years. In this respect, industry sales growth reflects the volume of growth opportunities and the availability of resources with which to pursue new opportunities in the environment (Cao et al. 2009).

Control variables In addition to the independent variables and moderators, we control for a variety of organisational and environmental factors. For organisational factors, we controlled for potential independent effects of firm type, firm size, firm assets, firm age, firm growth stages, and functional coordination. Firm type may influence the availability of external resource supports in the Chinese business market (Li and Tang 2010; Tan and

Tan 2005). Firm type is measured with a dummy variable (1 = state-owned firms; 0 = others) to simplify the analysis. Firm size and age reflect resource endowments accumulated from previous paths (Voss and Voss 2013). Firm size was measured with 6 categories based on the number of full-time employees. Firm growth stage was scaled from start-ups characterised by high levels of growth, maturity, stabilisation, decline, and a tendency to exist. Firms at different lifecycle stages may harbour different perceptions of risk-taking; for example, younger firms (i.e., technology start-ups) are more likely to be risk-taking than older, mature firms (Teece 1986). Furthermore, we control functional coordination because this may influence the interactive effectiveness of opportunity-sensing and seizing activities on new product success. Functional coordination was measured using four items adopted from Narver and Slater (1990). For environmental factors, we controlled for industry type and market competition. Market competition reflects the intensity, volatility or unpredictability of competition and was measured from respondents' assessments of competition intensity in the main industry.

Assessment of reliability and validity

For the two risk-taking constructs, from the item purification process involving exploratory factor analysis (EFA), we found that item-1 of sensing risk-taking was cross-loaded across sensing risk-taking and seizing risk-taking. We subsequently removed this item and employed a confirmatory factor analysis (CFA) to examine measurement validity. Items-5 and -6 for seizing risk-taking present factor loadings of less than .40; thus, we removed these two items. Hence, eight items were included for our CFA and the fit indices show that the measurement model fits the data reasonably well (χ^2 = 26.881, $P < .050$; Goodness of fit index = .967, Comparative fit index = .935, Tucker-Lewis coefficient = .879; Root mean square error of approximation = .064). Based on these loadings, we found a composite reliability for sensing risk-taking of .624 and a value of .708 for seizing risk-taking. Thus, measures of risk-taking demonstrate an acceptable level convergent validity and reliability (Fornell and Larcker 1981).

We further assess the discriminant validity of two dimensional constructs of risk raking via a CFA to test whether the two-factor model fits the data better than a one-factor model (Bagozzi et al. 1991). Chi-square difference tests for the two constructs show that the Chi-square of the constrained model (correlation fixed at 1) is significantly greater than that of the unconstrained model (correlation estimated freely), suggesting good discriminant validity between sensing risk-taking and seizing risk-taking (Anderson and Gerbing 1988). Moreover, as is shown in Table 3, the square root of average variance extracted by each construct is greater than the latent correlation between the two constructs, further denoting the discriminant validity of the two risk-taking dimensions (Fornell and Larcker 1981).

Data on new product success were collected from both first and second respondents. The intraclass correlation coefficient (ICC) (0.87) denotes a high level of interrater reliability between two sources of responses, providing sufficient similarities for aggregating the responses. The aggregation multiple informants' responses offers significant advantages in measuring perceptual constructs because it can largely reduce common method biases by preventing a reliance on the attributions of a single individual (Fang et al. 2008; Lindell and Whitney 2001). More importantly, the examination of multiple aggregated informants can yield far more accurate data by

averaging out random errors and by reducing the influence of systematic errors associated with individual response data (Van Bruggen et al. 2002). Therefore, consistent with previous organisational innovation research (e.g., Ayers et al. 1997; Fang et al. 2008; Fürst et al. 2017), we used an averaged aggregation of both responses to analyse new product success.

The reliability of all unidimensional constructs was assessed using Cronbach α and is above .71 (see Table 3). We estimated a full measurement model CFA incorporating sensing risk-taking, seizing risk-taking, new product success and functional coordination. The standard factor loadings (SFL) of each item and model fit index statistics are presented in Appendix 2. The fit indices for each model are above acceptable levels ($\chi^2 = 268.378$, $P < .001$; CFI = .928, TLI = .915; RMSEA = .066). All SFLs exceed the threshold of .50, providing evidence of convergent validity (Bagozzi et al. 1991). Composite reliability for new product success is .918 and that for functional coordination is .896, providing good measure reliability. The square root of average variance extracted by each construct is greater than the latent correlation between this construct and all other constructs of that measurement model, indicating discriminant validity (Fornell and Larcker 1981).

Common method Bias

Common method bias (CMB) is a concern in cross-sectional studies (Podsakoff et al. 2003). To minimise CMB, the following steps were undertaken *ex ante*. First, we adopted a research design that involves data collection from two respondents from each studied firm. Specifically, we used data collected from the first respondents to measure risk-taking behaviours, market growth and control variables; and we measured our dependent variable—new product success–using averaged data taken from both the first and second respondents. Second, the anonymity and confidentiality of responses was ensured to the participants to limit response bias and social desirability. Third, psychological separation in the survey was designed to reduce the participants' perceptions of any direct connection between these constructs and was applied by using different sets of instructions, by placing a number of filler items between constructs and by presenting them in different sections of the survey. Fourth, the questionnaire was kept relatively short to prevent respondent fatigue.

Finally, we statistically tested the potential influence of CMB post hoc. We conducted Harman's single-factor test (Podsakoff and Organ 1986) to evaluate CMB. A factor analysis of all measurement items of the key constructs (sensing risk-taking, seizing risk-taking, and new product success) indicates that the first factor accounted for only 28.6% of the variance, which is less than the 0.4 cut-off. We also tested the CMB using common latent factor CFA, and the common variance among all observed items of key constructs is 6.30%. By adding a seemingly unrelated construct (the purchasing sources of a focal firm) to the CFA model, the common variance is reduced to 3.6%. These results suggest that CMB is unlikely to be a serious concern in this study.

