Journal of
Risk and Financial Management

MDPI

Article

Research on the Relationships between Knowledge-Based Dynamic Capabilities, Organizational Agility, and Firm Performance

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Abstract: To explore the impact of knowledge-based dynamic capabilities on enterprise performance mechanisms, on the basis of dynamic capabilities theory and upper echelons theory and according to the collected sample data using a structural equation model in an empirical test, this paper explores dynamic knowledgeability, organizational agility, business performance, and executive support provided by a theoretical model of four variables. The results show that knowledge-based dynamic capabilities and organizational agility have significant positive effects on firm performance; organizational agility has a mediating effect via the effect of knowledge-based dynamic capabilities on firm performance; and executive support has a moderating effect on the process of knowledge-based dynamic capabilities affecting organizational agility.

Keywords: knowledge-based dynamic capabilities; enterprise performance; organizational agility; executive support; structural equation modeling

Citation: Li, Guofan. 2022. Research on the Relationships between Knowledge-Based Dynamic Capabilities, Organizational Agility, and Firm Performance. *Journal of Risk and Financial Management* 15: 606. https://doi.org/10.3390/jrfm15120606

Academic Editors: Chux Gervase Iwu, Abdullah Promise Opute and Eresia-Eke Chuks

Received: 4 November 2022
Accepted: 25 November 2022
Published: 14 December 2022

1. Introduction

In today's complex economic situation, with limited resources, complex technology, a turbulent business environment, and increasing competitive pressure, organizations and teams have become effective guarantees for enterprises to improve their sustainability and cope with market competition. Determining how to improve enterprise performance has become a key focus in theoretical and practical circles. Based on the theory of dynamic capabilities, Wang, Han, and other scholars have discussed the influence mechanism of enterprise performance at the cognitive level, and thus the knowledge-based dynamic capabilities model emerged. The concept of dynamic capabilities was first proposed by Teece et al. (1997), who believed that dynamic capabilities refer to the ability of enterprises to integrate, construct, or reset internal and external resources and competitive capabilities in order to successfully cope with dynamic market changes. Based on the resource-based view, Wang et al. (2007) proposed the concept of knowledge-based dynamic capabilities, which is defined as the ability of enterprises to obtain core competitive advantages through the application of dynamic capabilities and the adjustment of the enterprise knowledge base. Knowledge-based dynamic capability is defined as the potential of an enterprise to solve problems systematically by dynamically applying and adapting the knowledge base (Han and Li 2015). From the perspective of knowledge, the most important and core resource of an enterprise is its knowledge resource. By using knowledge resources, enterprises can more accurately predict the trend of changes in the external environment and take timely and reasonable actions. The competitive advantage of enterprises comes from the creation, integration, and utilization of knowledge resources. The dynamic capabilities of an enterprise include tangible assets, intangible assets, the knowledge needed to identify new business opportunities and processes, and the ability to orchestrate its resource portfolio under changing circumstances. Based on this, some scholars have pointed out that the key to a firm's dynamic capabilities is the integration and reconstruction of resources,

among which knowledge resources are the core resources for a firm to form and maintain sustainable competitive advantages (Teece et al. 1997). Enterprises need to upgrade to knowledge-based dynamic capabilities to effectively improve enterprise performance, and this provides a research opportunity to uncover the mechanism of knowledge-based dynamic capabilities in enterprise performance.

In the dynamic market environment, with fierce competition in the global market, it has become a strategic goal of enterprises to build an agile organization that can adapt to external changes. Most scholars understand the connotation of organizational agility from this perspective and believe that organizational agility is part of the characteristics of dynamic capabilities. Agility is perceived as a dynamic comprehensive ability (Dong and Miao 2019). In enterprises, agility performance is related to the quick capture of market change, and it is an effective means of predicting market changes, developing new strategies, guiding enterprises in carrying out efficient resource restructuring to realize the innovation of products and services, and improving enterprises so that they better cope with the demands of consumers and market competitive advantages. Agility plays a significant role in promoting performance (Tallon and Pinsonneault 2011; Cai et al. 2013). This paper studies the impact of knowledge management capability on organizational agility and the impact of agility on performance. Taking organizational climate as a moderating variable, empirical research has shown that market application agility and organizational operational agility have significant positive effects on organizational performance. Organizational agility can provide a means for an organization to effectively cope with change. A survey carried out by the Economist Intelligence Unit found that 88% of executives believe that agility is the key to the success of global businesses (Mikalef and Pateli 2017). However, in a highly uncertain and competitive dynamic environment, organizational agility, as one of the most important competitive capabilities of enterprises, is the main way to improve the competitive performance of enterprises. The core of dynamic capability development is the effective use of knowledge resources, and knowledge-based dynamic capabilities can significantly promote the development of dynamic capabilities. Therefore, dynamic capabilities theory provides important theoretical support for our research model, but the academic research on how knowledge-based dynamic capabilities and organizational agility jointly affect enterprise performance is relatively scarce. This study attempts to explore the role of organizational agility in the relationship between knowledge-based dynamic capabilities and enterprise performance, with organizational agility as the intermediary variable.

