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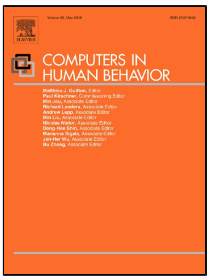

Understanding Entrepreneurial Perceptions in the Pursuit of Emerging e-Business Opportunities: The Dimensions and Drivers

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PII:	S0747-5632(18)30073-6
DOI:	10.1016/j.chb.2018.02.015
Reference:	CHB 5378
To appear in:	*Computers in Human Behavior*
Received Date:	02 August 2017
Revised Date:	20 December 2017
Accepted Date:	15 February 2018

Please cite this article as: Zhen Zhu, Shuai-fu Lin, Understanding Entrepreneurial Perceptions in the Pursuit of Emerging e-Business Opportunities: The Dimensions and Drivers, *Computers in Human Behavior* (2018), doi: 10.1016/j.chb.2018.02.015

Understanding Entrepreneurial Perceptions in the Pursuit of Emerging e-Business Opportunities: The Dimensions and Drivers

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Acknowledgment: This research has been supported by grants from the National Natural Science Foundation of China under Grants 71672183 and 71372174, and Fundamental Research Funds for the Central University, China University of Geosciences (Wuhan) under Grants CUGW150401, and Hubei Chengguang Talented Youth Development Foundation.

Part of this version was presented at the 2015 International Conference on Information Systems at Fort Worth, USA. This manuscript was revised and improved based on conference version.

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Highlights:

- This study conceptualizes and examines the dimensions of entrepreneurial perceptions in the pursuit of e-business opportunities.
- Data was collected from 203 manufacturing and service firms in China that plan to invest in e-business practices.
- Results reveal that external pressures and IT infrastructure maturity are positively related to entrepreneurial perceptions.
- Entrepreneurs should understand the three entrepreneurial perceptions for e-business opportunity discovery

Abstract: The purpose of this study is to empirically investigate the dimensions and drivers of entrepreneurial perceptions in the pursuit of emerging e-business opportunities for traditional (or offline) firms. This study introduces the subjectivist theory of entrepreneurship into the IS research context, and identifies three dimensions that make up entrepreneurial perceptions: collaboration perception, planning perception, and operation perception. The authors tested the proposed research model using structural equation modeling (SEM) with survey data collected from 203 firms in China. Results reveal that external pressures and IT infrastructure maturity are positively and significantly related to drive entrepreneurial perceptions. The results also suggest that IT infrastructure maturity has stronger effects on collaboration perception and planning perception than external pressures. This paper provides clear guidance for entrepreneurs to understand the three entrepreneurial perceptions for emerging e-business opportunity discovery and the driving forces to the entrepreneurial perceptions.

Keywords: e-business opportunities; entrepreneurial perceptions; external pressures; subjectivist theory of entrepreneurship; IT infrastructure maturity

1. Introduction

Emerging e-business opportunities refer to sets of circumstances for a firm to reconfigure the firm's processes, marketing, and services to adapt for digital omni-channel retailing operations (Brynjolfsson, et al., 2013; Hansen & Sia, 2015), social medial marketing (Shang, et al., 2017), and platform ecosystem (Ceccagnoli, et al., 2012). Given the rapid growth of mobile commerce and platform enabled business revolutions, researchers and practitioners are increasingly interested in how an entrepreneur recognizes these emerging e-business opportunities(Chen, et al., 2015; Hu, et al., 2016; Qiu, et al., 2017; Xue, et al., 2017). Featuring the mobile and open-standard settings, broad connectivity, and interoperability (Zhu, et al., 2015), emerging e-commerce platform technologies create unprecedented opportunities for innovative entrepreneurs (Barua, et al., 2004; Lusch & Nambisan, 2015; Rai & Tang, 2014; Rehm, et al., 2016). These revolutions make entrepreneurs reconsider their new business models (Feeny, 2001; Goh & Kauffman, 2013; Parker & Weber, 2014; Xu, et al., 2014) and enable firms to reconfigure their operational processes and inter-firm liaisons (Chen, et al., 2014; Shi & Liao, 2015; Wang, et al., 2014). As a result of recognizing and exploiting emerging e-business opportunities, firms strengthen and co-create customer relationship, reach out to new markets for attracting broader customer base, and deliver innovative products or services (Chuang & Lin, 2015; Mishra & Agarwal, 2010; Yao & Zhu, 2012; Zhang, et al., 2011).

However, compared with the research in e-commerce firms (Choshin & Ghaffari, 2017), the literature has less knowledge and evidence in suggesting how to seize emerging opportunities for traditional (or offline) firms (Wang & Cavusoglu, 2015). In recent years, a lot of e-commerce firms (e.g., Amazon, Expedia, Alibaba, JD, etc.) have launched data-driven innovative business model and digital service processes (Tan, et al., 2016; Wu & Chou, 2011; Zhao, et al., 2015) to change their

competition strategies in their industries and improve service experiences for their online and social customers (Qu, et al., 2015; Shang, et al., 2017; Wang & Zhang, 2015). The market share of offline transactions has been gradually replaced by online or mobile transactions (Wang, et al., 2017). In 2016, in the US, for instance, the holiday sales growth for online shopping is strong and steady, whereas the same figure for offline shopping was below the projected rate (Mulpuru, 2016). As the result of weak offline sales, brick-and-mortar retailers, including Macy's, Sears, J.C. Penney, and Walmart, have to close their physical stores. As such, firms in the traditional sectors (hereafter referred to as 'offline firms') face huge external pressures from e-business transactions and carry greater strategic and operational risks than before (Areepattamannil & Khine, 2017; Grant, et al., 2014). To response to intense competition from e-commerce firms, entrepreneurs in offline firms strive to find e-business opportunities to increase their online sales (Hu, et al., 2016). However, not every firm is able to transform its heavy spending on e-commerce into online sales growth. In order to find e-business opportunities for reconfiguring extant business models and operations processes for the online competition, research has suggested that firm entrepreneurs should possess entrepreneurial perceptions (Hu, et al., 2016; Santos-Alvarez & Garcia-Merino, 2010).