Results

Table 3 reports the descriptive statistics and correlations for the hypothesised and control variables. No interfactor correlations exceed the .65 threshold, suggesting that

Table 3 Descriptive statistics and correlations of major variables

	$N = 186$	Mean	SD	1	2	3	4	5	6	7	8	9	10	11
1	Sensing Risk-taking	5.104	.723											
2	Seizing Risk-taking	4.541	.873	.069										
3	New Product Success	4.768	.714	.231**	−.200**									
4	Market Growth	2.327	.832	−.123	.179*	−.100								
5	Firm Type	2.708	.967	−.046	.105	.133	.066							
6	Firm Size	3.827	1.734	.151*	−.099	.199**	−.071	.258**						
7	Firm Assets	2.760	1.562	.121	−.177*	.194**	−.109	.176*	.588**					
8	Firm Growth Stage	3.668	1.046	−.115	−.082	−.064	.207**	.211**	.211**	.139				
9	Firm Age	3.714	1.215	−.013	−.046	.092	−.034	.243**	.556**	.577**	.449**			
10	Functional Coordination	4.992	.883	−.043	−.016	.304**	.041	−.004	.044	.082	−.035	−.006		
11	Industry Type	4.424	2.645	−.023	.022	−.021	−.029	−.103	−.216**	−.198**	.053	.001	.079	
12	Market Competition	1.725	.604	−.114	−.034	−.118	.078	−.121	−.085	−.081	.049	−.017	−.035	.233**

*$p < .05$; **$p < .01$ (two-tailed)

Table 4 Results of hierarchical regression analysis

	DV:New Product Success							
	Model 1		Model 2		Model 3		Model 4	
	B	Std.Error	B	Std.Error	B	Std.Error	B	Std.Error
Constant	3.618***	.393	3.083***	.574	2.959***	.572	3.208***	.588
Control variables								
Firm Type	.080	(.053)	.114*	(.051)	.125**	(.051)	.099*	(.051)
Firm Size	.053	(.047)	.039	(.045)	.029	(.045)	.051	(.046)
Firm Assets	.022	(.053)	−.011	(.052)	−.003	(.051)	−.019	(.052)
Firm Growth Stage	−.064	(.054)	−.079	(.052)	−.067	(.052)	−.072	(.052)
Firm Age	.003	(.056)	.036	(.054)	.032	(.053)	.027	(.053)
Functional Coordination	.235***	(.055)	.245***	(.053)	.245***	(.052)	.255***	(.052)
Industry Type	.007	(.020)	.004	(.019)	.003	(.018)	.001	(.018)
Market Competition	−.089	(.083)	−.071	(.079)	−.065	(.078)	−.103	(.080)
Market Growth	−.068	(.060)	−.016	(.059)	−.040	(.059)	−.036	(.060)
Main Effects								
Sensing-Risk taking			.232***	(.066)	.241***	(.066)	.192**	(.072)
Seizing-Risk taking			−.187***	(.056)	−.166**	(.056)	−.144**	(.056)
Interactive Effects								
Sensing-Risk taking ×Seizing-Risk taking					−.103*	(.048)	−.086†	(.052)
Sensing-Risk taking ×Market Growth							.010	(.052)
Seizing-Risk taking × Market Growth							−.016	(.052)
Sensing-Risk taking ×Seizing-Risk taking × Market Growth							.112*	(.048)
R^2	.160		.248		.266		.292	
Adjusted R^2	.120		.203		.218		.234	
ΔR^2	.160		.087		.019		.026	
F	3.951		5.510		5.537		4.960	
ΔF	3.951***		10.674***		4.643*		2.212*	

† $p < .10$; *$p < .05$; **$p < .01$; *** $p < .001$ (two-tailed); Unstandardized coefficients are reported

our estimations are unlikely to be biased by multicollinearity problems (Tabachnick and Fidell 2007). Of particular note, the correlation between sensing risk-taking and seizing risk-taking is found to be non-significant ($r = .069$), serving as a strong preliminary indication that sensing risk-taking and seizing risk-taking represent two distinct dimensions of risk-taking.

We employ the hierarchical moderated regression method to test our hypotheses. All variance inflation factor values fall well below the recommended ceiling of 10, further

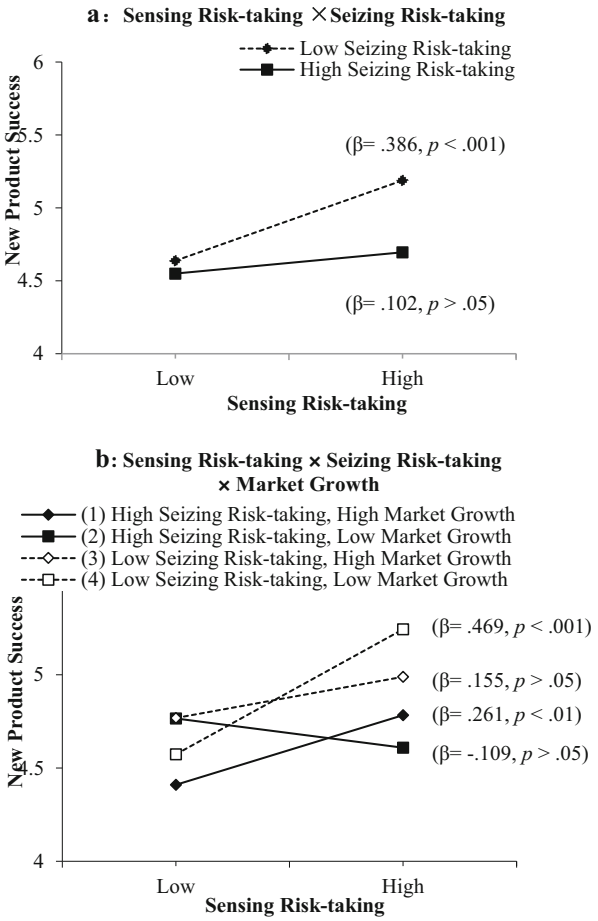

Fig. 2 The interactive effects on new product success

suggesting that the likelihood of multicollinearity problems is minimal. Table 4 reports these regression results. To further control for potential multicollinearity, we mean-centred all variables in the interaction terms (Aiken and West 1991).

Table 5 Results of slope difference tests

Pair of slopes	t-value for slope difference	*p* value for slope difference
(1) and (2)	2.616	0.009
(1) and (3)	0.684	0.494
(1) and (4)	−1.471	0.142
(2) and (3)	−1.867	0.063
(2) and (4)	−3.731	0.001
(3) and (4)	−2.220	0.027

Model 1 is the base model, with control and moderating variables (market growth) included in the equation. The results from Model 1 indicate that functional coordination is positively related to new product success (b = .235, $p < .001$). Model 2 includes the main effects of sensing risk-taking and seizing risk-taking. From Model 2, we find that sensing risk-taking is positively related to new product success (b = .232, $p < .001$) but that the effect of seizing risk-taking on new product success is negatively significant (b = −.187, $p < .001$). Thus, H_1 and H_2 are supported.

Model 3 adds the interaction term of sensing risk-taking * seizing risk-taking to the regression, and the interaction term is, as predicted, negative and significant (b = −.103, $p < .05$). An *R*-square analysis suggests that over and above the main effects of sensing risk-taking and seizing risk-taking (Model 2), the interactive effect of sensing risk-taking and seizing risk-taking explains an additional 1.9% of variance in new product success, significantly improving the predictive power of the model (Model 3). To gain further insight into this interactive effect, we conducted a simple slope analysis by re-estimating the relationship between sensing risk-taking and new product success when seizing risk-taking is high (one standard deviation above the mean) or low (one standard deviation below the mean) (Aiken and West 1991). Figure 2a shows a plot of the interactive effect. Consistent with the reasoning of H_3, which suggests a negative interaction between sensing risk-taking and seizing risk-taking, the plot indicates that the positive performance effect of high level of sensing risk-taking ($\beta = .386$, $p < .001$) becomes non-significant when there is a high degree of seizing risk-taking ($\beta = .102$, $p > .05$). H_3 is thus supported.