In addition, according to the upper echelons theory, the influence of top management has always been an important issue in strategic management and plays an important role in the output results of enterprises (Hambrick and Mason 1984). Executive support is an important component of upper echelons theory, which reflects the cognitive and behavioral involvement of top management is an important factor in the success of organizational goal projects (Qin 2020; Kumar et al. 2019). According to Kumar, the importance of top management support stems from its ability to fully influence other HR-related factors. The higher the overall level of senior management support, the higher the recognition degree from senior management regarding technology implementation, which can guide the members of the organization to quickly accept the changes caused by relevant technology and form a positive organizational atmosphere. Sullivan (2010) pointed out that, under the influence of different pressures, top managers adopt different resource selection and allocation strategies and solve problems in different ways (Sullivan 2010), thus affecting enterprise performance. Zhen et al. (2019) studied the moderating effect of executive support when comparing information security integration ability and enterprise performance, and they believed that executive support behavior can have a positively demonstrated effect on the attention and participation of top managers regarding enterprise information security and can enhance the utility of information security governance and information security integration. In its moderating effect, executive support, in both theory and action, shows that the attention given by an executive to related activities and applications creates a positive atmosphere and environmental conditions for the development of activities, improves

the level of resource utilization and capability matching, and thus produces significant performance improvement. Existing studies have focused on the boundary condition role of executive support in the mechanism of organizational learning and information integration affecting enterprise performance, but few studies have taken executive support as an important situational variable in examining the relationship between knowledge-based dynamic capability, organizational agility, and enterprise performance.

Therefore, this paper comprehensively uses the dynamic capabilities theory and the higher-order theory to explore the relationships among knowledge-based dynamic capabilities, executive support, organizational agility, and firm performance based on Internet enterprise data. It also constructs a theoretical model with organizational agility as a mediating variable and executive support as a moderating variable. The following three issues are mainly addressed: (1) whether knowledge-based dynamic capabilities significantly improve enterprise performance; (2) whether organizational agility plays a mediating role between knowledge-based dynamic capabilities and firm performance; and (3) whether executive support has a moderating effect on the mediation mechanism.

2. Literature Review and Research Hypotheses

2.1. Knowledge-Based Dynamic Capabilities and Firm Performance

The theory of dynamic capabilities views the development of knowledge management capabilities as a learning process for enterprises, which includes implementing existing knowledge and absorbing and applying it to create new knowledge and capabilities (Wong and Wong 2011). Enterprises perceive and respond to changes through a series of dynamic activities, such as knowledge development, retention, and utilization, and they utilize internal and external knowledge to improve their performance.

Firstly, knowledge-based dynamic capabilities enable enterprises to identify innovation gaps, capture opportunities, and respond quickly (Zhang et al. 2022). When companies face frequent and unpredictable market changes, knowledge-based dynamic capabilities can help enterprises search for valuable information from other companies based on their enthusiasm and prospects, better understand market changes, identify opportunities and threats, and obtain valuable knowledge resources through the effective integration of knowledge to adjust their innovations. For example, knowledge-based dynamic capabilities can enable companies to create new products or services quickly and creatively in response to changes and enhance their ability to respond to market demands and changes and thus improve their performance.

Secondly, knowledge-based dynamic capabilities can help enterprises integrate their existing expertise and knowledge to create advantages. With knowledge-based dynamic management capabilities, enterprises can exchange knowledge about cross-departmental customers, disseminate knowledge to all people in the company, and convert knowledge into products and services. Through the timely transmission of information and knowledge, enterprises can make decisions quickly and effectively, thus improving their performance.

Finally, knowledge-based dynamic capabilities can help enterprises effectively restructure and optimize their knowledge. By making full use of the existing knowledge resources of a product, a company can quickly adjust its internal operating processes and its production scale. An agile enterprise leverages knowledge to change its procedures, processes, and resource allocation (Ashrafi et al. 2019); improve its business flexibility; and enhance its ability to respond quickly to turbulent and uncertain market conditions, which helps it to perceive important opportunities and solve problems related to products, services, and distribution channels, thereby improving business performance.

Based on this, the following research hypothesis is proposed:

H1. *Knowledge-based dynamic capabilities positively affect firm performance.*

2.2. Mediating Effect of Organizational Agility

Organizational agility is regarded as the core ability of an organization to respond quickly to changes in the external environment, reflecting the ability of an enterprise to cope

with unpredictable changes and to grow vigorously in a constantly changing environment by seizing appropriate opportunities (Qian et al. 2021). From the perspective of internal and external organizational functions, organizational agility is divided into two dimensions: operational adjustment agility and market utilization agility (Lu and Ramamurthy 2011). Operational adjustment agility refers to a company's ability to quickly respond to market or demand changes through the adjustment of its internal business processes. It emphasizes the flexible and rapid response to changes in business operations, and it is a type of internal agility. Market utilization agility refers to an enterprise's ability to quickly respond to and take advantage of market changes in order to meet customer needs by continuously monitoring and rapidly improving the quality of its products or services. It emphasizes a dynamic, positive acceptance of changes and judgment ability under uncertain conditions, and it is a type of external agility. According to this view, this paper divides organizational agility into operational adjustment agility and market utilization agility to conduct an in-depth study.

First, knowledge-based dynamic capabilities can help enterprises integrate relevant knowledge and resources to make innovative internal adjustments, such as creating new products or services to respond to changes quickly and creatively and improving and updating their knowledge and capabilities. This will allow them to enhance their ability to respond to market demands or changes (Qian et al. 2021) and to improve the agility of market utilization. Market use agility enables enterprises to effectively perceive and respond to market changes and opportunities and to actively take measures to cope with market changes, thus improving enterprise performance (Swafford et al. 2008).