Developed in the literature of corporate entrepreneurship strategy, entrepreneurial perception is defined as a subjective sense of conceiving that accounts for business opportunity construction and organizational resource mobilization to extend beyond existing products, services, markets and competencies (Kor, et al., 2007; Neill & York, 2012). The perceptions of firms' executives perform a critical function in the allocation of attention and in the interpretation of how the firm interacts with its environment and resources (Gavetti & Levinthal, 2000; Neill & York, 2012). These entrepreneurial perceptions from firm executives, as suggested by the entrepreneurship theory,

play a critical role in identifying opportunities for reconfiguring business model and operational processes (i.e., opportunity discovery) (Kor, et al., 2007; McMullen & Shepherd, 2006; Neill & York, 2012; Renko, et al., 2012; Shinnar, et al., 2012). However, in spite of the importance of (as well as the pressures from) e-business for offline firms, most of the extant studies either focused on theory development, or were conducted in the non-digital opportunity discovery, such as new ventures (Vaghely & Julien, 2010). Also, the essence and the formation of entrepreneurial perceptions in the pursuit of these e-business opportunities is underexplored. The purpose of this paper is to address the following research questions:

1. *What are the key dimensions that define an entrepreneur's entrepreneurial perception in the pursuit of e-business opportunities?*
2. *How may a firm's external pressures and internal resources promote an entrepreneur's entrepreneurial perceptions?*

This study proposes a research model that integrates the subjectivist theory of entrepreneurship (STE) (Kor, et al., 2007; Mahoney & Michael, 2005), the literature on institutional pressures (DiMaggio & Powell, 1983; Teo, et al., 2003), and the resource-based view (Barney, 1991) to explain how a firm's external pressures and (internal) IT infrastructure maturity influence the firm executive's entrepreneurial perceptions. This study tested the research model using data collected from 203 Chinese firms through a large-scale survey. To our knowledge, this is the first study that conceptualizes and examines the three dimensions of entrepreneurial perceptions (i.e., collaboration perception, planning perception, and operation perception) and that theorizes how a firm's external environment and internal resources promote entrepreneurial perceptions in the pursuit of e-business opportunities.

The rest of the paper is organized as follows. The next section discusses the theories (including STE, which explains the concept of entrepreneurial perceptions) that underlie our research model and presents the hypotheses. Then, the procedure to examine the proposed relationships and the result are presented. Next, theoretical contributions and practical implications are discussed. The limitations of the study are also outlined for further research.

2. Theories Development and Hypotheses Model

2.1 Subjectivist Theory of Entrepreneurship (STE) and entrepreneurial perceptions

The extant corporate entrepreneurship research suggests that an entrepreneur's task is to discover and exploit opportunities and make decisions about how to launch and manage innovative activities in organizations (Alvarez & Barney, 2007; Kor, et al., 2007). The presumption is rooted in the Austrian economics school, which argues that the process of opportunity discovery depends on an entity's capability and willingness (Kirzner, 1997). Following this presumption, Subjectivist Theory of Entrepreneurship (STE) focuses on the impact of entrepreneurs' ability, resources (such as knowledge) and social capital on the opportunity discovery processes (Kor, et al., 2007; Mahoney & Michael, 2005). STE builds on Penrose's resource approach to establish links between entrepreneurial experience and entrepreneurial creativity (Penrose, 1959). Penrose's resource approach states:

> "*The decision to search for opportunities is an enterprising decision requiring entrepreneurial intuition and imagination and must precede the 'economic' decision to go ahead with the examination of opportunities for expansion*" (Penrose, 1959, p. 34)

Acting as an entrepreneur's critical ability in STE, entrepreneurial perceptions are rooted in the entrepreneur's understanding of formal experiences that are *industry-specific, management team-specific and operations-specific* (Alvarez & Barney, 2007; Kor, et al., 2007). First, entrepreneurs'

industry-specific experience involves interactions with buyers, suppliers, distributors, and other stakeholders. Such industry-specific experience produces perceptions about the opportunities, threats, competitive conditions, and governmental regulations. Second, entrepreneurs' experience of management team regards how to discuss and debate on strategic decisions, take risks on behalf of the firm, and committee economically to certain strategic actions under uncertainty (Kor, 2003). This kind of experience in many firms will help entrepreneurs to develop strategic perceptions about new business model. Lastly, entrepreneurs also create operations-specific perceptions over time through leveraging, managing, and developing firm's heterogeneous resources. Therefore, we identify *collaboration perception*, *planning perception*, and *operation perception* as the three dimensions of e-business entrepreneurial perception about industry, management team, and firm's operations. These definitions are showed as Table 1.

