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The Causal Model of Absorptive Capacity, Strategic Flexibility and Innovation Performance on Sustainable Competitive Advantage: An Internationalization Perspective

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Abstract

Many scholars have focused on absorptive capacity in recent years, mainly around the technology spillover effect of investment from developed countries to developing countries. However, there is a lack of theoretical exploration and guidance on the use of absorptive capacity by emerging economies firms (EEFs). This study aims to explore the mechanism and the effect of absorptive capacity on sustainable competitive advantage, noting the mediating roles of strategic flexibility and innovation performance, as well as the moderating roles of environmental uncertainty. Applying the structural equation model using SPSS Amos 23, 404 Chinese overseas firms as a sample, the study found that potential absorptive capacity has a significant and positive effect on sustainable competitive advantage, however, realized absorptive capacity does not; as mediators, strategic flexibility and innovation performance can influence the impact of absorptive capacity on sustainable competitive advantage; as a moderator, environmental uncertainty play a significant but negative effect in the casual model; in six control variables, only “industry” and “R&D intensity” have significant effects on sustainable competitive advantage. The results verify the mechanism of absorptive capacity on sustainable competitive advantages, providing new theoretical basis for EEFs, expanding the application areas of absorptive capacity while enriching the connotation of internationalization theory.

Keywords

Absorptive Capacity, Strategic Flexibility, Innovation Performance, Sustainable Competitive Advantage, Internationalization

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Introduction

Early theories of enterprises internationalization mainly concentrated on developed countries' multinational corporations, and typical theoretical viewpoints included monopoly advantage theory, Uppsala model, transaction cost theory (He & Zhong, 2018). However, it is noteworthy that the process of enterprises internationalization has changed in recent years. More and more emerging economies firms (EEFs), not developed countries' firms, have invested overseas for more profit and development space, and the pace of internationalization has accelerated significantly (Bilgili, Kedia, & Bilgili, 2016). Simultaneously, with the coming of the knowledge economy era, the key resource to maintain competitive advantage is knowledge in the complex and changeable external environment. The firms' "absorptive capacity" was also proposed in the 1990s (Kostopoulos, Papalexandris, Papachroni, & Ioannou, 2011) and widely used in overseas direct investment research. Except relying on internal forces to promote innovation performance, enterprises should also absorb external knowledge and implement flexible strategies, so as to keep the sustainable competitive advantage in long-term competition (Liao, Chen, Hu, Chung, & Yang, 2017). Besides, EEFs usually do not have strong capital or advanced technical support. The risk of environmental uncertainty should be considered.

Therefore, due to the different research subjects and theoretical application fields, the early internationalization theory cannot accurately explain the new problems encountered by emerging economies firms (EEFs) and absorptive capacity also needs to be explored in a new arena. The objectives of this study are to fill this research gap.

The first objective is to link absorptive capacity, strategic flexibility, innovation performance and sustainable competitive advantage into a complete causal model. This study will verify the positive correlation between absorptive capacity and sustainable competitiveness, the mediating effect of strategic flexibility and innovation performance, and the negative moderating effect of environmental uncertainty. The second objective of the study is to apply the theory of absorptive capacity to a new study field instead of technology spillover from developed countries firms to developing countries firms.

Based on the new problems encountered in the internationalization process of EEFs and the existing theoretical basis, this research found new points and theoretical frameworks after collating the relevant literature, providing a new theoretical basis and practical guidance for the internationalization process of EEFs.

Theoretical Background and Hypotheses Development

Absorptive Capacity

Cohen and Levinthal (1990) defined the absorptive capacity construct as the capacity of a firm to value, assimilate and apply, for commercial ends, knowledge from external sources. According to the prior research, absorptive capacity will be studied from a dynamic perspective or a process-oriented perspective (Lane, Koka, & Pathak, 2006). Following Camison and Fores (2010), these four dimensions of absorptive capacity are classifiable into two components: potential absorptive capacity (acquisition and assimilation) and realized absorptive capacity (transformation and application). Zahra and George (2002) state that potential absorptive capacity can help companies maintain a competitive advantage, improve the efficiency and flexibility of company management, and at the same time, help coordinate the allocation of resources and capabilities, while realized absorptive capacity does so through the development of new products and processes. Although realized absorptive capacity is the primary source of innovation, the company's business innovation requires potential absorptive capacity of new knowledge as a basis, this can avoid the imitation of peers and the stagnation of the company.

Strategic Flexibility

Strategic flexibility is the ability of an organization to continuously rethink its strategic portfolio, asset allocation and investment strategy to promote the ability to deliberately adapt to and resist environmental changes according to the current environment (Sanchez, 1995). Conceptually, strategic flexibility is one of the company's strategic capabilities. It can adjust the company's internal resource layout and development direction in time according to changes in the external environment, and reduce the loss caused by environmental uncertainty (Bahrami, 1992). Strategic flexibility emphasizes the flexible use and reconfiguration of resources and reflects dynamic types of enterprises' actions (Dai, Goodale, Byun, & Ding, 2018). Due to the variability and complexity of the market environment, companies must master and skillfully use absorptive capacity and strategic flexibility. These two capabilities can enable companies to allocate resources and adjust strategies at the right time to deal with fierce competition and risks brought by uncertain factors. When necessary, companies should stop losses in time, actively reallocate resources to the most needed places, and take innovative measures in accordance with the new market environment (Zhou & Wu, 2010). Based on the relationship between absorptive capacity and strategic flexibility, the study thus proposes the following hypothesis:

Hypothesis 1a: The potential absorptive capacity of emerging economics firms correlates positively with the strategic flexibility.

Hypothesis 1b: The realized absorptive capacity of emerging economics firms correlates positively with the strategic flexibility.

Innovation Performance

Innovation performance includes all the benefits brought by the organization's innovation activities, including multiple aspects of measurement. It can be studied from two levels, the narrow-sense and the broad-sense (Hagedoorn & Cloodt, 2003). Narrow-sense innovation performance focuses on innovation efficiency and the value generated by innovation including the research and development speed of new products, new technologies and new equipment (Freeman & Soete, 1997). Broad-sense innovation performance focuses on evaluating the economic benefits brought by innovation activities, including technological innovation, product innovation, marketing innovation, and so on (Rajapathirana & Hui, 2018). The absorption and utilization of new knowledge can accelerate the occurrence and deepening of innovative behaviors (Ahnert & Suntrayuth, 2015), which in turn will bring about the production of new knowledge and new products. These outcomes will help enterprises maintain their core competitive advantage in the future (Ferraris, Devalle, Ciampi, & Couturier, 2019). The study proposes the following hypothesis:

Hypothesis 2a: The potential absorptive capacity of emerging economics firms correlates positively with the innovation performance.