Second, knowledge-based dynamic capabilities can help businesses leverage and integrate existing expertise and knowledge into their operations. For example, with exploitative knowledge management capabilities, companies can exchange knowledge about customers across departments, which will benefit them in quickly adapting their internal operational processes in order to respond to changing customer needs. At the same time, an agile enterprise utilizes knowledge to change its procedures, processes, and resource allocation; improve its business flexibility; and enhance its rapid response ability under volatile and uncertain market conditions, which is conducive to improving operational adjustment agility. Operational adjustment agility enables an enterprise to effectively allocate resources and explore opportunities (Han and Li 2015), thus affecting enterprise performance.

Therefore, organizational agility, as a key strategic resource and capability, enables enterprises to quickly adapt to dynamic and changing business environments (Sambamurthy et al. 2003). Knowledge-based dynamic capabilities enable enterprises to effectively integrate and develop their internal and external resources and capabilities, actively perceive and respond to market changes and opportunities, enhance their organizational agility, enhance their competitiveness, and thus improve enterprise performance (Swafford et al. 2008).

Accordingly, the following research hypothesis is proposed:

H2. *Organizational agility plays a mediating role in the relationship between knowledge-based dynamic capabilities and firm performance.*

2.3. Moderating Effect of Executive Support

According to the upper echelons theory, executive support reflects the degree of top managements' cognitive and behavioral involvement, which is used to explain the role of organizational commitment and to improve the work enthusiasm of employees. It is an important factor in the success of organizational goal projects (Qin 2020). Guidance for strategic decisions and directions of the enterprise, from the attitude of and actions taken by the top managers to the insights and decisions of knowledge and resources, ultimately affects the enterprise's performance (Cao et al. 2020).

Firstly, when the overall level of corporate executive support is high, the knowledge-based dynamic capabilities of a firm help make faster market decisions. When industry

change speeds up and the market demand increases, high-level managers use knowledge-based dynamic capabilities in a specific time frame to make better decisions and form knowledge-driven decision-management practices, help their enterprises obtain more market information, understand more customer demand information, and actively respond with strategies, thus improving market agility.

Secondly, when an enterprise has a high-level executive support atmosphere, the enterprise's knowledge resources can help to produce a better management plan for operation processes. High-level managers provide positive resources for operation management with dynamic access, such as finding better partners and establishing good cooperative relationships, to form knowledge resources which allow for more flexibility, higher efficiency, and low-cost operation process optimization. The purpose of the authors is to not only achieve enterprise efficiency but to also provide customers with better services, thereby improving operational adjustment agility.

Thirdly, when an enterprise has a high-level executive support atmosphere, the enterprise's knowledge-based dynamic capabilities help to improve its performance. Information can be obtained from internal and external businesses and with the integration of dynamic capabilities into effective knowledge resources. The knowledge resources of high-level managers come from knowledge-driven decision-making management practices and can help enterprises to obtain more market information, find a better operating strategy, achieve a higher commercial value, and improve enterprise performance.

Based on this, the research hypotheses are proposed as follows:

H3. *Executive support plays a positive moderating role in the relationship between knowledge-based dynamic capabilities and organizational agility.*

H4. *Executive support plays a positive moderating role in the relationship between knowledge-based dynamic capabilities and firm performance. When the level of senior executives is high, the positive impact of knowledge-based dynamic capabilities on firm performance is stronger.*

Based on the above theoretical assumptions, a research model is constructed, as shown in Figure 1.

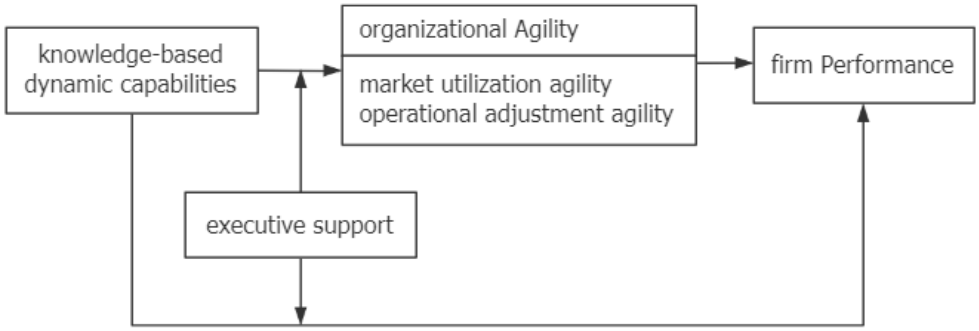

Figure 1. Research model.

3. Study Design

3.1. Sample Selection and Data Collection

As a typical knowledge-intensive enterprise, Internet enterprises have higher requirements for the knowledge management abilities of their employees. At the same time, in the context of accelerating the upgrading of Internet products, it is urgent for enterprises to quickly respond to the market in order to improve their performance. Therefore, this paper mainly adopts the questionnaire survey method to collect data for Internet enterprises. Specific items of the questionnaire are shown in Appendix A. To ensure that the investigated enterprises are in the Internet industry, this paper sets a special measure item to measure whether an enterprise is an Internet enterprise. At the same time, to obtain accurate enterprise information, the respondents comprised senior and middle managers and ordinary employees of Internet enterprises.

In this study, the convenience sampling method was used to collect data in two ways: one was to use the "questionnaire Star" network platform to distribute and collect questionnaires, and the second was to use the snowball method to entrust students and friends who work in Beijing, Shanghai, and other places to collect questionnaires through their network with the help of their interpersonal relationships. After carrying out ANOVA on the data from the two sources, it was found that there was no significant difference in the sample data obtained using the different data collection methods, so they could be pooled and analyzed.