Table 1. Construct Definition

Constructs	Definition	Supporting Reference
Collaboration Perception	The degree to which the entrepreneurs are able to understand collaborative experience with partners to support e-business usage.	(Kor, et al., 2007)
Planning Perception	The degree to which the entrepreneurs are able to understand planning experiences to support e-business usage.	(Kor, et al., 2007)
Operation Perception	The degree to which the entrepreneurs are able to understand operations experience to support e-business usage.	(Kor, et al., 2007)

2.2 The drivers of entrepreneurial perceptions

STE suggests that entrepreneurial perceptions stem from the an entrepreneur's evaluation of external environment dynamics and internal organizational resources (Kor, et al., 2007). First, environment dynamics act as economically valuable exploration circumstances (Kor, et al., 2007;

McGrath, 2001; Witt, 1998). Previous research argue that entrepreneurs can learn knowledge, and discover new trend and opportunities from dynamics of various market activities, such as partners alignment (Kaplan, 2008), and new technology applications (Kim, et al., 2013). External partners' pressures, consumer economics, political actions, and regulatory standards may stimulate an entrepreneur to pursue opportunities to consider e-business planning and strategy design (Hu, et al., 2016). Second, entrepreneurs also seek organizational resources mobilization to gain these opportunities and turn their visions into IT-enabled business reality (Chen, et al., 2015). A firm's idiosyncratic resources can serve as cognitive drivers of future strategy via 'resource learning' (Spender, 1996).

In this paper, we argue that e*xternal pressures* and *IT infrastructure maturity* affect *an entrepreneur's perceptions*. *External pressures* refer to the degree of institutional pressures from external partners, customers and competitors for e-business usage in a certain industry or region (Ke, et al., 2009). *IT infrastructure maturity* is defined as the degree to which the organizational IT Infrastructure can ensure the availability for e-business usage (Ragowsky, et al., 2012). While external pressures represent environment dynamics in STE (Kor, et al., 2007) and reflect the external power imperative to adopting e-business, IT infrastructure maturity represents the sufficiency of internal resources applications for facilitating e-business adoption (Lin, et al., 2007; Ragowsky, et al., 2012). These two forces from environment and heterogeneous organizational resources will drive the process of forming entrepreneurial perceptions in pursuit of e-business opportunities. Figure 1 presents our hypotheses model.

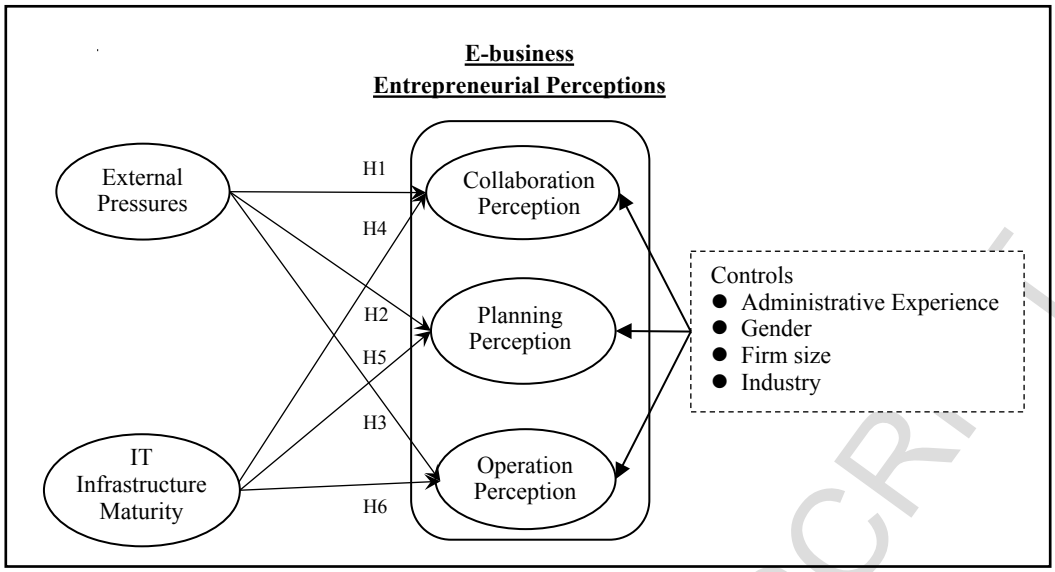


Figure 1 Hypotheses Model

2.3 The effects of environment pressures on entrepreneurial perceptions

External pressures from the environment affect top management beliefs (Gholami, et al., 2013; Liang, et al., 2007) that may activate entrepreneurial perceptions in the pursuit of e-business opportunities. Institutional theory suggests that the institutional environment provides rule-like social expectations and norms for organizational structures, operations, and behavior change (DiMaggio & Powell, 1983). As organizations compete for market share, customers' needs, and political power, organizations face external pressures to conform to these shared notions of appropriate forms for establishing organizational legitimacy (DiMaggio & Powell, 1983; Ke, et al., 2009; Teo, et al., 2003). DiMaggio and Powell (1983) identified three types of institutional pressures: coercive, mimetic, and normative pressures; and suggested that the coercive and normative pressures operate through interconnected relations while mimetic pressures act through structural equivalence. Coercive pressures are defined as formal or informal pressures originated from influences exerted by powerful supply chain partners on which a firm depends. Mimetic pressures refer to the pressures to adopt the same actions, structure, and behaviors from successful *competitors as a means of gaining legitimacy*.

Normative pressures are defined in this study as the pressures from collective expectations (within the e-business industry) that defines appropriate actions and behaviors to be legitimate (Ke, et al., 2009; Teo, et al., 2003).

We argue that the external coercive pressures from relational channels will affect collaboration perception of an entrepreneur. For example, embedded in the e-business collaborative network, coercive pressures are requirements raised by constituents from suppliers and customers. The pressure will lead to an entrepreneur's perceptions for potential digital operational process change (Santos-Alvarez & Garcia-Merino, 2010; Shi & Liao, 2015). Therefore, external pressures from supply chain partners and collective expectations will improve entrepreneurial perceptions of how to use collaborative relationship for a firm's potential e-business opportunities. This leads to the following hypothesis:

H1: External pressures are positively associated with an entrepreneur's collaboration perception in the pursuit of e-business opportunities.