Model 4, in turn, includes all other interaction terms and the hypothesised three-way interaction terms with market growth. The interaction term of sensing risk-taking and seizing risk-taking remains negative and significant (b = −.086, $p < .1$), suggesting that the interactive relationships reported are robust across alternative model specifications. The interaction terms of sensing risk-taking and market growth, seizing risk-taking and market growth are not found to be significant for new product success. The three-way interaction term of sensing risk-taking, seizing risk-taking and market growth is found to be positive and significant for new product success (b = .112, $p < .05$). Figure 2b plots the three-way interactive effect and indicates that sensing risk-taking is significantly associated with new product success when seizing risk-taking and market growth are both high (Line 1: $\beta = .261$, $p < .01$) and both low (Line 4: $\beta = .469$, $p < .001$). The slope for which sensing risk-taking and seizing risk-taking are both high and market growth is low presents the lowest and most negative coefficient though it is not significant (Line 2: $\beta = -.109$, $p > .05$). Consequently, we conducted slop difference tests to determine whether individual slopes were significantly different from each other (Dawson and Richter 2006). As shown in Table 5, we find that line 1 and line 2 are significantly different ($p < .01$), indicating that the interactive effect of sensing risk-taking and seizing risk-taking is significantly different when market growth is high or low. H_4 is thus supported. We also find that lines 1 and 4 are not significantly different ($p > .05$), which suggests that there is a configurational relationship between sensing risk-taking, seizing risk-taking and market growth. Firms adopting a risk-taking posture in both sensing and seizing opportunities in a high-growing market and adopting risk-taking only when sensing opportunities while being conservative with seizing opportunities in a slow-growing or declining market can positively enhance their new product success.

Regarding the control variables, in the baseline model (Model 1), firm type is not significantly related to new product success; however, after adding the risk-taking constructs, firm type becomes positively related to new product success (b = .099, $p < .05$). This indicates that state-owned firms have better product performance than other types of firms. Functional coordination is found to be positively related to new product success (b = .255, $p < .001$).[5] This is consistent with previous studies (Troy et al. 2008) showing that cross-functional coordination contributes significantly to a firm's innovation success. Importantly, since sensing and seizing activities for new product development involve considerable cross-functional interactions, controlling for cross-functional coordination allows us to discover the truly interactive effect of sensing risk-taking and seizing risk-taking.

Discussion

The primary objective of this study is to conceptualise the risk-taking construct, to disaggregate it into two dimensions (sensing risk-taking and seizing risk-taking), and to empirically test the independent and interactive effects of the two dimensions on new product success. Our findings indicate that sensing risk-taking is positively related to new product success whereas seizing-risk-taking is negatively associated with new product success. The interactive effect of sensing risk-taking and seizing risk-taking negatively affects new product success; however, when the market grows quickly, such a negative impact can be diminished and become positive for new product success. Our findings make three contributions to the literature.

First, this study significantly enhances the EO literature by unpacking the risk-taking construct into two related but distinct dimensions and by empirically examining the appropriateness of such unpacking by testing the independent and interactive effects of risk-taking dimensions on new product performance. Extant EO literature indicates a lack of clarity on risk-taking conceptualisations (George and Marino 2011) and mixed results on the effects of risk-taking on various firm performance (e.g., Hughes and Morgan 2007; Kollmann and Stockmann 2014; Wang and Juan 2016). Wales (2016) posits that EO distributes heterogeneously within organisations because different organisational functions and areas may benefit from different levels of EO. However, very few EO studies have theorised how risk-taking manifests in different organisational processes such as opportunity sensing and seizing activities or how they may interactively impact entrepreneurial performance.

Building on prior research, we explicitly conceptualised that risk-taking as a construct consists of two dimensions—sensing risk-taking and seizing risk-taking. Unpacking risk-taking in this manner can shed new light on this important construct

[5] Due to its significant coefficient as a control variable, we re-run the regression model by removing function coordination, and the significant pattern of results on main and interaction effects remains unchanged. Specifically, in the full model, both sensing risk-taking (b = .185, $p < .05$) and seizing risk-taking (b = −.164, $p < .05$) are significantly related to new product success; the interactive effect of sensing and seizing risk-taking is negatively associated with new product success (b = −.146, $p < .05$), and the three-way interaction with market growth is positively related to new product success (b = .156, $p < .05$). Therefore, incorporating functional coordination does not affect the main results and reinforces the importance of coordination for new product success.

by providing a basis for teasing apart the various organisational processes through which risk-taking influences organisational performance. Our findings indicate that sensing risk-taking enhances whereas seizing risk-taking hurts a focal firm's new product success. This suggests that the two behavioural dimensions of risk-taking influences new product success through different causal mechanisms, and caution should be exercised when comparing results of studies that utilise means of tapping different risk-taking dimensions. The findings also indicate that the interaction effect of two risk-taking dimensions negatively affects new product success. This supports the statement that greater EO is not universally more beneficial than a more conservative orientation and that the downsides of EO are worth investigating (Wales 2016; Wiklund and Shepherd 2011). As such, this study helps reconcile the inconsistent conclusions of previous studies regarding the effect of risk-taking on new product performance.

In doing so, this study also responds to a call for more investigations of the unique role of each EO component in influencing organisational performance and offers new understanding of how firms can more effectively take risks with opportunities for firm growth (Anderson et al. 2015; Lumpkin and Dess 1996; Miller 2011; Wales 2016). Furthermore, the recent literature emphasises that scant attention so far has been paid to the relationship between EO and its more immediate outcomes, that is, more investigation is needed to demonstrate close causal adjacency between EO and its consequences such as firms' new entry (Covin and Wales 2019; Wales et al. 2015). As such, this study addresses this research gap by revealing the complex relationships between risk-taking and firm performance in relation to new product entry.