A total of 400 questionnaires were distributed in this study, and 280 were recovered, with a sample recovery rate of 70%. Among the collected questionnaires, 51 invalid questionnaires, such as those that were incompletely filled out, those with obvious option patterns, those where the same option was selected, and those completed by respondents from a non-Internet industry, were eliminated, and 229 valid questionnaires were obtained. The distribution of sample features is shown in Table 1.

Table 1. Sample distribution characteristics.

Variable	Classification	Frequency	Percentage
Level of education	High school and below	0	0
	High school	20	8.7
	Undergraduate/Junior College	74	32.3
	Master degree or above	135	59
Position	Senior leadership	78	34.1
	Middle-level leader	108	47.2
	Ordinary employees	43	18.7
Years of establishment	Less than 3 years	14	6.1
	3 to 8 years	56	24.5
	8 and 12 years	60	26.2
	More than 12 years	99	43.2
Size of Company	Less than 100 people	12	5.3
	100–300	30	13.1
	300–500	35	15.3
	500–1000	31	13.5
	More than 1000 people	121	52.8

3.2. Variable Measurement

In this study, Likert five-point scales were used to measure all variables, except for the control variables. The respondents answered the questions on the questionnaire according to the current situation of their enterprise by selecting "strongly disagree", "disagree", "general", "agree", or "strongly disagree".

The measurement indicators used in the questionnaire were compiled on the basis of the mature scale by means of translation, back translation, and adjustment. The Knowledge-based Dynamic Capability Scale is based on Wang et al. (2007) and Han and Li (2015). This scale was compiled on the basis of the research results, and it comprises a total of six items. Three categories, namely, the knowledge management ability of the product, customer, and manager, each contain the process of knowledge creation, transmission, integration, and adjustment. A representative topic is as follows: the enterprise can support the creation and transfer of R&D knowledge, operation knowledge, and the skills applicable to the company across all departments.

The Organizational Agility Scale is based on Lu and Ramamurthy (2011) and Gao and Li (2017). The scale used in this study has a total of six items. A representative statement is as follows: enterprises are able to make and implement appropriate decisions quickly in response to market and customer changes.

Business performance scales are based on Gray (1998) and Jia et al. (2015). The scale used mainly measures the subjective cognition of the respondents, with a total of seven items. A representative statement is as follows: enterprises have a higher return on investment.

The Executive Support Scale is based on Liang et al. (2007) and Dong et al. (2018). The scale used in this study considers executive support as an overall dimension, with a total of five items. A representative statement is as follows: senior managers actively encourage and guide employees to make decisions based on knowledge resources and improve work efficiency.

In the research model, the education level of the respondents, the job position of the respondents, the age of the enterprises, and the size of the enterprises may affect the results of the questionnaire, so they were taken as control variables.

4. Data Analysis and Hypothesis Testing

4.1. Reliability and Validity Test

After data collection, the constructs were analyzed for reliability and validity. In terms of the reliability test, AMOS 26.0 was used for an exploratory factor analysis. The results were as follows: KMO = 0.902 (greater than 0.6), and Bartlett's sphericity test result had a $p < 0.001$, indicating that the reliability of the scale was good and suitable for a factor analysis. In addition, the Cronbach α coefficient value and the combined reliability (CR) value calculated using SPSS 26.0 were both greater than 0.8, indicating that the scale had good internal consistency. Therefore, the scale has good reliability.

In terms of the validity tests, this study mainly tested content validity and discriminant validity. Firstly, in terms of content validity, the measurement scales of knowledge-based dynamic capabilities, enterprise performance, organizational agility, and executive support in this study were mainly based on mature classical scales developed by domestic and foreign scholars, which ensures the content validity of this study. Secondly, in terms of discriminant validity, AMOS 26.0 was used to perform the confirmatory factor analysis, and the results are shown in Table 2. The factor loading value of each variable was greater than 0.5, and the average refined variance AVE of each latent variable was greater than 0.5, indicating that the model had good cohesive validity. Moreover, the square root of the AVE of each variable was larger than the correlation coefficient between each variable and the other variables. Therefore, the scale has good discriminant validity.

Table 2. Reliability and validity test of samples.

Variable		Item	Factor Loading	Cronbach Alpha	CR	AVE
Knowledge-based Dynamic Capabilities		KDC1	0.814	0.930	0.93	0.691
		KDC2	0.827			
		KDC3	0.830			
		KDC4	0.801			
		KDC5	0.847			
		KDC6	0.850			
Organizational agility	Market leverage agility	MCA1	0.724	0.808	0.809	0.585
		MCA2	0.671			
		MCA3	0.797			
	Operational adjustment agility	OAA1	0.815	0.841	0.842	0.639
		OAA2	0.799			
		OAA3	0.803			
Executive support		TMS1	0.726	0.870	0.87	0.573
		TMS2	0.824			
		TMS3	0.758			
		TMS4	0.793			
		TMS5	0.787			
Enterprise performance		FP1	0.744	0.872	0.871	0.531
		FP2	0.772			
		FP3	0.716			
		FP4	0.722			
		FP5	0.687			
		FP6	0.749			

4.2. Common Method Bias Test

According to Podsakoff et al. (2003), this paper alleviates the problem of homology bias in both ex ante procedural control and ex post statistical tests. In terms of procedural control, the following methods were adopted: (1) for the English scale, the paper adopted the measure of back translation, repeated the comparison, and provided the respondents with a clear and understandable questionnaire; (2) in order to reduce the interference of psychological factors when filling out the questionnaire, the order of each scale was disrupted, the purpose of the data collection was explained to the respondents, and the respondents were asked to fill out the questionnaire anonymously. For the post hoc test, the Harman single-factor test was used in this paper. In the unrotated exploratory factor analysis results, there were five factors with characteristic roots greater than 1, among which the largest factor variance explanation rate was 36.197% (less than 40%). This indicates that there is no serious common method bias.