Furthermore, we argue that coercive and mimetic pressures may affect entrepreneurs' planning perception. Coercive pressures are more likely to arise from dominant *partners*, and could be especially pronounced in emerging markets like China, where the digital economy is still in developing stage (Ke, et al., 2009). When a dominant partner adopts e-business planning practices or structures to serve its business interests, the firm will try to comply with the demand. In a similar manner, mimetic pressures also affect planning perception of an entrepreneur. Recall that mimetic pressures refer to the pressures to adopt the same actions, structure, and behaviors from successful *competitors as a means of gaining legitimacy* (Ke, et al., 2009; Teo, et al., 2003). Such pressure reflects *an entrepreneur's* perceptions for competitive status in the industrial environment. Given the inherent uncertainty of e-business opportunities, a firm exhibits the tendency to imitate the strategic

action taken by their successful peers or competitors (Liang, et al., 2007). Therefore, external coercive and mimetic pressures will improve an entrepreneur's perceptions of how to learn and accumulate e-business planning experience from dominant partners in pursuit of opportunities. This leads to the following hypothesis:

H2: External pressures are positively associated with an entrepreneur's planning perception in the pursuit of e-business opportunities.

Finally, we suggest that normative pressures from supply chain will have positive effect on operation perception. Recall that normative pressures are the pressures of collective expectations regarding appropriate actions and behaviors (Ke, et al., 2009; Teo, et al., 2003). Such pressure is based on the logic that an organization within a certain industry should exhibit a certain homogeneous behavior in order to appear legitimate in the competition. Following this logic, normative pressures from external dominant partners' e-business practices will influence a firm's attitudes toward the maintenance and development of digital operations activities through collective e-business application behaviors (Ke, et al., 2009). Therefore, external normative pressures will improve an entrepreneur's perceptions of how to realize standard digital supply chain operations through learning and accumulate e-business operational experience in pursuit of opportunities. This leads to the following hypothesis:

H3: External pressures are positively associated with an entrepreneur's operation perception in the pursuit of e-business opportunities.

2.4 The effects of IT infrastructure maturity on entrepreneurial perceptions

The resource-based view suggests that tangible or intangible assets/resources controlled by a firm will enable a firm to conceive and implement various business strategies and innovation (Wernerfetl, 1984). SET highlights that an entrepreneur seeks resources to develop entrepreneurial

perceptions (Kor, et al., 2007). IT infrastructure maturity represents technical resource advantage for facilitating a firm's insights for e-business innovation applications (Ragowsky, et al., 2012) to improve entrepreneurial perceptions.

IT infrastructure allows a firm to develop digital collaborations with supply chain partners, and thus increases the firm's experience to make in-depth connections among market information, knowledge, and concepts (Jean, et al., 2014). IT infrastructure also can help a firm quickly identify customer needs through IT-enabled interacting with customers, thereby enabling the firm to identify new market segments and product/service innovation (Setia, et al., 2013). Therefore, IT infrastructure maturity provides an entrepreneur's perceptions of how to use collaborative experience for obtaining potential e-business opportunities. This leads to the following hypothesis:

H4: IT infrastructure maturity is positively associated with an entrepreneur's collaboration perception in the pursuit of e-business opportunities.

A firm with high IT infrastructure maturity also implies it has abundant planning experience in previous IT applications (Lu & Ramamurthy, 2011). Such experience fosters great confidence and knowledge for e-business initiatives. The accumulation of planning experience and knowledge is instrumental in the sense making process of how management team members share with each other to develop teamwork skills, and supports new e-business strategic decisions and implementation. Therefore, IT infrastructure maturity fosters entrepreneurial perceptions of how to use planning experience for in pursuit of opportunities. This leads to the following hypothesis:

H5: IT infrastructure maturity is positively associated with an entrepreneur's planning perception in the pursuit of e-business opportunities.

IT infrastructure provides visibility across inter-functional areas, which strengthens the connections between procurement, sales, logistics and customer services departments (Devaraj, et al.,

2007). IT infrastructure maturity also improves efficiency of digital operations and facilitates collaboration to create insights concerning new business opportunities. Therefore, IT infrastructure maturity provides the source of an entrepreneur's perceptions of how to leverage the operational experience in pursuit of e-business opportunities. This leads to the following hypothesis:

H6: IT infrastructure maturity is positively associated with an entrepreneur's operation perception in the pursuit of e-business opportunities.

3. Research Design

3.1 Research setting

To examine our research model, we collected survey data from traditional firms in China, mainly in the manufacturing and service industries. To empirically examining our research model, this study collect data from China for data analysis is appropriate for the following reasons. First, In 2013, the gross merchandise volume (GMV) of e-business (including B2C and B2B transactions) has reached about 10 trillion RMB (iResearch, 2014). The dissemination of e-business technologies in China provides a good research background. Second, e-business has become an innovative engine in the recent the transformation of traditional industries in the Chinese economy (Zhu, et al., 2015). Third, as increasing numbers of partners, customers, and competitors applied e-business technologies in their operations (Jiang & Zhao, 2014), firms in traditional industries face external pressures from e-business transactions. Entrepreneurs are wondering how to understand e-business opportunities under such external pressures. Moreover, as firms in traditional industries usually have weaker IT infrastructure than e-business firms, these firms may experience difficulties in innovative usage of e-business. Thus entrepreneurs are also wondering how IT infrastructure of these firms can be deployed as a foundation for exploiting e-business opportunities. The widespread diffusion of e-business in traditional Chinese economy provides an appropriate entrepreneurial research setting for investigating

our research model.