Second, this study contributes extensively to the entrepreneurial opportunity literature by exploring the influences of internal entrepreneurial strategies and external environmental contingency on sensing and seizing opportunities for new product success. The recent literature has called for more opportunity studies as a critical means to extend EO and entrepreneurship research (Busenitz et al. 2014; Martens et al. 2016; Stokvik et al. 2016). Adding to this line of inquiry, our findings indicate that, in a fast-growing market, firms benefit from adopting concurrently high levels of risk-taking when engaging in sensing and seizing opportunities (i.e., high sensing risk-taking and high seizing risk-taking) for new product success; in contrast, in a slow-growing or declining market, new product success is mostly enhanced by adopting a high level of risk-taking in the midst of sensing opportunities accompanied with a conservative posture in seizing opportunities (i.e., high sensing risk-taking and low seizing risk-taking). This implies that an aggressive posture of risk-taking should be adopted when market growth is high, whereas an appropriate balance of risk-taking in opportunities sensing and seizing activities appears more critical when market growth is low. Hence, consistent with prior research (Burgers and Covin 2016; Shepherd et al. 2009; Thanos et al. 2016), our study highlights the importance of scrutinising internal strategic and external environmental factors when promoting corporate entrepreneurship.

Third, this study enriches our understanding of the recently popular entrepreneurial ecosystem approach by delineating the interdependency between entrepreneurial activities and market conditions for value creation. In offering a systemic view of entrepreneurship, the entrepreneurial ecosystem approach highlights a set of interdependent actors and factors coordinated in such a way that they enable productive entrepreneurship (Acs et al. 2017; Stam 2015). Extant research has devoted much effort to exploring several social, political, economic and cultural

attributes and their interactions, which are necessary for supporting the development and growth of innovative, high-risk ventures and nascent entrepreneurs (Cavallo et al. 2018; Malecki 2018; Spigel 2017). However, this stream of literature remains a practitioner-centred field with a limited conceptual and empirical base of inquiry underpinning the main phenomena involved (Colombo et al. 2017; Stam 2015). Our study tackles an important entrepreneurial ecosystem pillar (i.e., the market) (Spigel 2017; Stam 2015; World Economic Forum 2013) and empirically demonstrates how the value creation outcomes of entrepreneurial activities (i.e., risk-taking) are contingent on the level of market growth or demand. Therefore, our findings support the conclusion that strong markets provide entrepreneurial opportunities, which are fundamental sources of value creation and which thus serve as a catalyst for the development of new ventures in an entrepreneurial ecosystem.

Practical implications

The findings of this study have practical implications for entrepreneurs in terms of whether and how to adopt risk-taking behaviours in their pursuit of entrepreneurial opportunities for new product entry. Entrepreneurs should understand that risk-taking can be adopted with several facets of organisational processes and behaviours and thus may lead to different performance outcomes. For example, risk-taking can be employed through activities when entrepreneurs sense new opportunities, such as taking wide-ranging action to search the external environment for new technological and market opportunities, exhibiting a positive attitude towards market changes, and being willing to engage in projects with a chance of high yields and losses. Risk-taking can also be embraced when entrepreneurs look for ways to capture new opportunities, such as by taking aggressive action and making early entry decisions rather than a wait-and-see approach, investing heavily in new initiatives rather than in established processes with certain payoffs, and being willing to deviate or cannibalise established processes and routines for supporting new initiatives.

In general, entrepreneurs should be risk-taking when identifying and/or creating new opportunities but should follow familiar and specialised processes and tried-and-true paths to exploit opportunities. However, when engaging with high-growth markets, entrepreneurs that are more ambiguous and risk-taking across activities in both identifying and exploiting opportunities are more likely to succeed in launching new products.

Our findings also have implications for policymakers regarding the development of entrepreneurial ecosystems in regions. The presence of fundamental market conditions and entrepreneurial cultures and activities mutually determine value creation, enhancing regional entrepreneurial economies. Policymakers should focus on activating local markets and on stimulating domestic demand to create sufficient entrepreneurial opportunities for innovative and high-risk ventures. Policymakers should also devote efforts to develop supportive services and programmes that facilitate the flow of business experience and knowledge among entrepreneurs and other related stakeholders. This helps new ventures learn from successful experience and to rapidly adopt best practices. Overall, policymakers should bear in mind that entrepreneurs are the central players and leaders, while the government acts as a "feeder" of entrepreneurial ecosystems.

Limitations and future research

The present study is not without limitations, some of which suggest avenues for future research. One boundary condition for our study pertains to the generalisability of our findings, as our sample focuses on Chinese manufacturing firms. Although our sample provides an excellent basis for the study of effects of risk-taking and opportunities of firm performance, future research examining the effects of risk-taking on other industries and economies would be useful. Second, we note that our operationalisation of the risk-taking construct presents psychotic properties of an acceptable level. Future research should extend such operationalisation and improve the applicability of the two-dimensional risk-taking construct to other important dependent variables. For example, sensing and seizing risk-taking may have differential effects on incremental and radical product performance, as these two types of new products require access to different resources and capabilities to develop (Kollmann and Stockmann 2014; Voss and Voss 2013).

Third, in this study, we theorised that the joint effect of sensing risk-taking and seizing risk-taking negatively affects new product success, as a concurrently high level of both forms of risk-taking may trigger resource competition and internal conflicts across functions and excessive overall risks and by inhibit entrepreneurial learning for new initiatives. These arguments are based in solid theoretical foundations; however, we are not able to empirically test these causal mechanisms (i.e., mediators).[6] Further research should empirically validate the existence and effects of these causal mechanisms, through which the interaction of risk-taking dimensions affects new product success.

Fourth, we must also bear in mind that, given the cross-sectional nature of this study, we were able to explore how a firm's risk-taking develops over time. Similar to previous research studying orientation constructs using cross-sectional methods, we assumed that a firm's orientation or behavioural attitude is rather stable over time (at least of a three year period). However, risk-taking behaviours may have a lagged effect on performance and vice versa. In this regard, a longitudinal study would help investigate how risk-taking behaviours evolve over time and their impacts on long-term performance, thus presenting stronger conclusions on the causality of the relationship between risk-taking and firm performance.

Finally, future research should explore the interplay between entrepreneurial activities and other important pillars or elements in entrepreneurial ecosystems to provide more theoretical and empirical support for this fast-growing research field. For instance, regulatory, normative and cultural-cognitive institutional environments

[6] In this study we provide indirect evidence partly implying the existence of causal mechanisms by comparing our results derived with controlling and not controlling cross-functional coordination. The results show that the regression effect of the interaction term of sensing risk-taking and seizing risk-taking on new produce success decreases from −.146 ($p < .05$) to −.103 ($p < .05$) after adding cross-functional coordination to the group of control variables. According to Baron and Kenny (1986), when the interaction term and cross-functional coordination are significantly related to new produce success, the significant effect of the interaction term is reduced after adding cross-functional coordination, and we can in turn conclude that cross-functional coordination (partially) mediates the relationship between the interaction term and new produce success. This implies that a concurrently high level of sensing and seizing risk-taking negatively affects cross-functional coordination, which in turn reduces new product success. As such, this finding indirectly reveals that concurrently high levels of risk-taking trigger internal competition and conflicts, thus negatively affecting coordination across functional units.

greatly affect strategic business decisions and entrepreneurial activities (Peng 2003; Yang et al. 2012, 2018).