Hypothesis 2b: The realized absorptive capacity of emerging economics firms correlates positively with the innovation performance.

Sustainable Competitive Advantage

Sustainable competitive advantage comes from the core competitiveness of enterprises. Bocken and Geradts (2019) believe that there are two types of factors that determine the sustainable competitive advantage of an enterprise: one is the difference and imitation of ability and knowledge, and the other is the irreplaceability of resources, ability and knowledge. Coyne (1986) pointed out that sustainable competitive advantage has two essential characteristics. One is "dynamic", that is, sustainable competitive advantage is not static and immutable, and there is no advantage that can ever be replaced over time. No matter what kind of market organization structure, competitive advantage is temporary and conditional. The second is "continuity." The long-term accumulation of relative competitive advantage can form an absolute competitive advantage. The theory of absorptive capacity explores how companies can acquire and maintain their sustainable competitive advantage from the perspective of learning ability,

and focuses on the external resources of the company without contradicting resource-based theories. In this case, the study thus proposes the following hypothesis:

Hypothesis 3a: The potential absorptive capacity of emerging economics firms correlates positively with the sustainable competitive advantage.

Hypothesis 3b: The realized absorptive capacity of the emerging economics firms correlates positively with the sustainable competitive advantage.

Strategic flexibility could contribute to the development of new products (Kandemir & Acur, 2012) and the ability to innovate. Most research proceed to exhibit a correlation between strategic flexibility and product innovation (Cottrell & Nault, 2004). Based on previous research this study proposes the following hypothesis:

Hypothesis 4: The strategic flexibility of emerging economics firms correlates positively with innovation performance.

Strategic flexibility is the ability of firms to use their resources to modify their strategies, change their strategic direction, or generate as many strategic options as possible continuously not only to survive, but to become a market leader in that industry, thus attaining a sustainable competitive advantage (Cingoz & Akdogan, 2013). This study thus proposes the following hypothesis:

Hypothesis 5: The strategic flexibility of emerging economics firms correlates positively with the sustainable competitive advantage.

Tseng, Chang Pai, and Hung (2011) identified that innovation performance can create a huge value for customers, thereby bringing greater market performance and profitability, supporting long-term business performance, so that short-term competitive advantages and long-term competitive advantages are perfectly connected. This study thus proposes the following hypothesis:

Hypothesis 6: The innovation performance of the emerging economics firms correlates positively with the sustainable competitive advantage.

Environmental Uncertainty-Moderator

Environmental uncertainty includes the unpredictability of competitors, suppliers, customers, markets, product and technology changes, etc., including not only the variation of these factors, but also the degree of instability, governance mechanisms and operations of enterprises (Qi, Zhao, & Sheu, 2011). The enterprise can only adapt to the external environment through in-depth understanding of the external environment and maximize the benefits by combining its own capabilities (Miroshnychenko, Strobl, Matzler, & De Massis, 2020). When the environmental uncertainty is low, companies need to continue the trend of

market development to more easily capture small changes in the environment. At this time, new uses and resources brought by strategic flexibility are difficult to perform effectively. When the environmental uncertainty is high, companies need to carry out more exploratory innovations, bringing more resources or discovering a more flexible use of resources (Sanchez, 1995). Thus, the study proposes the following hypothesis:

Hypothesis 7a: The environmental uncertainties negatively regulate the relationship between potential absorptive capacity and innovation performance.

Hypothesis 7b: The environmental uncertainties negatively regulate the relationship between realized absorptive capacity and innovation performance.

Hypothesis 7c: The environmental uncertainties negatively indicate the relationship between strategic flexibility and innovation performance.

The Mediating Role of Strategic Flexibility and Innovation Performance

Through the elaboration of variables' concepts in the previous section, this study found that strategic flexibility and innovation performance were mediators that affected the relationship level of other variables; empirical research was necessary whether the mediating effect existed or not. Therefore, this study proposed the following hypotheses for the mediating effect measurement:

H8: Strategic flexibility mediates the relationship between potential absorptive capacity and sustainable competitive advantage.

H9: Innovation performance mediates the relationship between potential absorptive capacity and sustainable competitive advantage.

H10: Strategic flexibility mediates the relationship between potential absorptive capacity and innovation performance.

H11: Innovation performance mediates the relationship between realized absorptive capacity and sustainable competitive advantage.

H12: Innovation performance mediates the relationship between strategic flexibility and sustainable competitive advantage.

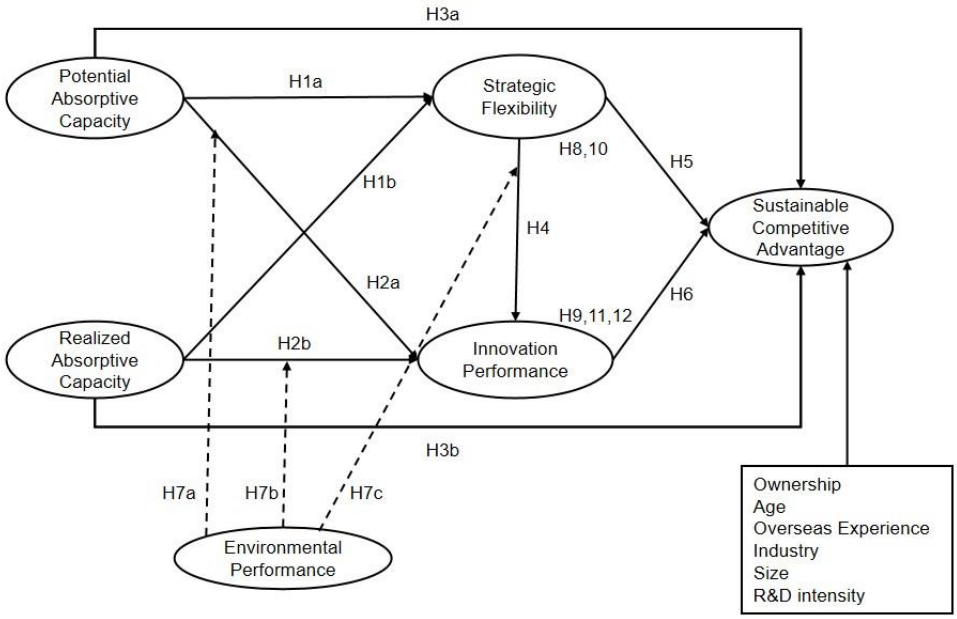

Figure 1 The Conceptual Model

Methodology

Samples and Data Collection

The study chose Chinese international enterprises from manufacturing and service industries as the population, the sampling method was non-probabilistic convenience sampling, and the respondents were the principal persons in charge (chairman or manager) of enterprises. According to C. M. o. Commerce (2019), more than 27,000 Chinese domestic investors have established 43,000 or more foreign direct investment companies in 188 countries (regions) around the world. The top 20 countries (regions) make up 93.4% of the total, so the study selected Chinese enterprises from the top 20 countries (regions). Since the information of British Virgin Islands and Cayman Islands are protected and cannot be searched, the Chinese companies actually participating in the survey are from 18 countries (Hong Kong (China), America, Singapore, Luxembourg, Australia, Indonesia, Malaysia, Canada, Germany, Laos, Vietnam, United Arab Emirates, Sweden, Netherlands, Korea, United Kingdom, Macao (China), and Cambodia).