3.2 Data collection and research sample

Survey data was collected from traditional firms in China, mainly in the manufacturing and service industries. These entrepreneurs of traditional firms are planning to invest in e-business technologies or leverage e-commerce platform services (e.g., Alibaba, T-Mall) to realize the Net-enabled transformation and obtain Internet-based competitive advantage. To ensure the study sample well represents the population, we sought assistance from the Chinese Electronic Commerce Association (CECA) and Chambers of Commerce from three main cities that located at e-business blooming regions.

From above institutions, we obtained valid contact information of 650 sample firms, with removing 300 firms that are without valid contact information (e.g., invalid contacts, phone numbers, email, or fax). We followed the key informant approach to do survey from top managers (i.e., CEO, president/stockholder, vice president, general manager, or vice general manager) in each firm. These top managers are appropriate respondents because they are usually recognized as main entrepreneurs of a firm in previous research (Vaghely & Julien, 2010; Wiklund & Shepherd, 2003).

All questionnaires were sent via face-to-face interviews, or e-mails with a cover letter explaining the purpose of the research and the survey instructions. Within two weeks, follow-up emails or telephone calls were made to increase the response rate. The data collection process resulted in 218 responses. Among them, fifteen responses had too many missing data and were eliminated. Therefore, 203 responses are valid for data analysis and the valid response rate is about 31.2 percent. Summary of the sample description is shown in Table 2. The percentage constitution of industries in

the sample is very close to the percentage constitution in the 650 sample companies we obtained from CECA and three Chambers of Commerce. Chi-square tests show that there were non-significant (p>0.05), thus providing no evidence of response bias.

Table 2 Sample Description

	N	Percentage		N	Percentage
Firm Employee			**IT Administrative Experience**		
<=100	98	48.3%	<=3 years	24	11.8%
101 – 500	41	20.2%	4-5 years	92	45.3%
501 – 1000	18	8.9%	7–8 years	74	36.5%
>=1001	38	18.7%	>=9 years	13	6.4%
Unknown	8	3.9%	**Gender**		
Industry			Male	145	71.4%
Manufacturing	80	39.4%	Female	58	28.6%
Service	123	60.6%	**Education**		
Position			Secondary School	12	6.0%
CEO	25	12.3%	College	114	56.1%
President member	9	4.4%	Bachelor	63	31.0%
Vice president	12	5.9%	Master or above	14	6.9%
General manager	109	53.7%			
Vice general manager	48	23.7%			

3.3 Instrument development

A survey questionnaire was used to collect data. The measurement items were adapted from the measures in the literature to fit our study context. As an initial evaluation of the measures, a pilot study in ten firms was conducted. All constructs in the study were measured using items of a five-point Likert reflective scale, as summarized at Table 3. The measurement items for *external pressures* were adapted from the measure in Liang et al.'s (2007) study. These items (measured by 1=Very low, 5=Very high) examine the institutional pressures from partners, customers, and competitors for e-business applications. *IT infrastructure maturity* was operationalized as three items (measured by 1= Strongly disagree, 5= Strongly agree) assessing the mature level of IT integration, compatibility, and

modularity (Dong, et al., 2009). These items capture the three most important types of IT infrastructure for supporting e-business application (Curley, et al., 2013).

Since the three constructs of entrepreneurial perceptions are newly developed in this study, we developed items based on a literature analysis together with face-to-face interviews of top managers. First, we used the content analysis (Krippendorff, 2004) and followed the entrepreneurship literature (Kor, et al., 2007; McMullen & Shepherd, 2006) to identify the critical thirteen theoretical expressions of three dimensions of entrepreneurial perceptions. Next, we designed thirteen items specifically for the e-business context according to the theoretical content analysis. To validate the rationale and adequacy of these measurement items, we presented and discussed these items in interviews with fifteen top managers. Based on the suggestions of the interviews, eleven items were retained and adapted. Two items were dropped because they are suggested to be irrelevant or impractical to e-business practices. Therefore, the eleven items (measured by 1= Strongly disagree,5= Strongly agree) were developed to measure entrepreneurs' ability to understand collaborative experience, planning experience, and operational experience (See Table 3).

Four control variables for both entrepreneur and firm levels were included in the study to account for potential alternative explanations for entrepreneurial perceptions. Entrepreneurs with more years of administrative experience about IT may have greater perceptions of e-business opportunities than entrepreneurs with less years of such experience. Thus, the year of administrative experience about IT is considered as a control variable. Empirical study suggested that in the Spanish culture, men engage more than women in discovering business opportunities, probably because men posse more human and social capital than women in the specific cultural environment (Gonzalez-Alvarez & Solis-Rodriguez, 2011). Based on the culture dimension framework, the masculinity score of the Chinese

culture (66) is higher than the Spanish culture (42) (Hofstede, et al., 2010). Therefore, we suspect that in our study men may exhibit higher entrepreneur perceptions than women. We specified gender, measuring with a dummy variable (Man=1, Woman=0), as a control variable that may affect entrepreneurial perceptions. Firm size has long been considered to be a factor that may affect firms' strategic activities (Goode & Gregor, 2009). Thus, we used the logarithm number of employees as a proxy for firm size to control for its effect on opportunity discovery. Due to variations in market dynamics, firms operating in different industries may face different levels of needs for business opportunities. In China, firms in the manufacturing industry may face more intense competition than firms in the service industry. Therefore, we used the industry variable (Manufacturing=1, service =0) to control for the impact of industry type on entrepreneurial perceptions.