Acknowledgements This study is financially supported by the Fundamental Research Funds for the Central Universities (Grant No. 20720171014), the National Natural Science Foundation of China (No. 71402154). The authors thank Editor Professor Salvador Roig and three anonymous reviewers for their insightful comments and guidance.

Compliance with ethical standards

Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Informed consent Informed consent was obtained from all individual participants included in the study.

Appendix 1 Characteristics of respondents and their organisations

Characteristics	Categories	Percentage (%)
Firm type	• State-Owned	9.2
	• Privately-owned or partnership	37.8
	• Co. Ltd	26.0
	• Foreign-invested	27.0
Main operating industry	• Communication equipment & apparatus	18.4
	• Office and computing machinery	8.2
	• Textiles & wearing apparel, luggage & handbags	23.0
	• Transport equipment	8.7
	• Machinery & equipment	4.1
	• Chemicals products, Rubber & plastics products	2.6
	• Electrical machinery & apparatus	11.7
	• Rubber & petroleum products and Others	23.5
Number of fulltime employees	• Less than 100	13.8
	• 101–300	14.8
	• 301–500	11.2
	• 501–1000	16.8
	• 1001–5000	21.9
	More than 5000	21.4
Firm assets (RMB ¥)	• Less than 100 millions	30.1
	• 100–500 millions	22.4
	• 501million - 1 billion	12.2
	• 1–5 billions	11.7
	• More than 5 billions	23.5
Firm growth stage	• Start-ups	9.2
	• High growing	38.3
	• Maturity,	27.6

Appendix 1 (continued)

Characteristics	Categories	Percentage (%)
	• Stabilising,	23.5
	Declining and prepared to exist	1.5
Firm age	• 1–5 years	15.3
	• 6–10 years	30.6
	• 11–20 years	30.6
	• 21–30 years	12.8
	• 30 years over	10.7
Respondent position (first/s respondents)	• President	5.1/3.1
	• CEO	7.7/6.1
	• General manager or deputy general manager	28.6/31.6
	Branch manager	58.7/59.2
Respondent education (first/s respondents)	• Diploma	12.2/15.3
	• Bachelor degree	59.2/53.6
	• Master degree	24.5/29.5
	• PhD degree	4.1/1.5

Appendix 2 Measurement Items and Validity Assessment

Overall model fit: $\chi^2(145) = 268.378$, $P < .001$; $CFI = .928$, $TLI = .915$; $RMSEA = .066$

Sensing Risk-taking (1:strongly disagree; 7:strongly agree): CR = .624; AVE = .541

1. Operations have generally followed the "tried and true" paths. R. a
2. We firmly believe that a change in market creates a positive opportunity for us.
3. We tend to talk more about opportunities rather than problems.
4. Generally we a strong tendency toward getting involved in high risk projects (with a chance for high yield).
5. Generally we believe that the business environment of the company is such that it is better to explore it carefully and gradually in order to achieve the company's objectives. R.

Seizing Risk-taking (1:strongly disagree; 7:strongly agree): CR = .708; AVE = .511

1. When we are facing insecure decision-making situations, we normally take up a cautious "wait-and-see" position in order to minimize the hazard of making costly erroneous decisions. R.
2. We value the orderly and risk-reducing management process much more highly than leadership initiatives for change. R.
3. Top managers in this business unit like to "play it safe". R.
4. Top managers around here like to execute plans only if they are very certain that they will work. R.
5. When it comes to capture a new opportunity, we value creative new solutions more than the solutions of conventional wisdom. a
6. Top managers here encourage the development of innovative marketing strategies, knowing well that some will fail. a

Appendix 2 (continued)

Overall model fit: $\chi^2(145) = 268.378$, $P < .001$; $CFI = .928$, $TLI = .915$; $RMSEA = .066$

Market Growth (1:very slow; 5:very fast)

1. The average sale growth in our main industry in the past three years. –

New Product Success (1:strongly disagree; 7:strongly agree): CR = .918; AVE = .782

Indicate the extent of your agreement on the following statements regarding to new product success in the past three years:

1. We more frequently introducing new products.
2. New products are more successful in terms of long-term profits.
3. New products are more successful in terms of sales.
4. New products have helped improve our overall competitive advantages.
5. The ratio of new products' sales to overall sales has increased.
6. The lead time for new product development has reduced.
7. The success rate of new product innovation has increased.

Functional Coordination (1:strongly disagree; 7:strongly agree): CR = .896; AVE = .825

1. We share a great deal of information across all business functions.
2. Tightly coordinating the activities of all functions adds customer value.
3. Resources are frequently shared across all business functions.
4. All of our business functions are integrated in responding to changing market conditions.

[R] Item is reverse coded; [a] Item deleted from further analysis due to low factor loading; CR = composite reliability; AVE = average variance extracted

References

Aaker, D. A., & Jacobson, R. (1987). The role of risk in explaining differences in profitability. *Academy of Management Journal, 30*(2), 277–296.

Acs, Z. J., Stam, E., Audretsch, D. B., & O'Connor, A. (2017). The lineages of the entrepreneurial ecosystem approach. *Small Business Economics, 49*(1), 1–10.

Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*: Sage.

Alarape, A. A. (2013). Entrepreneurial orientation and the growth performance of small andmedium enterprises in Southwestern Nigeria. *Journal of Small Business & Entrepreneurship, 26*(6), 553-577.

Alvarez, S. A. (2007). Entrepreneurial rents and the theory of the firm. *Journal of Business Venturing, 22*(3), 427–442.

Andersen, T. J., Denrell, J., & Bettis, R. A. (2007). Strategic responsiveness and bowman's risk–return paradox. *Strategic Management Journal, 28*(4), 407–429.

Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin, 103*(3), 411–423.

Anderson, B. S., Kreiser, P. M., Kuratko, D. F., Hornsby, J. S., & Eshima, Y. (2015). Reconceptualizing entrepreneurial orientation. *Strategic Management Journal, 36*(10), 1579–1596.

Ayers, D., Dahlstrom, R., & Skinner, S. J. (1997). An exploratory investigation of organizational antecedents to new product success. *Journal of Marketing Research (JMR), 34*(1), 107–116.

Bagozzi, R. P., Youjae, Y., & Phillips, L. W. (1991). Assessing construct validity in organizational research. *Administrative Science Quarterly, 36*(3), 421–458.

Baird, I. S., & Thomas, H. (1985). Toward a contingency model of strategic risk taking. *Academy of Management Review, 10*(2), 230-243.

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51*(6), 1173–1182.

Begley, T. M., & Boyd, D. P. (1987). Psychological characteristics associated with performance in entrepreneurial firms and small businesses. *Journal of Business Venturing, 2*(1), 79–93.