4.3. Descriptive Statistics and Correlation Analysis

AMOS 26.0 was used for a Pearson product–moment correlation analysis and an analysis of the knowledge-based dynamic capabilities, market utilization agility, business performance, operational adjustment agility, and executive support to determine the correlations between each variable and the descriptive statistics. Table 3 shows the results of the correlation analysis. The results show that the independent variables, dependent variables, and mediating variables were significantly correlated ($p < 0.01$), and all of them had a moderate level of correlation. Among them, the correlation between knowledge-based dynamic capabilities and enterprise performance was 0.446, the correlation between knowledge-based dynamic capabilities and market utilization agility was 0.368, and the correlation between knowledge-based dynamic capabilities and operational adjustment agility was 0.360. These results provide preliminary evidence for subsequent hypothesis testing.

Table 3. Descriptive statistics and correlation analysis.

Variable	1	2	3	4	5
1. Knowledge dynamic capabilities	1				
2. Market leveraging agility	0.368 **	1			
3. Operational adjustment agility	0.360 **	0.493 **	1		
4. Executive support	0.272 **	0.524 **	0.368 **	1	
5. Business performance	0.446 **	0.468 **	0.427 **	0.321 **	1
The mean	3.423	3.541	3.469	3.196	3.358
The standard deviation	0.762	0.979	1.065	1.060	0.943

Note: N = 229; ** $p < 0.01$.

4.4. Hypothesis Testing

4.4.1. Direct Effect Test

In this study, AMOS 26.0 is used to establish a structural equation model of the relationship between knowledge-based dynamic capabilities and firm performance. Various fitting indices and the corresponding evaluation criteria of this model are shown in Table 4. The fitting index of the model is as follows: $\chi 2/df = 1.676$, RMSEA = 0.051 (less than 0.08), CFI = 0.955, IFI = 0.956, TLI = 0.949 (CFI, IFI, and TLI are all greater than 0.9). All fitting indices meet the judging criteria, indicating that the model has a good fitting degree.

Table 4. Model fit index (N = 229).

Statistical Test Index	Judgment Criteria and Critical Values	The Model Results	Fitting
χ^2/df	$1 < \chi^2/df < 5\chi$	1.676	good
RMSEA	<0.08	0.051	good
CFI	>0.8	0.955	good
IFI	>0.8	0.956	good
TLI	>0.8	0.949	good

The path parameters of this model are shown in Figure 2. Among them, knowledge-based dynamic capabilities have a significant positive impact on firm performance (path coefficient $\beta = 0.262$, $p < 0.001$); that is, knowledge-based dynamic capabilities are positively correlated with firm performance, and, thus, H1 is verified. Knowledge-based dynamic capabilities have a significant positive impact on market utilization agility (path coefficient $\beta = 0.439$, $p < 0.001$); that is, knowledge-based dynamic capabilities are positively correlated with market utilization agility, and market utilization agility has a significant positive impact on enterprise performance (path coefficient $\beta = 0.299$, $p < 0.001$). In other words, market utilization agility is positively correlated with firm performance. Knowledge-based dynamic capabilities have a significant positive effect on operational adjustment agility (path coefficient of beta = 0.422, $p < 0.001$; that is, knowledge-based dynamic capabilities and operational adjustment agility have a significant positive effect on business performance (path coefficient of beta = 0.22, $p < 0.01$); thus, H2 is partially verified.

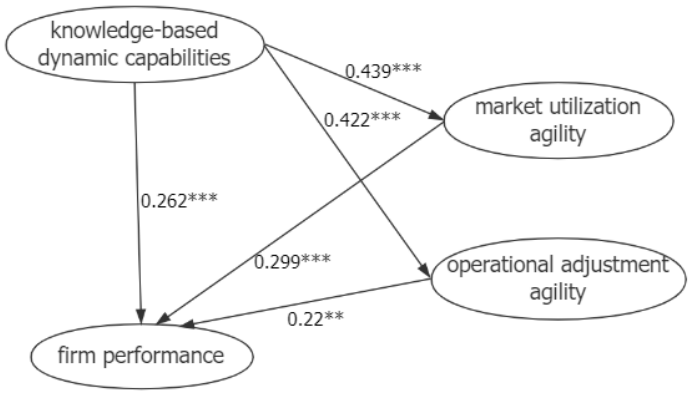

Figure 2. Model path parameters. *** and ** indicate $p < 0.001$ and $p < 0.01$, respectively.

4.4.2. Mediating Effect Test

There are many mediating effect test methods commonly used by scholars, among which the Bootstrap method has a high detection power and is highly respected by many scholars. Therefore, this study used AMOS 26.0 to run the Bootstrap method with 5000 samples in order to test the significance of the intermediary effect, and the 95% deviation correction confidence intervals BC of the relevant variable coefficients were obtained. The mediating effect test results were obtained, and they are shown in Table 5. The interval of the indirect effect of market utilization agility on firm performance and the interval of the indirect effect of operational adjustment agility on firm performance do not include 0, indicating that the mediating effect is significant. In addition, the interval of the direct effect of market utilization agility on firm performance and the interval of the direct effect of operational adjustment agility on firm performance does not include 0, indicating that both market utilization agility and operational adjustment agility play a mediating role in the relationship between knowledge-based dynamic capabilities and firm performance. Therefore, H2 is verified.