3.4 Common methods variance assessment

We assessed the threat of common method bias using latent single common method factor (CMF) test (Podsakoff, et al., 2003). A structural equation model (SEM)-based CMF test was executed (Podsakoff, et al., 2003). Following Wagner and Bode's method (Wagnera & Bodeba, 2014), we compared a base CFA model with a CFA model that extended the base model with a single latent method factor that is uncorrelated with all the other latent variables. The inclusion of the CMF only marginally improved model fit (base model: χ^2/ df=1.23($\chi^2_{(93)}$=114.49, p <0.05), RMSEA=0.037, CFI=0.98, NFI=0.93, GFI=0.93; CMF model: χ^2/ df=1.22($\chi^2_{(92)}$=112.06, p <0.05), RMSEA=0.036, CFI=0.98, NFI=0.94, GFI=0.93). This result suggests that the inclusion of the CMF does not significantly improve the model fit ($\Delta\chi^2$ (1) =2.43, p>0.1). We further calculated the standard loadings between the items with and without the methods factor. The high correlation coefficients (r=0.83, p< 0.05) strongly support that common method variance does not pose a significant threat to the research

model.

4. Research Results

4.1 Measurement model

Two approaches were used to evaluate the psychometric adequacy of the measurement model. First, a principle component analysis with Varimax rotation was used to examine the factor structure of the measures. The resulted factor structure is as expected (KMO is 0.778 with significant Bartlett's test of sphericity at 0.05 levels). Five factors emerged with eigenvalue above 1.0 and explained a total of 66.69% of the variance in the data. One item in collaboration perception (CPer4) was deleted, due to its low factor loading. Then, a confirmatory factor analysis (CFA) was conducted using LISREL 8.72. Overall, the measurement model fits the data well (χ^2/ df=1.23, RMSEA=0.037, CFI=0.98, NFI=0.93, GFI=0.93). The normed chi-square (χ^2 divided by degrees of freedom) estimates the relative efficiency of competing model. Our results show that a value less than 2.0 (χ^2/ df=1.23), indicating a good fit (Hair, et al., 2009). Results of CFI (0.98) and NFI (0.93) are both higher than 0.90, suggesting a reasonable fit of the measurement model (Hair, et al., 2009).

We also conducted a validity test for the dimensions of entrepreneurial perceptions. Although validity of entrepreneurial perceptions has been identified in the measurement model together with other constructs using SEM, we would like to test the potential consistency of the three detentions of entrepreneurial perceptions as a whole. For this purpose, principle component analysis was used. The resulted factor structure was as expected with KMO is 0.739 (Bartlett's test of sphericity at 0.05 levels). Three factors emerged with eigenvalue above 1.0 and explained a total of 66.61% of the variance. The discriminant validity among these dimensions confirms that entrepreneurial perceptions

are comprised of three dimensions. We assessed construct reliability, convergent validity, and discriminant validity through the measurement model. The results are reported in Table 3. Construct reliability assesses the degree to which items are free from random error and therefore yield consistent results (Straub & Carlson, 1989). We used Cronbach's alpha to evaluate construct reliability. The results range from 0.72 to 0.82 for the five constructs, indicating high internal consistency. Convergent validity assesses the consistency across multiple items from survey. As shown in Table 3, all estimated standard loadings are significant ($p < 0.05$), suggesting adequate convergent validity. Average variance extracted (AVE) (Fornell & Larcker, 1981) was used to assess the discriminant validity, meaning different constructs diverge from one another. Table 4 shows that each of the constructs has a square root of AVE greater than 0.5 and higher than their correlations with any of the other constructs. As shown in Table 4, all square roots of AVEs are above 0.75 and much higher than cross-correlations. Such result suggests that the items share more common variance with their respective constructs than with other constructs, indicating discriminant validity of the constructs (Fornell & Larcker, 1981).

Table 3. Factor Loadings, Reliability, and Convergent Validity

Constructs	Indicates	Loadings	Cronbach α	AVE
External Pressures (EP)	EP1: The extent of pressures from our partners' influence in the e-business environment	0.59*	0.72	0.56
	EP2: The extent of pressures from our customers' influence in the e-business environment	0.87**		
	EP3: The extent of pressures from our competitors' influence in the e-business environment	0.63**		
IT Infrastructure Maturity (ITIM)	ITIM1: Our IT infrastructure can be fully integrated with back-office systems and databases.	0.80**	0.78	0.69
	ITIM2: Our IT infrastructure can be compatible with our partners to transmit, integrate and process data.	0.70**		
	ITIM3: Our IT infrastructure consists of modular software components to support reuse in other business applications.	0.74**		
Collaboration Perception (CPer)	CPer1: I believe we have experience to build trust-based relationship between our firm and partners.	0.84**	0.82	0.72
	CPer2: I believe we have experience to establish long-term collaborative goals between our firm and partners.	0.76**		
	CPer3: I believe we have experience to build equal collaboration mechanisms between our firm and partners.	0.74**		
Planning Perception (PPer)	PPer1: I believe our management team has knowledge to improve e-business strategic vision.	0.69**	0.79	0.61
	PPer2: I believe our management team has experience to established explicit goals to develop e-business.	0.77**		
	PPer3: I believe our management team has knowledge to initiate team management for strategic transformation.	0.69**		
	PPer4: I believe our management team has experience to align our IT strategy with business strategy.	0.63**		
Operation Perception (OPer)	OPer1: I believe our firm has good technical operational experience for supporting e-business.	0.71**	0.73	0.66
	OPer2: I believe our firm has good management operational experience for supporting e-business.	0.78**		
	OPer3: I believe our firm has good collaborative working experience for supporting e-business	0.68**		

Note: *p<0.05, **p<0.01, χ^2/df=1.23, RMSEA=0.037, CFI=0.98, NFI=0.93, GFI=0.93

Table 4. Descriptive Statistics, Inter-construct Correlations, and Square Root of AVE