At the end of 2018, 78% of China's foreign direct investment stock was concentrated in the tertiary industry (the service industry). The secondary industry accounted for 21.4%, of which manufacturing (excluding metal products, machinery, and equipment repairing) accounted for 43% (P. s. R. o. C. M. o. Commerce, 2019). Therefore, based on the above data, the estimated number of the population was obtained in this way:

43000*93.4% = 40162.

40162*78%+40162*21.4%*43% = 35022.

Then the population is 35022.

In this study, the sample size was acquired from the simplified formula suggested by Yamane (1967).

$n = N/(1+N(e)^2)$;

Where n is the target sample size, N is the known population size, based on the above data, N is equal to 35022, and e is the level of precision or acceptable sampling error (which is the 95% confidence level, and a 5% margin of error is employed in this study). Having applied the formula, the sample size is 396 respondents.

The investigation was divided into two stages, pilot test and main survey. The pilot test used 10% of the sample size required for the full study (Hertzog, 2008). Following the calculation of sample size above, 40 samples were collected using the online survey tool Sojump in Hong Kong from September 20-25, 2020. The main survey did not include these 40 samples. In the main survey, a total of 456 questionnaires were collected by distributing them online using Sojump from September 28 to October 10, 2020. They targeted the Chinese Enterprises Associations of target countries (regions), of which 404 were valid and used in the hypothesis testing process. Hair et al (2010) suggested that sample size should be five to ten times the number of indicators/items of the questionnaire for conducting SEM Analysis. According to the questionnaire of the study, a total 85 items were listed and 456 samples were collected, meeting the requirement. From the number of usable responses returned, a response rate of 88.6% was achieved. The original questionnaire was in English. The study used back translation to minimize language differences, and produced a Chinese version of the questionnaire as well.

Variable Measurements

The study operated the survey by measurement scales established in prior studies. The measurement items of 6 main variables contain 85 items, which were measured using a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree); the measurement of 6 control variables was completed by 6 choice items, and the basic information of the respondents was completed in other items. Therefore, the entire questionnaire consisted of 96 items.

Absorptive capacity includes 2 parts: potential absorptive capacity (PAC) and realized absorptive capacity (RAC). The measurement of innovation performance (IP) is divided into three dimensions: technological innovation (IPTI), product innovation (IPPI) and marketing innovation (IPMI). The measurement of environmental uncertainty (EU) is divided into two dimensions, namely environment dynamic (EUED) and environmental hostility (EUEH). Previous research, for example, Ma, Sun, Gao, and Gao (2019), selected the most

representative factors as the control variables, which were age, size, industry, ownership, overseas experience and R&D intensity of EEFs. More information of the questionnaire (resources, authors, years) are shown in Table 2.

To ensure the content validity during the development of questionnaires, three experts were requested to evaluate Index of Item-Objective Congruence (IOC). The scores of IOC were +1 (the item was found to be congruent), 0 (the item was found to be questionable) and -1 (the item was found to be incongruent) (Turner & Carlson, 2003). The result of IOC showed that all the questions passed the minimum criteria of 0.50.

Pilot Test

The following results were found after the analysis of data from the pilot test. The measurement criterion of Cronbach's α coefficient was above the threshold value of 0.7 as recommended by Fornell and Larcker (1981), indicating a good reliability. While the Cronbach's α coefficients of all factors met the criterion, the study eliminated some items (SF10, SF12, EUED3, SCA9). After they were deleted, the Cronbach's Alpha coefficient of the scale increased.

For the validity analysis, exploratory factor analysis (EFA) was used and combined with the KMO test and Bartlett's test of Sphericity. The two values were used to judge whether the items were suitable for factor analysis. The criterions included the need for the KMO value to be above 0.7 and the significance level of Bartlett's test of Sphericity to be under .05 (Bartlett, 1937). Based on the results from the pilot test, all KMO values were higher than .7 and all significance levels were .000 (< 0.05), indicating a good construct validity. The internal structure of the questionnaire needs to be verified to ensure the rigor of the survey. After EFA, the data showed that the number of principal components extracted for each variable was consistent with the referenced literature (PAC, RAC, SF, SCA：1 component； IP: 3 components; EU: 2 components). This means that the questionnaire had a good construct validity and could be used in the main survey.

Analysis Approaches

This study used IBM SPSS Statistics 23 and IBM SPSS AMOS 23 for data analysis. Analysis included a pilot test and main test. First, the study used SPSS to analyze the reliability and Exploratory Factor Analysis (EFA) in a pilot test to adjust the questionnaire. Second, in the main test, the study used AMOS to perform confirmatory factor analysis (CFA) to verify the reliability, validity, and the model fit. Path analysis was used to test all the hypotheses proposed in this study. Maximum Likelihood (ML) estimation is widely used to analyze most confirmatory factor analysis (CFA) models and is applicable when the measured variables follow a multivariate normal distribution in the population (Curran, West,

& Finch, 1996). The absolute value of skew was within 3, and the absolute value of kurtosis was within 7, which was in line with the recommended value of Kline (2005). This study also adopted the ML estimation. Similarly, this study uses SPSS and AMOS to verify the degree of effect of the moderator and mediator. The goal of the research was to test and confirm whether there is a connection between variables and the degree of mutual influence. Therefore, IBM SPSS statistics and AMOS were the most suitable techniques to implement the structural equation model (SEM) of this research.

Results

Descriptive Statistics of Respondents

The descriptive statistics of the main survey are shown in Table 1. For the nature of company, state-owned (30.4%), private enterprise (39.1%), and others (30.4%). For years of company establishment, "6-10 years" (35.6%), "3-5 years" (32.9%), "11-15 years" (31.4%). For years of overseas businesses, "3-5 years" (37.4%), “6-10 years" (32.4%), "11-15 years" (30.20%). For the distribution of company industry, service industry (42.1%), manufacturing Industry (57.9%). For R&D intensity, "1%-3%" (34.4%), "3%-5%" (33.2%), "less than 1%" (32.4%). For accumulated overseas investment scale, the range is from 14.4 million to 18.8 million, no significant differences. By the descriptive analysis of the above variables, it was found that, except for the industry distribution, that the manufacturing industry accounts for the main proportion, the other variables are relatively evenly distributed.