Brockhaus, R. (1980). Risk taking propensity of entrepreneurs. *Academy of Management Journal, 23*(3), 509–520.

Bromiley, P. (1991). Testing a causal model of corporate risk taking and performance. *Academy of Management Journal, 34*(1), 37–59.

Burgers, J. H., & Covin, J. G. (2016). The contingent effects of differentiation and integration on corporate entrepreneurship. *Strategic Management Journal, 37*(3), 521–540.

Busenitz, L. W., Plummer, L. A., Klotz, A. C., Shahzad, A., & Rhoads, K. (2014). *Entrepreneurship research (1985–2009) and the emergence of opportunities, editorial* (pp. 981–1000). Theory & Practice: Entrepreneurship.

Cabrales, Á. L., Medina, C. C., Lavado, A. C., & Cabrera, R. V. (2008). Managing functional diversity, risk taking and incentives for teams to achieve radical innovations. *R&D Management, 38*(1), 35–50.

Calantone, R., Garcia, R., & Dröge, C. (2003). The effects of environmental turbulence on new product development strategy planning. *Journal of Product Innovation Management, 20*(2), 90–103.

Cao, Q., Gedajlovic, E., & Zhang, H. (2009). Unpacking organizational ambidexterity: Dimensions, contingencies, and synergistic effects. *Organization Science, 20*(4), 781–796.

Casillas, J. C., & Moreno, A. M. (2010). The relationship between entrepreneurial orientation and growth: The moderating role of family involvement. *Entrepreneurship and Regional Development, 22*(3–4), 265–291.

Cavallo, A., Ghezzi, A., & Balocco, R. (2018). Entrepreneurial ecosystem research: Present debates and future directions. *International Entrepreneurship and Management Journal*, 1-31.

Chesbrough, H. (2003). *Open innovation: The new imperative for creating and profiting from technology*. Boston, MA: Harvard Business School.

Chesbrough, H., & Rosenbloom, R. S. (2002). The role of the business model in capturing value from innovation: Evidence from Xerox Corporation's technology spin-off companies. *Industrial and Corporate Change, 11*(3), 529–555.

Colombo, M. G., Dagnino, G. B., Lehmann, E. E., & Salmador, M. (2017). The governance of entrepreneurial ecosystems. *Small Business Economics*.

Covin, J. G., & Lumpkin, G. T. (2011). Entrepreneurial orientation theory and research: Reflections on a needed construct. *Entrepreneurship Theory and Practice, 35*(5), 855–872.

Covin, J. G., & Miller, D. (2014). International entrepreneurial orientation: Conceptual considerations, research themes, measurement issues, and future research directions. *Entrepreneurship Theory and Practice, 38*(1), 11–44.

Covin, J. G., & Slevin, D. P. (1989). Strategic management of small firms in hostile and benign environments. *Strategic Management Journal, 10*(1), 75–87.

Covin, J. G., & Wales, W. J. (2012). The measurement of entrepreneurial orientation. *Entrepreneurship: Theory and Practice, 36*(4), 677–702.

Covin, J. G., & Wales, W. J. (2019). Crafting high-impact entrepreneurial orientation research: Some suggested guidelines. *Entrepreneurship: Theory and Practice, 43*(1), 3–18.

Dai, L., Maksimov, V., Gilbert, B. A., & Fernhaber, S. A. (2014). Entrepreneurial orientation and international scope: The differential roles of innovativeness, proactiveness, and risk-taking. *Journal of Business Venturing, 29*(4), 511–524.

Danneels, E. (2008). Organizational antecedents of second-order competences. *Strategic Management Journal, 29*(5), 519–543.

Das, S. R., & Joshi, M. P. (2007). Process innovativeness in technology services organizations: Roles of differentiation strategy, operational autonomy and risk-taking propensity. *Journal of Operations Management, 25*(3), 643–660.

Dawson, J. F., & Richter, A. W. (2006). Probing three-way interactions in moderated multiple regression: Development and application of a slope difference test. *Journal of Applied Psychology, 91*(4), 917–926.

Dess, G. G., & Beard, D. W. (1984). Dimensions of organizational task environments. *Administrative Science Quarterly, 29*(1), 52–73.

Douglas, S. P., & Craig, C. S. (1983). Examining performance of US multinationals in foreign markets. *Journal of International Business Studies, 14*(3), 51–62.

Eckhardt, J. T., & Shane, S. A. (2003). Opportunities and Entrepreneurship. *Journal of Management, 29*(3), 333–349.

Eisenhardt, K. M. (1989). Making fast strategic decisions in high-velocity environments. *Academy of Management Journal, 32*(3), 543–576.

Eshima, Y., & Anderson, B. S. (2017). Firm growth, adaptive capability, and entrepreneurial orientation. *Strategic Management Journal, 38*(3), 770-779.

Fang, E. (2011). The effect of strategic alliance knowledge complementarity on new product innovativeness in China. *Organization Science, 22*(1), 158–172.

Fang, E., Palmatier, R. W., Scheer, L. K., & Li, N. (2008). Trust at different organizational levels. *Journal of Marketing, 72*(2), 80–98.

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research, 18*(1), 39–50.

Fürst, A., Leimbach, M., & Prigge, J.-K. (2017). Organizational multichannel differentiation: An analysis of its impact on channel relationships and company sales success. *Journal of Marketing, 81*(1), 59–82.

Gao, G. Y., Zhou, K. Z., & Yim, C. K. B. (2007). On what should firms focus in transitional economies? A study of the contingent value of strategic orientations in China. *International Journal of Research in Marketing, 24*(1), 3–15.

George, B. A., & Marino, L. (2011). The epistemology of entrepreneurial orientation: Conceptual formation, modeling, and operationalization. *Entrepreneurship Theory and Practice, 35*(5), 989–1024.

Ginsberg, A., & Venkatraman, N. (1985). Contingency perspectives of organizational strategy: A critical review of the empirical research. *Academy of Management Review, 10*(3), 421–434.

Hambrick, D. C. (1982). Environmental scanning and organizational strategy. *Strategic Management Journal, 3*(2), 159–174.

Hitt, M. A., Ireland, R. D., Camp, S. M., & Sexton, D. L. (2001). Strategic entrepreneurship: Entrepreneurial strategies for wealth creation. *Strategic Management Journal, 22*(6–7), 479–491.

Hormiga, E., & Bolívar-Cruz, A. (2014). The relationship between the migration experience and risk perception: A factor in the decision to become an entrepreneur. *International Entrepreneurship and Management Journal, 10*(2), 297–317.

Houston, M. B., Walker, B. A., Hutt, M. D., & Reingen, P. H. (2001). Cross-unit competition for a market charter: The enduring influence of structure. *Journal of Marketing, 65*(2), 19–34.