	Mean	S.D.	1	2	3	4	5	*6*	*7*	*8*
1.EP	3.67	0.52	**0.75**							
2.ITIM	3.84	0.62	0.18*	**0.83**						
3.CPer	4.12	0.62	0.25**	0.41**	**0.85**					
4.PPer	4.07	0.67	0.003	0.29**	0.14*	**0.78**				
5.OPer	3.90	0.51	0.11	0.16*	0.18**	0.39**	**0.81**			
6. Gender [a]	*0.29*	*0.32*	0.04	0.02	-0.08	0.10	-0.03	—		
7. Firm size [b]	*1.99*	*0.83*	0.06	0.14*	0.02	0.19	0.03	0.39**	—	
8. Experience	*4.54*	*2.28*	0.05	0.21**	0.13	0.09	0.04	0.03	0.26**	—
9. Industry	*0.39*	0.49	0.05	0.09	-0.07	0.11	-0.08	0.01	0.39**	0.03

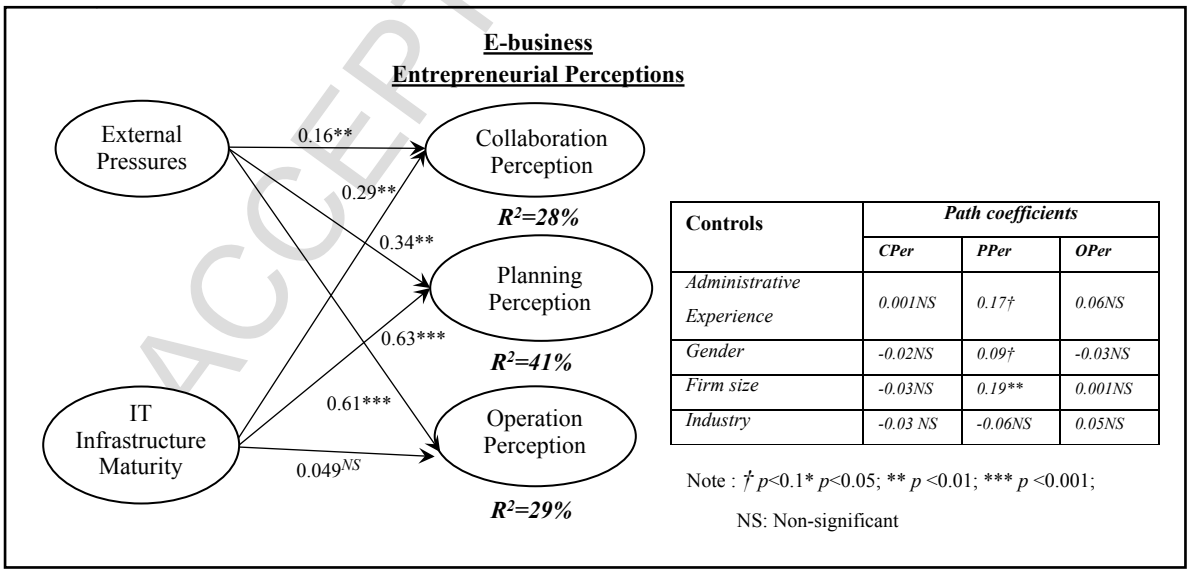
Note: *p<0.05 ; **p<0.01. Bold diagonals represent the square root of AVE for multi-item scales.

a: Dummy variables are used;

b: Logarithm number of employees

4.2 Structure model

A structural equation model (SEM) was estimated to assess the hypothesis relationships proposed in the model. The overall model provided a good fit to the data (χ^2/ df=1.46, p <0.05, RMSEA=0.048, CFI=0.95, NFI=0.87, GFI=0.90). The R^2 showed that this model accounts for 28 percent of the variance in collaboration perception, 41 percent in planning perception, and 29 percent in operation perception. Figure 2 shows the SEM results.



Controls	Path coefficients		
	CPer	*PPer*	*OPer*
Administrative Experience	*0.001NS*	*0.17†*	*0.06NS*
Gender	*-0.02NS*	*0.09†*	*-0.03NS*
Firm size	*-0.03NS*	*0.19***	*0.001NS*
Industry	*-0.03 NS*	*-0.06NS*	*0.05NS*

Note : † p<0.1* p<0.05; ** p <0.01; *** p <0.001;
NS: Non-significant

Figure 2 SEM Model Result

The results show that three control variables have significant effects on planning perception. Entrepreneurs' IT-related administrative experience (β=0.17, p<0.1) and gender (β=0.09, p<0.1) positively impact planning perception. This result indicates that entrepreneurs with more years of IT-related administrative experience may have better planning perception than others, probably because of their accumulated knowledge and capability for e-business innovation. Firm size (β=0.19, p<0.01) positively and significantly impacts planning perception, which suggests that larger firms normally have better capability of planning perception than smaller firms.

As shown in Figure 2, external pressures has a positive effect on collaboration perception (β=0.16, p<0.01), planning perception (β=0.34, p<0.001), operation perception (β=0.61, p<0.001). Thus, we found strong evidence for hypotheses H1, H2, and H3, suggesting that high degree of external pressures activates entrepreneurial perceptions in the pursuit of e-business opportunities. IT infrastructure maturity has positive and significant effects on collaboration perception (β=0.29, p<0.001) and planning perception (β=0.63, p<0.001), but it does not have a significant impact on operation perception (β=0.049, p>0.05). Therefore, H4 and H5 are supported, but H6 is not supported.