Table 1 Descriptive statistics of respondents (N=404)

Item	Options	Frequency	Percentage (%)
Nature of your company	State-own	123	30.4
	Private enterprise	158	39.1
	Others	123	30.4
Years of company establishment	3-5 years	133	32.9
	6-10 years	144	35.6
	11-15 years	127	31.4
Years of overseas businesses	3-5 years	151	37.4
	6-10 years	131	32.4
	11-15 years	122	30.2
Industry involved by your company (main businesses):	Services industry	170	42.1
	manufacturing industry	234	57.9

Table 1 Descriptive statistics of respondents (N=404) (Continued)

Item	Options	Frequency	Percentage (%)
R&D intensity	Less than 1%	131	32.4
	1%~3%	139	34.4
	3%~5%	134	33.2
Accumulated overseas investment scale	Under USD 0.5 million	70	17.3
	USD 0.5-3 million	76	18.8
	USD 3-15 million	72	17.8
	USD 15-50 million	58	14.4
	USD 50-100 million	69	17.1
	Over USD 100 million	59	14.6

Reliability and Validity

Reliability analysis involves the Cronbach'α coefficient and the composite reliability (CR) coefficient of the latent variables, the values should be above 0.7 (Fornell & Larcker, 1981). The Cronbach'α coefficients of all variables shown in the Table 3 were in the range of 0.897 to 0.968, which indicates consistency among the items of each construct. Similarly, the composite reliability coefficients ranged from 0.901 to 0.964, meaning that items can represent each construct. Convergent validity involves the factor loadings and the average variance extracted (AVE) (Fornell & Larcker, 1981), the benchmark of these two indicators should be greater than 0.5 suggested by Fornell and Larcker (1981). All standardized loadings as shown in Table 2, were greater than 0.5, and the lowest value of AVE of all variables was 0.508, which was greater than 0.5 as well. The discriminative validity mainly tests the relationship between the correlation coefficient between each latent variable and the square root of AVE. As shown in Table 4, the square root value of AVE for all variables was greater than the correlation coefficient between variables, which indicates a good discriminant validity of each variable.

Table 2 The information of the questionnaire and factor loadings

Construct	Items	Adapted from	Loadings
PAC	1. The search for relevant information concerning our industry is an every-day business in our company.	(Flatten, Engelen, Zahra, & Brettel, 2011)	0.757
	2. Our management motivates the employees to use information sources within our industry.		0.736
	3. Our unit has frequent interactions with corporate headquarters to acquire new knowledge.	(Jansen et al., 2005)	0.696
	4. Employees of our unit regularly visit other branches.		0.734
	5. We collect industry information through informal means.		0.712
	6. Our unit periodically organizes special meetings with customers or third parties to acquire new knowledge.		0.755
	7. Our management emphasizes cross-departmental support to solve problems.	(Flatten et al., 2011)	0.846
	8. In our company there is a quick information flow.		0.829
	9. Our management demands periodical cross-departmental meetings to interchange new developments, problems, and achievements.		0.797
	10. New opportunities to serve our clients are quickly understood.	(Jansen et al., 2005)	0.793
	11. We quickly analyze and interpret changing market demands.		0.844
RAC	1. Our employees can structure, and use collected knowledge.	(Flatten et al., 2011)	0.851
	2. Our employees are used to absorb new knowledge as well as to prepare it for further purposes and to make it available.		0.849
	3. Our employees successfully link existing knowledge with new insights.		0.910
	4. Our employees can apply new knowledge in their practical work.		0.852

Table 2 The information of the questionnaire and factor loadings (Continued)

Construct	Items	Adapted from	Loadings
RAC	5. Our unit regularly considers the consequences of changing market demands in terms of new products and services.	(Jansen et al., 2005)	0.725
	6. Our unit quickly recognizes the usefulness of new external knowledge to existing knowledge.		0.807
	7. Our unit periodically meets to discuss the consequences of market trends and new product development.		0.850
	8. Our management supports the development of prototypes.	(Flatten et al., 2011)	0.854
	9. Our company regularly reconsiders technologies and adapts them accordant to new knowledge.		0.911
	10. Our company can work more effectively by adopting new technologies.		0.848
	11. We constantly consider how to better exploit knowledge.	(Jansen et al., 2005)	0.722
SF	1. Sometimes we act as major agents of change in our industry.	(Fan, Wu, & Wu, 2013)	0.771
	2. We often come up with strategies that cannot be predicted based on past action.		0.780
	3. We constantly work to create options for growth in multiple technological areas.		0.669
	4. We attempt to use technology to establish new standards.		0.712
	5. Our strategic plans emphasize building in slack so we can manage unforeseen circumstances.		0.581
	6. We consider an array of contingencies when developing strategies.		0.617
	7. We can take advantage of opportunities that arise from environmental change.		0.812

Table 2 The information of the questionnaire and factor loadings (Continued)

Construct	Items	Adapted from	Loadings
SF	8. We engage in planning that is typical of the 'wait and see' nature.		0.783
	9. If circumstances change, our organization is prepared to react in a modified and viable manner.	(Miroshnychenko et al., 2020)	0.771
	10. You have a very smooth communication mechanism.	(Yang, Zhang, Jiang, & Sun, 2015)	0.536
IP	*Innovation performance-technical innovation (IPTI)*		
	1. Developing new technologies.	(Prajogo & Ahmed, 2006)	0.615
	2. Incorporating technologies into new products.		0.587
	3. Facilitating new processes to improve quality and cost.		0.627
	4. Increase in new services introduced.	(Ferraris et al., 2019)	0.625
	5. Increase in the number of new products.		0.666
	6. New products sales' share of total sales revenue.	(Fan, Wu, & Wu, 2013)	0.725
	7. Overall market competition for the products of a firm.		0.608
	Innovation Performance-Production Innovation (IPPI)		
	1. Replacement of products being phased out.	(Vidal, Lapiedra, & Chiva, 2006)	0.644
	2. Extension of product range within the main product field through technologically new products.		0.816
	3. Extension of product range within the main product field through technologically improved products.		0.582
	4. Development of environment-friendly products.		0.632
	5. Opening of new markets abroad.		0.579
	6. Opening of new domestic target groups.		0.602

Table 2 The information of the questionnaire and factor loadings (Continued)

Construct	Items	Adapted from	Loadings
IP	7. Provide our clients with services that offer unique benefits superior to those of competitors.	(Calik & Cetinguc, 2017)	0.631
	8. Our firm actively carries out its work on developing existing products and creating new products.		0.576
	9. We enhance the range of our products and services with not previously released products and services.		0.581
	10. We try to acquire new products by differing technical specifications and functionality.		0.645
	11.Our company sees creating new products and services as critical tools to reach success.		0.821
	Innovation Performance-Marketing Innovation (IPMI)		
	1. Our company needs to make changes in the appearance, packaging, shape, and volume of our products.	(Calik & Cetinguc, 2017)	0.665
	2. Our company constantly looks for new ways to deliver our products to our customers.		0.721
	3. We implement new marketing methods to promote our products.		0.793
	4. We make improvements in the manner of customer relationships to obtain customer satisfaction.		0.614
	5. New ideas that come from customers and suppliers are evaluated continuously, and we try to include them in product development activities.		0.715