Hughes, M., & Morgan, R. E. (2007). Deconstructing the relationship between entrepreneurial orientation and business performance at the embryonic stage of firm growth. *Industrial Marketing Management, 36*(5), 651–661.

Im, S., & Workman, J. J. P. (2004). Market orientation, creativity, and new product performance in high-technology firms. *Journal of Marketing, 68*(2), 114–132.

Ireland, R. D., Hitt, M. A., & Sirmon, D. G. (2003). A model of strategic entrepreneurship: The construct and its dimensions. *Journal of Management, 29*(6), 963–989.

Ireland, R. D., Covin, J. G., & Kuratko, D. F. (2009). Conceptualizing corporate entrepreneurship strategy. *Entrepreneurship: Theory and Practice, 33*(1), 19–46.

Jansen, J. J. P., Simsek, Z., & Cao, Q. (2012). Ambidexterity and performance in multiunit contexts: Cross-level moderating effects of structural and resource attributes. *Strategic Management Journal, 33*(11), 1286–1303.

Jiang, W., Mavondo, F. t., & Matanda, M. J. (2015). Integrative capability for successful partnering: A critical dynamic capability. *Management Decision, 53*(6), 1184–1202.

Kahneman, D., & Lovallo, D. (1993). Timid choices and bold forecasts: A cognitive perspective on risk taking. *Management Science, 39*(1), 17–31.

Kirzner, I. (1973). *Competition and entrepreneurship*. Chicago, IL: University of Chicago Press.

Kollmann, T., & Stockmann, C. (2014). Filling the entrepreneurial orientation-performance gap: The mediating effects of exploratory and exploitative innovations. *Entrepreneurship: Theory and Practice, 38*(5), 1001–1026.

Krasnikov, A., & Jayachandran, S. (2008). The relative impact of marketing, research-and-development, and operations capabilities on firm performance. *Journal of Marketing, 72*(4), 1–11.

Kreiser, P. M., Marino, L. D., & Weaver, K. M. (2002). Assessing the psychometric properties of the entrepreneurial orientation scale: A multi-country analysis. *Entrepreneurship Theory and Practice, 26*(4), 71–94.

Kreiser, P. M., Marino, L. D., Kuratko, D. F., & Weaver, K. M. (2013). Disaggregating entrepreneurial orientation: The non-linear impact of innovativeness, proactiveness and risk-taking on sme performance. *Small Business Economics, 40*(2), 273–291.

Larraza-Kintana, M., Wiseman, R. M., Gomez-Mejia, L. R., & Welbourne, T. M. (2007). Disentangling compensation and employment risks using the behavioral agency model. *Strategic Management Journal, 28*(10), 1001–1019.

Lechner, C., & Gudmundsson, S. V. (2014). Entrepreneurial orientation, firm strategy and small firm performance. *International Small Business Journal, 32*(1), 36–60.

Leonard-Barton, D. (1992). Core capabilites and core rigidities: A paradox in managing new product development. *Strategic Management Journal, 13*(S1), 111–125.

Li, J., & Tang, Y. (2010). CEO hubris and firm risk taking in China: The moderating role of managerial discretion. *Academy of Management Journal, 53*(1), 45–68.

Lindell, M. K., & Whitney, D. J. (2001). Accounting for common method variance in cross-sectional research designs. *The Journal of Applied Psychology, 86*(1), 114–121.

Lumpkin, G. T., & Dess, G. G. (1996). Clarifying the entrepreneurial orientation construct and linking it to performance. *Academy of Management Review, 21*(1), 135–172.

Lumpkin, G. T., & Dess, G. G. (2001). Linking two dimensions of entrepreneurial orientation to firm performance: The moderating role of environment and industry life cycle. *Journal of Business Venturing, 16*(5), 429–451.

Luo, X., Slotegraaf, R. J., & Pan, X. (2006). Cross-functional "coopetition": The simultaneous role of cooperation and competition within firms. *Journal of Marketing, 70*(1), 67–80.

Malecki, E. J. (2018). Entrepreneurship and entrepreneurial ecosystems. *Geography Compass, 12*(3), 1–21.

March, J. G. (1991). Exploration and exploitation in organisational learning. *Organization Science, 2*(1), 71–87.

Martens, C. D. P., Lacerda, F. M., Belfort, A. C., & Freitas, H. M. R. d. (2016). Research on entrepreneurial orientation: Current status and future agenda. *International Journal of Entrepreneurial Behavior & Research, 22*(4), 556–583.

Matsuno, K., Mentzer, J. T., & Özsomer, A. (2002). The effects of entrepreneurial proclivity and market orientation on business performance. *Journal of Marketing, 66*(3), 18–32.

McGrath, R. G. (2001). Exploratory learning, adaptive capacity and the role of managerial oversight. *Academy of Management Journal, 44*(1), 118–131.

Miller, D. (1983). The correlates of entrepreneurship in three types of firms. *Management Science, 29*(7), 770–791.

Miller, D. (2011). Miller (1983) revisited: A reflection on eo research and some suggestions for the future. *Entrepreneurship: Theory and Practice, 35*(5), 873–894.

Miller, D., & Friesen, P. H. (1982). Innovation in conservative and entrepreneurial firms: Two models of strategic momentum. *Strategic Management Journal, 3*(1), 1–25.

Mitchell, W. (1991). Dual clocks: Entry order influences on industry incumbent and newcomer market share and survival when specialized assets retain their value. *Strategic Management Journal, 12*(2), 85–100.

Naldi, L., Nordqvist, M., Sjöberg, K., & Wiklund, J. (2007). Entrepreneurial orientation, risk taking, and performance in family firms. *Family Business Review, 20*(1), 33–47.

Narver, J. C., & Slater, S. F. (1990). The effect of a market orientation on business profitability. *Journal of Marketing, 54*(4), 20–35.

Nasution, H. N., Mavondo, F. T., Matanda, M. J., & Ndubisi, N. O. (2011). Entrepreneurship: Its relationship with market orientation and learning orientation and as antecedents to innovation and customer value. *Industrial Marketing Management, 40*(3), 336–345.

Palmer, T. B., & Wiseman, R. M. (1999). Decoupling risk taking from income stream uncertainty: A holistic model of risk. *Strategic Management Journal, 20*(11), 1037–1062.

Peng, M. W. (2003). Institutional transitions and strategic choices. *Academy of Management Review, 28*(3), 275–296.

Podsakoff, P. M., & Organ, D. W. (1986). Self-reports in organizational research: Problems and prospects. *Journal of Management, 12*(4), 531–545.

Podsakoff, P. M., MacKenzie, S. B., Lee, J., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology, 88*(5), 879–903.

Rauch, A., Wiklund, J., Lumpkin, G. T., & Frese, M. (2009). Entrepreneurial orientation and business performance: An assessment of past research and suggestions for the future. *Entrepreneurship: Theory and Practice, 33*(3), 761–787.