4.3 Endogeneity Check

We evaluated endogeneity account for selection effects due to omitted variable bias. Two sets of drivers of external pressures and IT infrastructure maturity choice observed in prior studies must be accounted. These include (a) firm size, and (b) environmental turbulence. Larger firms may be more likely to have higher level of IT infrastructure maturity (Zhu, et al., 2006), but not significantly correlated with entrepreneurial perceptions. As the instrumental variables, we defined environmental turbulence as changes in consumer needs, and changes in new technologies. Firms in a more dynamic

environment are more likely to experience external pressures in order to quickly response to a volatile environment. Environmental turbulence was measured by eight items adapted from Pavlou and El Sawy's measurement items (Pavlou & El Sawy, 2010). We adopted a two-stage least squares (2SLS) regression with the variables discussed above. The result of 2SLS is similar to the SEM result and shows that the six hypotheses were consistently supported. We also conducted a Hausman test of endogeneity (Hausman, 1978). The result suggests that external pressures (Hausman t=1.12, n.s.) and IT infrastructure (Hausman t=1.29, n.s.) maturity are not endogenous. Because the results from the two endogeneity tests were insignificant, the null hypothesis that external pressures and IT infrastructure maturity are exogenous cannot be rejected.

5. Discussions and Implications

5.1 Theoretical contribution

Despite the fact that some studies have investigated entrepreneurial opportunity discovery in various domains (Kor, et al., 2007; Wiklund & Shepherd, 2003), little empirical works have been done to examine entrepreneurial perceptions in emerging e-business organizations. In this study, we introduced the subjectivist theory of entrepreneurship into the IS research context and examined the dimensions of entrepreneurial perceptions in the pursuit of emerging e-business opportunities. We also validated the causal relationships by explaining how driving forces, i.e., external pressures and IT infrastructure maturity, promote entrepreneurial perceptions. This study contributes to the IS entrepreneurship literature in the following three ways.

Firstly, this study has identified three dimensions that make up entrepreneurial perceptions: collaboration perception, planning perception, and operation perception. Entrepreneurial perceptions

present when entrepreneurs can understand former experience for business exploration that is industry-specific, management team-specific, and operations-specific (Alvarez & Barney, 2007; Kor, et al., 2007). The study has developed a new instrument for entrepreneurial perceptions; and the psychometric adequacy of the measures has been empirically examined. These measures can facilitate empirical research efforts about entrepreneurial perceptions for obtaining e-business opportunities in future research.

Secondly, this study identifies the role of external pressures and IT infrastructure maturity for driving entrepreneurial perceptions in the pursuit of e-business opportunities. STE has suggested that, acting as entrepreneurs' critical capability, entrepreneurial perceptions takes place as entrepreneurs seek opportunities afforded by environment dynamics and accumulated organizational resources (Kor, et al., 2007; Siegel & Renko, 2012; Smith & Gregorio, 2002). Nevertheless, little empirical effort has been undertaken to support this statement. Our research model integrated the literature of institutional pressures (DiMaggio & Powell, 1983; Teo, et al., 2003) and the resource-based view (Barney, 1991) to examine how external pressures and IT infrastructure maturity shape the an entrepreneurs' perceptions in seeking e-business opportunities of a firm. The findings about the driving forces in the discovery of IT-related entrepreneurial opportunities contributes to the IT and strategic management literature.

Finally, our results show that the two driving forces in our study, external pressures and IT infrastructure maturity, can affect the three entrepreneurial perceptions differently. Specifically, the effects of IT infrastructure maturity are much stronger than external pressures on two entrepreneurial perceptions: collaboration perception and planning perception. These findings suggest that entrepreneurs in China are influenced more by organizational resources than external pressures in

developing collaboration perception and planning perception. In addition, while external pressures have a positive and significant effect on operation perception, IT infrastructure maturity doesn't have a significant influence on the same entrepreneurial perception. This result suggests that partners, customers, and competitors pose pressures so that entrepreneurs endeavor to understand former operational experience for e-business innovation. Through understanding the differential impacts of external pressures and internal IT infrastructure maturity on the three entrepreneurial perceptions, this study suggests that entrepreneurs should exploit external market dynamics and internal organizational resources to develop entrepreneurial perceptions for e-business opportunity discovery.

5.2 Practice implications

Our study has two major implications for business practice. First, our study provides a framework for entrepreneurs to understand the types of entrepreneurial perceptions in the pursuit of e-business opportunities, as well as how entrepreneurial perceptions can be assessed. Second, entrepreneurs should view both external pressures and IT infrastructure maturity as external and internal driving forces for activating entrepreneurial perceptions. Our findings encourage entrepreneurs to accumulate collaborative, planning and operational experience for enhancing entrepreneurial perceptions.

5.3 Limitations and further research

The limitations of this study are as follows. First, the result is based on the entrepreneurs and organizations in China. The economic dynamics of the transition economy in China may be unique and thus the result may not be replicated in other countries and markets. Therefore, to further

generalize the findings, future studies could incorporate other constructs, such as incorporating the institutional framework (Meyer, et al., 2009) or constructs that represent country or culture (Leidner & Kayworth, 2006). Second, this study used cross-sectional data, which provides a snapshot of entrepreneurial perceptions. A longitudinal design would be desirable to further examine how entrepreneurs develop entrepreneurial perceptions over time and how entrepreneurial perceptions promote e-business opportunities discovery.

6. Conclusion

While Web-based e-business technologies bring in the promise of Net-enabled revolutions (Barua, et al., 2004; Rai & Tang, 2014), there is a need to understand the role of entrepreneurial perceptions in discover e-business opportunities to response the transformation of traditional economy. In this study, we introduced the subjectivist theory of entrepreneurship into e-business research context. Our result identifies three dimensions that make up entrepreneurial perceptions: collaboration perception, planning perception, and operation perception, and reveal the different role of external pressures and IT infrastructure maturity in improving three entrepreneurial perceptions.

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