Table 2 The information of the questionnaire and factor loadings (Continued)

Construct	Items	Adapted from	Loadings
EU	*Environmental Uncertainty-Environmental Dynamic (EUED)*		
	1. Our customers often change their order over the month.	(Wong et al., 2011)	0.771
	2. Our suppliers' performance is unpredictable.		0.871
	3. Our plant uses core production technologies that often change.		0.881
	4. Faster update of products or services in the industry.		0.877
	5. Difficult to foresee the behavior of competitors in the industry.	(Miller, 1987)	0.772
	6. Fast technology advance in the industry.		0.763
	7. Difficult to foresee the change of customer demands in the industry.		0.862
	8. Higher frequency of marketing strategy change in the company.		0.922
	9. Larger mobility of technicians of the company.	(Newkirk &	0.877
	10. Frequent change of top management officers in the company.	Lederer, 2006)	0.886
	Environmental Uncertainty-Environmental Hostility (EUEH)		
	1. Fiercer competition in quality and innovation in the industry.	(Miller, 1987)	0.782
	2. Fiercer competition of price in the industry.		0.879
	3. More enterprises exit from the industry.	(Newkirk &	0.887
	4. Slower intervention speed of the government in the industry due to its relaxation in it.	Lederer, 2006)	0.941
	5. More difficult to control the production cost of the com pany.		0.878
	7. Smaller capacity of the market in the industry.		0.783

Table 2 The information of the questionnaire and factor loadings (Continued)

Construct	Items	Adapted from	Loadings
SCA	1. The innovations we introduced enabled us to enjoy a superior market position for a reasonable period.	(Salunke, Weerawardena, & McColl-Kennedy, 2019)	0.690
	2. The new changes we introduced have been appreciated by our clients/customers giving us a distinct advantage for some time now.		0.788
	3. Our competitors could not easily match the advantages of the new products or services that we introduced.		0.749
	4. The new products or services we introduced were a steppingstone for further development.		0.650
	5. Key resources represent value for exploring market opportunities or assisting the organization in defending itself against environmental threats through an increase in revenue and/or a reduction in spending.	(Guimarães et al., 2017)	0.683
	6. The company's key resources cannot be used by other companies, and it is difficult for competitors to obtain these resources.		0.801
	7. Key resources are difficult for competitors to imitat		0.752
	8. The key resources of the company can hardly be replaced by another strategic resource.		0.647
	9. The company responsibly uses key resources in terms of the following aspects: economic (to provide society with goods and services); legal (regarding legal premises); ethics (respect for practices that are expected or prohibited by society); philanthropy (promote the well-being or quality of life of society).		0.585

Note: PAC: Potential Absorptive Capacity; RAC: Realized Absorptive Capacity; SF: Strategic Flexibility; IP: Innovation Performance; SCA: Sustainable Competitive Advantage; EU: Environmental Uncertainty.

Collinearity assessment is necessary while analyzing the structural model. Collinearity is the degree of high correlation among the two model indicators. If the variance inflation factor (VIF) value is greater than 5 or less than 0.2 (Wong, 2013), the collinearity issues exist. As shown in Table 3, the range of VIFs is from 1.487 to 3.061. It met the criteria, indicating that the latent variables did not have multicollinearity.

Table 3 Reliability, Convergent validity, VIF and R^2.

Construct	Cronbach's α	CR	AVE	VIF	R2
PAC	0.927	0.928	0.540	2.958	
RAC	0.953	0.952	0.647	3.061	
SF	0.908	0.910	0.508	1.913	0.477
IP	0.934	0.922	0.648	1.776	0.437
EU	0.968	0.964	0.611	1.487	
SCA	0.897	0.901	0.512		0.660

Note: PAC: Potential Absorptive Capacity; RAC: Realized Absorptive Capacity; SF: Strategic Flexibility; IP: Innovation Performance; SCA: Sustainable Competitive Advantage; EU: Environmental Uncertainty; CR: Composite reliability; AVE: Average Variance Extracted; VIF: Variance Inflation Factor.

Table 4 Means, Standard deviations, Correlations, and Discriminant Validity.

Construct	Mean	SD	PAC	RAC	SF	IP	EU
PAC	3.593	0.804	**(0.735)**				
RAC	3.675	0.866	0.706**	**(0.804)**			
SF	3.781	0.673	0.583**	0.610**	**(0.713)**		
IP	4.081	0.501	0.552**	0.547**	0.519**	**(0.805)**	
EU	1.830	0.745	-0.385**	-0.365**	-0.490**	-0.505**	**(0.782)**
SCA	3.860	0.585	0.550**	0.534**	0.484**	0.801**	-0.488**

Note: *p value<0.05, **p value<0.01 (two-tailed); The square root values of AVE are displayed in the parentheses. PAC: Potential Absorptive Capacity; RAC: Realized Absorptive Capacity; SF: Strategic Flexibility; IP: Innovation Performance; SCA: Sustainable Competitive Advantage; EU: Environmental Uncertainty; *. Correlation is significant at the 0.05 level (2-tailed); **. Correlation is significant at the 0.01 level (2-tailed).

Moreover, this study needs to test whether common method variance (CMV) exists or not. The results of the Harman's single-factor test showed that the percentage variance extracted from a single factor was 33.241% (lower than the threshold of 50%) (Podsakoff, MacKenzie, & Podsakoff, 2012), indicating that CMV does not affect the model.

Model Fit

The results of structural modeling show that the model can be identified and converged, and there is no negative error variance in the model graph of the non-standardized estimates, indicating the results met the model identification rules. Besides, it is assumed that the model fits the data well ($\chi 2$ = 50.689, df = 18, $\chi 2$ /df = 2.816, RMR= 0.019, CFI = 0.962, GFI = 0.944, NFI= 0.944, IFI= 0.963, TLI= 0.924, RMSEA = 0.067); the squared multiple correlations (R^2) (SF= 0.458, IP= 0.374, SCA= 0.484) all met the requirement by Fornell and Larcker (1981); the modification indices are less than 4, and the above values are in line with the fit index value recommended by Hair et al (2010). This represents a high degree of fit between the structural model and the actual data, the structural model does not need to be revised.

Path Analysis

In this study, AMOS 23.0 was used to perform structural equation model operations on the collected data and to analyze the running results as Hair et al. (2010) recommends. The significance test of the model is shown in Figure 2 and Table 5.