Table 5. Mediating Effect Test Table (N = 229).

Relationship between Variables	Effect of Decomposition	Unstandardized Estimates	The Standard Deviation for SE	Bias-Corrected 95% Confidence Interval (BC)	
				The Lower Limit	Ceiling
Knowledge-based dynamic capabilities → Market utilization agility → Firm performance	The total effect	0.392	0.071	0.264	0.539
	Direct effect	0.261	0.071	0.123	0.404
	The indirect effect	0.131	0.041	0.062	0.230
Knowledge dynamic capability → operational adjustment agility → enterprise performance	The total effect	0.354	0.070	0.217	0.498
	Direct effect	0.261	0.071	0.123	0.404
	The indirect effect	0.093	0.037	0.035	0.183

4.4.3. Moderating Effect Test

Hierarchical regression is generally used to test the moderating effect. In this study, SPSS 26.0 software was used to test the moderating effect of executive support on the effect of knowledge-based dynamic capabilities on enterprise performance. The test results are shown in Table 6.

Table 6. Test table of moderating effects.

Variable	Model 1 Market Leveraging Agility		Model 2 Operational Adjustment Agility		Model 3 Enterprise Performance	
	B	t	B	t	B	t
Education level	0.171 **	2.796	0.194 **	2.673	0.197 **	3.307
Position	0.054	0.750	−0.068	−0.793	0.091	1.326
Establishment of fixed number of years	−0.026	−0.452	−0.061	−0.911	−0.014	−0.255
The company size	0.043	1.159	0.036	0.829	0.101 *	2.886
Knowledge Dynamic capabilities	0.302 ***	4.325	0.394 ***	4.757	0.285 ***	4.058
Market leveraging agility	-	-	-	-	0.199 **	3.170
Operations adjust agility	-	-	-	-	0.149 **	2.814
Executive support	0.420 ***	8.598	0.284 ***	4.895	0.049	0.912
Knowledge Dynamic Capabilities * Executive support	0.116 *	2.061	0.134 *	2.014	−0.056	−1.043
R^2	0.370		0.252		0.394	
F	20.944 ***		12.012 **		17.877 ***	
Delta R^2	0.011		0.012		0.003	
Delta F	4.246 *		4.054 *		1.088	

Note: N = 229, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

In Table 6, according to Model 1, the interaction term of "knowledge dynamic capabilities × executive support" reached a significant level (B = 0.116, $p < 0.05$), and the explanatory power of the model was significantly enhanced ($\Delta R^2 = 0.011$, $p < 0.05$).

According to Model 2, the interaction term of "knowledge dynamic capability × executive support" reached a significant level (B = 0.134, $p < 0.05$), and the explanatory power of the model was significantly enhanced ($\Delta R^2 = 0.012$, $p < 0.05$). Therefore, H3 was verified.

According to Model 3, the interaction term of "knowledge dynamic capability × executive support" did not reach a significant level (B = −0.056), and the explanatory power of the model was not significantly enhanced ($\Delta R^2 = 0.003$); thus, H4 is not supported.

To further explain the above results regarding H3, a simple slope test was used in this study. Knowledge-based dynamic capabilities and executive support were grouped according to standard deviation plus or minus one, and the influence of the different degrees of executive support on knowledge-based dynamic capabilities and the agility relationship between the two types of organizations were plotted to provide more specific evidence for the moderating effect test, as shown in Figures 3 and 4.

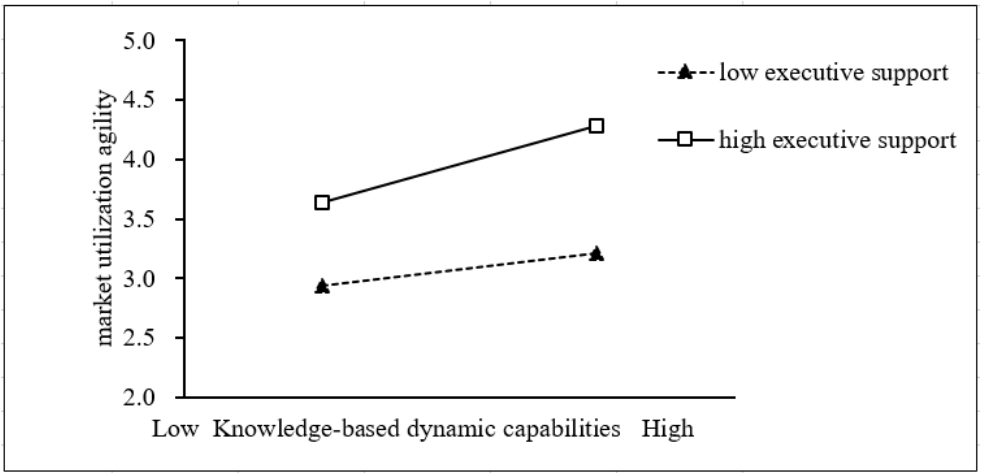

Figure 3. Knowledge-based dynamic capabilities and executive support interact to influence market utilization agility.