Sanders, W. G., & Hambrick, D. C. (2007). Swinging for the fences: The effects of ceo stock options on company risk taking and performance. *Academy of Management Journal, 50*(5), 1055–1078.

Schumpeter, J. A. (1934). *The theory of economic development: An inquiry into profits, capital, interest and the business cycle*. London, UK: Oxford University Press.

Shan, P., Song, M., & Ju, X. (2016). Entrepreneurial orientation and performance: Is innovation speed a missing link? *Journal of Business Research, 69*(2), 683–690.

Shane, S., & Venkataraman, S. (2000). The promise of entrepreneurship as a field of research. *Academy of Management Review, 25*(1), 217–226.

Shepherd, D. A., Covin, J. G., & Kuratko, D. F. (2009). Project failure from corporate entrepreneurship: Managing the grief process. *Journal of Business Venturing, 24*(6), 588–600.

Song, X. M., & Parry, M. E. (1997). A cross-national comparative study of new product development processes: Japan and the United States. *Journal of Marketing, 61*(2), 1–18.

Spigel, B. (2017). The relational organization of entrepreneurial ecosystems. *Entrepreneurship: Theory and Practice, 41*(1), 49–72.

Stam, E. (2015). Entrepreneurial ecosystems and regional policy: A sympathetic critique. *European Planning Studies, 23*(9), 1759–1769.

Staw, B. M., Sandelands, L. E., & Dutton, J. E. (1981). Threat rigidity effects in organizational behavior: A multilevel analysis. *Administrative Science Quarterly, 26*, 501–524.

Stokvik, H., Adriaenssen, D. J., & Johannessen, J. A. (2016). Strategic entrepreneurship and intrapreneurial intensity. *Problems and Perspectives in Management, 14*(2), 348–359.

Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics* (5th ed.). Boston: Pearson Education.

Tan, J., & Tan, D. (2005). Environment-strategy co-evolution and co-alignment: A staged model of chinese soes under transition. *Strategic Management Journal, 26*(2), 141–157.

Tang, Z., Kreiser, P. M., Marino, L., Dickson, P., & Weaver, K. M. (2009). A hierarchical perspective of the dimensions of entrepreneurial orientation. *International Entrepreneurship and Management Journal, 5*(2), 181–201.

Teece, D. J. (1986). Profiting from technological innovation: Implications for integration, collaboration, licensing and public policy. *Research Policy, 15*(6), 285–305.

Teece, D. J. (2007). Explicating dynamic capabilities: The nature and microfoundations of (sustainable) enterprise performance. *Strategic Management Journal, 28*(13), 1319–1350.

Thanos, I. C., Dimitratos, P., & Sapouna, P. (2016). The implications of international entrepreneurial orientation, politicization, and hostility upon SME international performance. *International Small Business Journal, 35*(4), 495–514.

Troy, L. C., Hirunyawipada, T., & Paswan, A. K. (2008). Cross-functional integration and new product success: An empirical investigation of the findings. *Journal of Marketing, 72*(6), 132–146.

Van Bruggen, G. H., Lilien, G. L., & Kacker, M. (2002). Informants in organizational marketing research: Why use multiple informants and how to aggregate responses. *Journal of Marketing Research (JMR), 39*(4), 469–478.

Venkatraman, N. (1989). Strategic orientation of business enterprises: The construct, dimensionality, and measurement. *Management Science, 35*(8), 942–962.

Voss, G. B., & Voss, Z. G. (2013). Strategic ambidexterity in small and medium-sized enterprises: Implementing exploration and exploitation in product and market domains. *Organization Science, 24*(5), 1459–1477.

Wales, W. J. (2016). Entrepreneurial orientation: A review and synthesis of promising research directions. *International Small Business Journal, 34*(1), 3–15.

Wales, W. J., Gupta, V. K., & Mousa, F.-T. (2013). Empirical research on entrepreneurial orientation: An assessment and suggestions for future research. *International Small Business Journal, 31*(4), 357–383.

Wales, W. J., Wiklund, J., & McKelvie, A. (2015). What about new entry? Examining the theorized role of new entry in the entrepreneurial orientation–performance relationship. *International Small Business Journal, 33*(4), 351–373.

Wang, E. S.-T., & Juan, P.-Y. (2016). Entrepreneurial orientation and service innovation on consumer response: A B&B case. *Journal of Small Business Management, 54*(2), 532–545.

Wiklund, J., & Shepherd, D. (2003). Knowledge-based resources, entrepreneurial orientation, and the performance of small and medium-sized businesses. *Strategic Management Journal, 24*(13), 1307–1314.

Wiklund, J., & Shepherd, D. A. (2011). Where to from here? Eo-as-experimentation, failure, and distribution of outcomes. *Entrepreneurship: Theory and Practice, 35*(5), 925–946.

World Economic Forum. (2013). *Entrepreneurial ecosystems around the globe and company gorwth dynamics (industry agenda)*. Geneva: World Economic Forum.

Xia, F., & Walker, G. (2015). How much does owner type matter for firm performance? Manufacturing firms in China 1998-2007. *Strategic Management Journal, 36*(4), 576–585.

Yang, Z., Su, C., & Fam, K.-S. (2012). Dealing with institutional distances in international marketing channels: Governance strategies that engender legitimacy and efficiency. *Journal of Marketing, 76*(1), 41–55.

Yang, D., Wang, A. X., Zhou, K. Z., & Jiang, W. (2018). Environmental strategy, institutional force, and innovation capability: A managerial cognition perspective. *Journal of Business Ethics*.

Zahra, S. A. (2005). Entrepreneurial risk taking in family firms. *Family Business Review, 18*(1), 23–40.

Zahra, S. A., & Garvis, D. M. (2000). International corporate entrepreneurship and firm performance: The moderating effect of international environmental hostility. *Journal of Business Venturing, 15*(5–6), 469–492.

Zahra, S. A., & George, G. (1999). Manufacturing strategy and new venture performance: A comparison of independent and corporate ventures in the biotechnology industry. *The Journal of High Technology Management Research, 10*(2), 313–345.

Zahra, S. A., Hayton, J., & Salvato, C. (2004). Entrepreneurship in falimy vs. non-family firms: A resource-based analysis of the effect of organizational culture. *Entrepreneurship: Theory and Practice, 28*(4), 363–381.

Zhou, K. Z., & Li, C. B. (2012). How knowledge affects radical innovation: Knowledge base, market knowledge acquisition, and internal knowledge sharing. *Strategic Management Journal, 33*(9), 1090–1102.

Zhu, Z., & Matsuno, K. (2016). Entrepreneurial proclivity: its environmental conditions and growth consequences. *Journal of Strategic Marketing, 24*(1), 20-33.