Hypothesis 1a: The potential absorptive capacity of emerging economics firms correlates positively with the strategic flexibility. The results indicated a significant positive effect between the two variables (β= 0.268***). Therefore, hypothesis 1a is supported.

Hypothesis 2a: The potential absorptive capacity of emerging economics firms correlates positively with the innovation performance. The results indicated a significant positive effect between the two variables (β= 0.290> 0.05). Therefore, hypothesis 2a is supported.

Hypothesis 3a: The potential absorptive capacity of emerging economics firms correlates positively with the sustainable competitive advantage. The results indicated a significant positive effect between the two variables (β= 0.122*). Therefore, hypothesis 3a is supported.

Hypothesis 1b: The realized absorptive capacity of emerging economics firms correlates positively with the strategic flexibility. The results indicated a significant positive effect between the two variables (β= 0.396***). Therefore, hypothesis 1b is supported.

Hypothesis 2b: The realized absorptive capacity of emerging economics firms correlates positively with the innovation performance. The results indicated a significant positive effect between the two variables (β= 0.185**). Therefore, hypothesis 2b is supported.

Hypothesis 3b: The realized absorptive capacity of the emerging economics firms correlates positively with the sustainable competitive advantage. The results indicated no significant effect between the two variables (p= 0.583> 0.05). Therefore, hypothesis 3b is not supported.

Hypothesis 4: The strategic flexibility of emerging economics firms correlates positively with innovation performance. The results indicated a significant positive effect between the two variables (β= 0.242***). Therefore, hypothesis 4 is supported.

Hypothesis 5: The strategic flexibility of emerging economics firms correlates positively with the sustainable competitive advantage. The results indicated a significant positive effect between the two variables (β= 0.176***). Therefore, hypothesis 5 is supported.

Hypothesis 6: The innovation performance of the emerging economics firms correlates positively with the sustainable competitive advantage. The results indicated a significant positive effect between the two variables (β= 0.693***). Therefore, hypothesis 6 is supported.

Control Variables

As shown in the Table 5, the path analysis of some control variables on SCA does not show significance, such as “ownership” (p= 0.801> 0.05), “age” (p= 0.120> 0.05), “overseas experience” (p= 0.317> 0.05), and “size” (p= 0.285> 0.05). This means they don’t have impacts on SCA. However, “industry” (β= -0.065*) and “R&D intensity” (β= 0.059*) have significance effects on SCA.

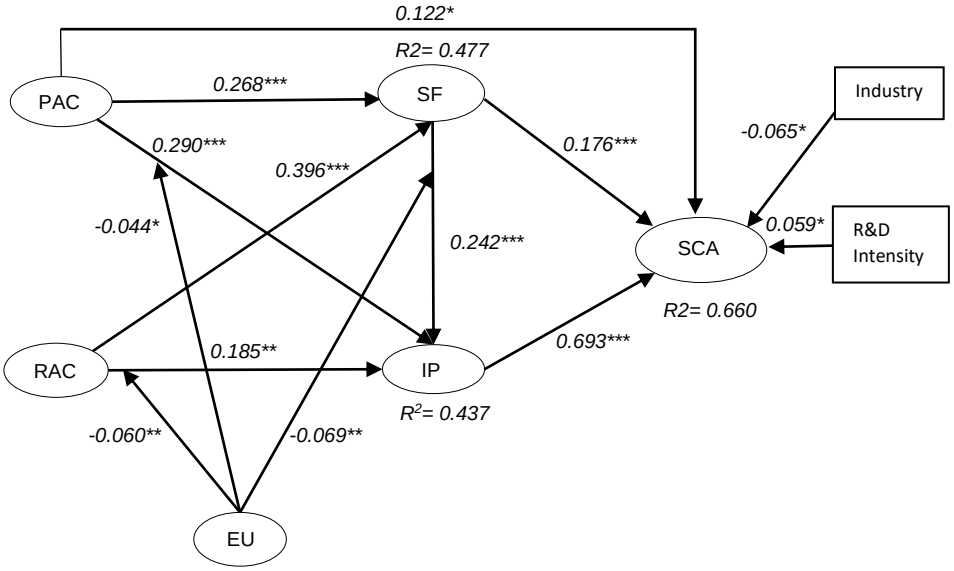

Figure 2 Final Result of Structural Equation Modeling

Note: *: p<0.05; **: p<0.01; ***: p<0.001 (two-tailed); Standardized coefficients are reported. PAC: Potential Absorptive Capacity; RAC: Realized Absorptive Capacity; SF: Strategic Flexibility; IP: Innovation Performance; SCA: Sustainable Competitive Advantage; EU: Environmental Uncertainty.

Table 5 Final results of the relationship checking of model's constructs.

Hypothesis	Relationship	Estimate β	p	Result
H1a	PAC→SF	0.268***	0.000	Supported
H2a	PAC→IP	0.290***	0.000	Supported
H3a	PAC→SCA	0.122*	0.015	Supported
H1b	RAC→SF	0.396***	0.000	Supported
H2b	RAC→IP	0.185**	0.006	Supported
H3b	RAC→SCA	0.028	0.583	Not supported
H4	SF→IP	0.242***	0.000	Supported
H5	SF→SCA	0.176***	0.000	Supported
H6	IP→SCA	0.693***	0.000	Supported
Control variables				
Ownership →SCA		-0.007	0.801	
Age →SCA		0.045	0.120	
Overseas experience →SCA		-0.029	0.317	

Table 5 Final results of the relationship checking of model's constructs (Continued)

Hypothesis Relationship	Estimate β	p	Result
Industry →SCA	-0.065*	0.023	
Size →SCA	-0.031	0.285	
R&D intensity →SCA	0.059*	0.040	

Note: *: p<0.05; **: p<0.01; ***: p<0.001 (two-tailed); PAC: Potential Absorptive Capacity; RAC: Realized Absorptive Capacity; SF: Strategic Flexibility; IP: Innovation Performance; SCA: Sustainable Competitive Advantage; EU: Environmental Uncertainty.

The Moderating Role of Environmental Uncertainty

This study used the moderating effect method of Wen, Zhang, and Hau (2006). The study standardized the independent variable and moderator and calculated their product term , a multiple stepwise regression was then performed.

From the Table 6, it can be seen that the p values (PAC= 0.000***, RAC= 0.000***, SF= 0.000***) are significant. This means that PAC, RAC and SF will have significant impacts on IP.

Hypothesis 7a: The environmental uncertainties negatively regulate the relationship between potential absorptive capacity and innovation performance. The interaction term between PAC and EU is significant (β= -0.044*). With the results of simple slope analysis as shown on Figure 3, the increase of EU will reduce the slope of the impact of PAC on IP. This result supports hypothesis H7a.