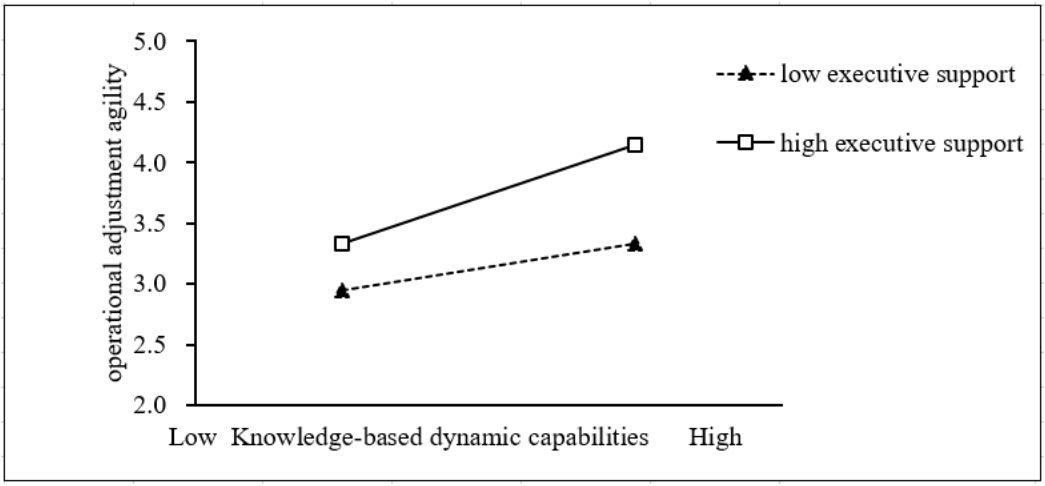

Figure 4. Knowledge-based dynamic capabilities and executive support interact to influence operational adjustment agility.

5. Conclusions and Implications

In this article, by analyzing 229 pieces of data gathered via Internet questionnaires, based on dynamic capabilities theory and upper echelons theory, this paper studied knowledge-based dynamic capabilities and organizational agility and their interaction relationships with corporate performance, and the regulating effect of executive support was empirically analyzed. The following conclusions were drawn: Firstly, knowledge-based dynamic capabilities positively influence enterprise performance. Secondly, organizational agility plays a mediating role in the relationship between knowledge-based dynamic capabilities and firm performance. Thirdly, executive support positively moderates the relationship between knowledge-based dynamic capabilities and organizational agility.

5.1. Theoretical Implications

First, based on the Internet industry, this study expands on the studies of the relationship between knowledge-based dynamic capabilities and enterprise performance, and it broadens the research on enterprise performance. It was again confirmed that knowledge-based dynamic capabilities play a key role in promoting firm performance, which is consistent with previous research conclusions (Wu and Shang 2015).

Second, this study divided organizational agility into operational adjustment agility and market utilization agility as mediating variables for empirical analyses, which provided

a more detailed theoretical observation perspective. From the dynamic capability perspective, it was revealed that knowledge-based dynamic capabilities can be placed into the "black box" in the process of enterprise performance, effectively answering the question of "knowledge dynamic ability how to drive business results". This problem further clarifies how operational adjustment agility and market utilization agility influence the status and role of knowledge-based dynamic capabilities in the process of enterprise performance.

Third, this study used executive support as a situational variable to investigate the relationship between knowledge-based dynamic capabilities and organizational agility. In the process of knowledge-based dynamic capability development and organizational agility promotion, with the continuous improvement in executive support level, the predictive effect of knowledge-based dynamic capabilities on market utilization agility and operational adjustment agility gradually increases, which provides a new theoretical perspective for subsequent innovation research on knowledge-based dynamic capabilities. However, the role of executive support in the relationship between knowledge-based dynamic capabilities and firm performance was not verified, which may be because the role of knowledge-based dynamic capabilities on firm performance is significant enough in the research, so the moderating effect of executive support does not play a significant role.

5.2. Practical Implications

Firstly, enterprises should build knowledge-based organizations and cultivate knowledge-based dynamic capabilities. Knowledge-based dynamic capabilities facilitate enterprises in the timely capture of market trends, in the adjustment of resource allocation, and in the optimization of workflow, which are important ways to promote enterprises to utilize external knowledge, commercialize internal knowledge, and then transform it to improving their performance. Managers should maintain their sensitivity to market opportunities and threats, acquire operational capabilities to ensure the survival of the enterprise, focus on long-term development strategies, shape knowledge-based dynamic capabilities, improve knowledge integration and application capabilities, and enhance the ability to cope with the market environment. At the same time, enterprises can help in the establishment of knowledge-based organizations, enhance the learning motivation of employees, improve the ability and speed of knowledge acquisition, and realize organizational innovation.

Secondly, enterprises should pay attention to organizational efficiency and improve organizational agility. In order to enhance market competitiveness, enterprises must pay close attention to market changes and environmental fluctuations, innovate products and services by discovering new market threats and seizing new market opportunities, enhance their initiatives, and foresee and grasp new opportunities for market growth so as to create a favorable market position and improve their performance. At the same time, enterprises should also use knowledge-based dynamic capabilities to discover changes in current market demands, adjust the current levels of existing products and services to meet different market demands, and optimize their internal processes so as to improve their performance.

Thirdly, enterprises should pay attention to the issue of executive support. Enterprises should pay attention to and improve senior managers' cognition of and participation in knowledge-based dynamic capabilities. They can regularly hold activities where executives share their experiences to convey the importance of knowledge-based decision-making to employees, gradually form a new knowledge culture, and maximize the role of knowledge-based dynamic capabilities. At the same time, senior managers should make decisions based on knowledge resources rather than experience, complete the effective transformation from the decision to behavior, and maximize the implementation and utilization of knowledge-based dynamic capabilities.