Hypothesis 7b: The environmental uncertainties negatively regulate the relationship between realized absorptive capacity and innovation performance. The interaction term between RAC and EU is significant (β= -0.060**). With the results of simple slope analysis as shown on Figure 4, the increase of EU will reduce the slope of the impact of RAC on IP. This result supports Hypothesis H7b.

Hypothesis 7c: The environmental uncertainties negatively indicate the relationship between strategic flexibility and innovation performance. The interaction term between SF and EU is significant (β= -0.069**). With the results of simple slope analysis as shown on Figure 5, the increase of EU will reduce the slope of the influence of SF on IP. This result supports Hypothesis H7c.

Table 6 The result of the moderating effect.

Hypothesis	Relationship	β	Moderating effect
H7a	PAC→IP	0.343***	Supported
	EU→IP	-0.231***	
	PAC*EU→IP	-0.044*	
H7b	RAC→IP	0.316***	Supported
	EU→IP	-0.237***	
	RAC*EU→IP	-0.060**	
H7c	SF→IP	0.386***	Supported
	EU→IP	-0.222***	
	SF*EU→IP	-0.069**	

Note: *: p<0.05; **: p<0.01; ***: p<0.001 (two-tailed); PAC: Potential Absorptive Capacity; RAC: Realized Absorptive Capacity; SF: Strategic Flexibility; IP: Innovation Performance; SCA: Sustainable Competitive Advantage; EU: Environmental Uncertainty.

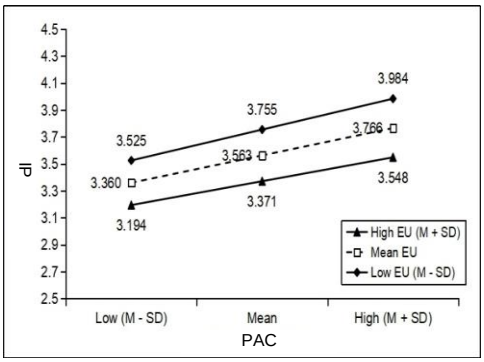

Figure 3 H7a

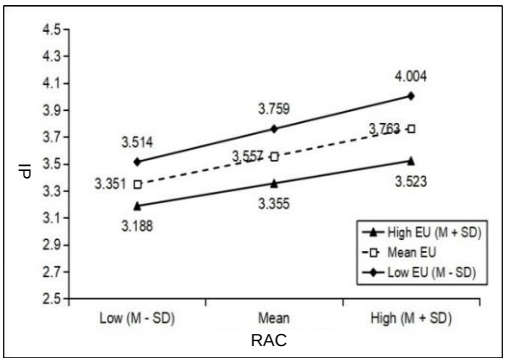

Figure 4 H7b

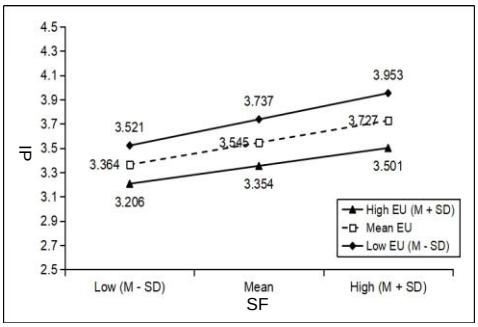

Figure 5 H7c

The Mediating Role of Strategic Flexibility and Innovation Performance

Using the bootstrap function of AMOS 23.0, 2000 bootstrap samples were generated with percentile bootstrapping at a 95% confidence interval. If under the condition of significance, bootstrapping is within the 95% confidence interval and its estimated interval does not contain 0, then the hypothesis that the effects do not exist is rejected (Wen et al., 2006), that is, the hypothesis that the effect exists is valid.

It can be seen from the Table 7 that the total effect (p= 0.008**) and indirect effect (p= 0.003**) of PAC in H8 and H9 are significant for SCA, the hypothesis is supported, and the direct effect (p= 0.178> 0.05) is not significant, that is, SF and IP play a complete mediating effect in the influence of PAC on SCA.

The indirect effect (p= 0.138> 0.05) of PAC on IP in H10 are not significant, that is, SF plays no mediating effect in the influence of PAC on IP.

The total effect (p= 0.000***) and indirect effect (p= 0.000***) of RAC on SCA in H11 are significant, but the direct effects(p=.935>.05) are not significant, that is, IP plays a complete mediating effect in the influence of RAC on SCA.

The total effect (p= 0.000***), direct effect (p= 0.004**) and indirect effect (p= 0.000***) of SF on SCA in H12 are significant, that is, IP plays a partial mediating effect in the influence of SF on SCA.

Table 7 The result of the mediating effect.

Hypothesis	Relationship	Direct effect	Indirect effect	Total effect	Mediating effect	Result
H8	PAC→SF→SCA	-0.074	0.239**	0.165**	Complete Mediation	Supported
H9	PAC→IP→SCA	-0.074	0.239**	0.165**	Complete Mediation	Supported
H10	PAC→SF→IP	0.191**	0.020	0.210**	****	Not Supported
H11	RAC→IP→SCA	0.005	0.261***	0.266***	Complete Mediation	Supported
H12	SF→IP→SCA	0.158**	0.199***	0.357***	Partial Mediation	Supported

Note: *: p<0.05; **: p<0.01; ***: p<0.001 (two-tailed); PAC: Potential Absorptive Capacity; RAC: Realized Absorptive Capacity; SF: Strategic Flexibility; IP: Innovation Performance; SCA: Sustainable Competitive Advantage; EU: Environmental Uncertainty.

Discussion and Conclusion

Results

This study examined the influence of absorptive capacity on sustainable competitive advantage, and provided a theoretical basis for EEFs to utilize absorptive capacity. At the same time, different from the areas of innovation and R&D, which are closely related to absorptive capacity, this study established a link between absorptive capacity and sustainable competitive advantage, strategic flexibility and innovation performance as mediators, environmental uncertainty as a moderator, six elements as control variables. These variables composed the conceptual model of this study and represented the basic process of utilizing absorptive capacity by enterprises.

The two dimensions of absorptive capacity have obvious differences about the impact on sustainable competitive advantage. Potential absorptive capacity has a significant impact on sustainable competitive advantage (β= 0.122*), however, realized absorptive capacity has no significant impact on sustainable competitive advantage (p= 0.583> 0.05). According to previous studies, if absorptive capacity was not divided into two dimensions but as a complete concept, the influence of absorptive capacity on sustainable competitive advantage is significant (Pangarso, Astuti, Raharjo, & Afrianty, 2020). This means that if enterprises wanted to improve their sustainable competitive advantage, they need to focus on potential absorptive capacity more.

Potential absorptive capacity has significant influences on strategic flexibility (β= 0.268***) and innovation performance (β= 0.290***), realized absorptive capacity has significant influences on strategic flexibility (β= 0.396, p= 0.000***) and innovation performance (β= 0.185***), and the mediating effects of innovation performance is significant, however, a finding, the mediating effects of strategic flexibility on potential absorptive capacity and innovation performance (two-tailed significance of indirect effect= 0.138> 0.05) is not significant. This means that the mediating effects of strategic flexibility on potential absorptive capacity and innovation performance is not significant. This result is different from the previous study (Kamasak, Yavuz, Karagulle, & Agca, 2016), however, it doesn't influence the operating mechanism, because other paths can make the potential absorptive capacity transfer to sustainable competitive advantage. By observing the results of other path analysis, this study found that under the influence of mediators, absorptive capacity can play a greater role in sustainable competitive advantage than the potential absorptive on sustainable competitive advantage (β= 0.122*). The conceptual model is supported by empirical analysis and can constitute an effective operating mechanism.

It was observed that innovation performance had a significant effect on sustainable competitive advantage (β= 0.693***), and the coefficient was greater than

that of other variables. This confirmed the previous research results that innovative behavior had a significant effect on absorptive capacity (Hong, Zheng, Deng, & Zhou, 2019) and sustainable competitive advantage (Kuncoro & Suriani, 2018), which means companies should focus on innovation strategy for overseas operations, innovation is a key factor to maintain competitiveness. In addition, environmental uncertainty, as a moderator, played a significant and negative role in the impact of other variables on innovation performance (H7a β= -0.044*, H7b β= -0.060**, H7c β= -0.069**). This confirmed previous research and showed companies should try to minimize the negative impacts brought by environmental uncertainty. If overseas companies cannot control the risks brought by the external environment, due to EEFs' own problems, such as insufficient funds, they will become difficult to operate, unable to make profits or even gradually lose market share. Therefore, companies must pay attention to the uncertainty of the external environment, flexibly respond to various difficulties and challenges, and maintain a long-term competitive advantage.

Finally, with regard to the six control variables, the results showed the significant impact of industry (β= -0.065*) and R&D intensity (β= 0.059*) on sustainable competitive advantage. This was confirms research from Medase and Barasa (2019) and Guimaraes, Severo, and Vasconcelos (2017). The impacts of absorptive capacity among different industries were different, and the greater the intensity of R&D, the greater the impact on sustainable competitive advantage. Other control variables, age (p= 0.120> 0.05), size (p= 0.285> 0.05), overseas experience (p= 0.317> 0.05), and ownership (p= 0.801> 0.05) had no effect on sustainable competitive advantage. This is different from previous studies, and likely related to the scope of the sample collection. There were not enough EEFs to be examined, and the role of these variables were not highlighted in this study.

Theoretical Contribution

First, the study combines the absorptive capacity, innovation performance, strategic flexibility and sustainable competitiveness to a complete mechanism of action. Most of the previous research focused on the relationship of some of these concepts, and very few studies have explored the sustainable competitive advantage of enterprises as the final destination. This study therefore forms a new research framework and a complete route.

Second, the study provides richer theoretical outcomes for the internationalization of EEFs. The main object of globalization was multinational enterprises from developed countries in the past, and there were very few studies on EEFs. With the increasing role and contribution of emerging economies in the development of the global economy, scholars need to address the academic issues

surrounding emerging economies gradually. For example, observing the behavioral characteristics of EEFs in the international market, finding how EEFs cultivate core competitive advantages and reduce external environmental risks, these explorations will provide internationalization theoretical guidance for EEFs. Therefore, this study makes new theoretical contributions for EEFs in the process of internationalization.

Third, the study applied the theory of absorptive capacity to a new field. In the original application of absorptive capacity theory, technology spillover from developed to developing countries was the major problem. This study focused on the influence of absorptive on sustainable competitive advantage in the process of internationalization of EEFs, enriching the theory of internationalization and absorptive capacity.

Research Implication

Above all, EEFs should pay attention to the cultivation of learning ability and absorptive capacity for the advanced technology and management models of local companies, combining the local market demands to innovate products and services in the fastest time and maintaining the competitive advantage. The improvements lie in stepping out of the domestic environment and improving development trends of the industry based on the global market.

Next, it is important to improve the innovation capabilities of overseas companies. The EEFs should extend innovation from products and technologies to services and business models in all aspects of operations, thereby maintaining their sustainable competitive advantage in the international market. Innovation strategies can be reflected in many aspects, such as formulating standardized innovation processes and systems, establishing localized innovation teams, fully authorizing overseas innovation teams, and fostering innovative corporate culture.

Third, EEFs should establish internal communication and collaboration mechanisms to implement flexible strategies in a complex market environment. The complexity and the uncertainty of the environment have brought challenges to the existing management system for overseas companies. In this situation, new ideas could be quickly transmitted and carried out between units.

Finally, a risk management and control mechanism need to be established. In the face of different cultural environments and diverse product requirements, the development and management of EEFs has become more difficult than domestic ones. The establishment of a strict risk management system can minimize the losses caused by factors such as poor information or resource allocation, and improve overall coordination of operations, thereby helping the companies to establish long-term development and protection mechanism.

Limitation and Future Research Directions

Despite the significant contributions of this study, some limitations still exist. Due to the limitation of research time and budget, the data collection didn't cover all emerging economies enterprises. The questionnaire was distributed among Chinese overseas companies. Simultaneously, from an international perspective, the research didn't consider cultural factors. Cultural factors are important elements in international research, however, the scales of cultural differences in the existing literature are not suitable for the measurement of cultural factors in the study.

Future research should consider the following. First, "dynamic capability theory" could be introduced to the research model, which would bring deeper exploration into the relationship between absorptive capacity and sustainable competitive advantage of EEFs. According to previous theories, most analyses of dynamic capability, absorptive capability and sustainable competitive advantage were based on the resource-based view. In addition, there are few scales on sustainable competitive advantage. The introduction of dynamic capability can not only enrich the dimensions of future research, but also make contributions to the development of the sustainable competitive advantage scale.

Second, a multi-dimensional analysis of improving absorptive capacity should be introduced in the future research. According to previous literature, the subjects of knowledge absorption can be divided into individuals and organizations. From the perspective of the source of knowledge absorption, it can be divided into internal prior knowledge and external communication networks. In addition, national policies also have impacts on the effects of knowledge absorption, such as financial support and information consultation. Various factors that can affect the improvement of absorptive capacity should be included in the research system.

Finally, the difference between potential absorptive capacity and realized absorptive capacity requires more exploration and empirical analysis. This study found that the relationship between the two dimensions and some variables was significantly different. Therefore, a clear definition and distinction of these two dimensions can help guide EEFs to grasp key points in operations and match them with other organizational strategies and behaviors.

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