5.3. Research Deficiencies and Prospects

Due to various subjective and objective reasons, this study has limitations: Firstly, this study is limited by the research conditions. The questionnaire contained both independent variables and dependent variables, and there was a lack of consistency regarding the sources of the data, inevitably causing homologous deviation problems. In the future, the questionnaire completion and collection methods can be matched by leaders and staff, and measurements of second-hand data variables can also be collected by enterprises to improve the objective rigor of the inspection of the results. Secondly, although the number of questionnaires meets the requirements for the number of samples, the convenience sampling method resulted in the sample data lacking certain representation. In the future, the sample distribution range and sample size can be expanded to further test the universality and reliability of the conclusions. Thirdly, different dimensions of knowledge-based dynamic capabilities may have different impacts on firm performance. Future research can further explore the impact of knowledge-based dynamic capabilities on firm performance from three dimensions: knowledge perception ability, knowledge utilization ability, and knowledge reallocation ability. Fourthly, the relationship between knowledge-based dynamic capabilities and firm performance may be affected by other moderating variables, such as environmental uncertainty. In the future, the moderating variable of environmental uncertainty can be added to further study the interaction between knowledge-based dynamic capabilities and firm performance.

Funding: This research has not received external funding.

Data Availability Statement: Not applicable.

Conflicts of Interest: The author declares no conflict of interest.

Appendix A

Dear Sir/Madam,

Hello! We are conducting a study on the development of Internet enterprises. It should take you about 5 min. This questionnaire is an anonymous survey, and there is no good or wrong answer. Please choose the most appropriate answer from the following questions for your company's position. The survey results are for academic research only, please feel free to fill in! Thank you for your cooperation!

1. Your education level:
○ High school or below ○ High School—Bachelor's
○ degree/Junior College ○ Master's degree or above
2. Your position in the company is:
○ Senior Leader ○ Middle level leader ○ Ordinary employee
3. Date of establishment of your company:
○ Less than 3 years ○ 3 to 8 years ○ 8 to 12 years ○ more than 12 years
4. Industry of your company:
○ Internet ○ Others
5. Number of employees in your company:
○ Less than 100 ○ 100~300 ○ 300~500 ○ 500~1000 ○ 1000 or more people
6. Our company can support the creation and transfer of R&D and operation knowledge and skills applicable to the company among different departments.
○ Strongly disagree ○ Disagree ○ general ○ agree ○ Strongly agree
7. Our company can support the creation and transfer of marketing knowledge and skills applicable to the company across different departments.
○ Strongly disagree ○ Disagree ○ general ○ agree ○ Strongly agree
8. Our company can support the creation and transfer of management knowledge and skills applicable to the company across different departments.
○ Strongly disagree ○ Disagree ○ general ○ agree ○ Strongly agree
9. Our company can support the integration and transfer of company related R & D and operation knowledge among different departments to create new products or services.
○ Strongly disagree ○ Disagree ○ general ○ agree ○ Strongly agree

10. Our company can support the integration of the company and transfer relevant customer knowledge among different departments to gain new market insights (such as customer background, service expectations, etc.).
○ Strongly disagree ○ Disagree ○ general ○ agree ○ Strongly agree
11. Our company can support the integration and transfer of company-related management strategies and processes among different departments to improve management ability.
○ Strongly disagree ○ Disagree ○ general ○ agree ○ Strongly agree
12. Our company is able to quickly make and implement appropriate decisions in response to market and customer changes.
○ Strongly disagree ○ Disagree ○ general ○ agree ○ Strongly agree
13. Our company is constantly looking for ways to reinvent and innovate to better serve the market.
○ Strongly disagree ○ Disagree ○ general ○ agree ○ Strongly agree
14. Our company is able to see relevant changes and disruptions in the market as opportunities for quick profits.
○ Strongly disagree ○ Disagree ○ general ○ agree ○ Strongly agree
15. Our company can quickly raise or lower production/service levels to meet fluctuations in market demand.
○ Strongly disagree ○ Disagree ○ general ○ agree ○ Strongly agree
16. Our company can quickly make the necessary alternative arrangements and internal adjustments to respond to supplier disruptions in the course of our operations.
○ Strongly disagree ○ Disagree ○ general ○ agree ○ Strongly agree
17. Our company will meet customers' quick response and special needs, and customers have confidence in us.
○ Strongly disagree ○ Disagree ○ general ○ agree ○ Strongly agree
18. The top management of our company believes that knowledge management can bring great profits to the company.
○ Strongly disagree ○ Disagree ○ general ○ agree ○ Strongly agree
19. The top management of our company will establish goals and standards to supervise the implementation of the knowledge system.
○ Strongly disagree ○ Disagree ○ general ○ agree ○ Strongly agree
20. Senior management in our company believes in the need for the company to constantly evaluate and improve its business rules to accommodate the insights gained from the knowledge source.
○ Strongly disagree ○ Disagree ○ general ○ agree ○ Strongly agree
21. Senior managers in our company are willing to go beyond their gut and make decisions based on knowledge resources.
○ Strongly disagree ○ Disagree ○ general ○ agree ○ Strongly agree
22. Senior managers of our company actively encourage and guide employees to make decisions and improve work efficiency based on knowledge resources.
○ Strongly disagree ○ Disagree ○ general ○ agree ○ Strongly agree
23. In comparison to our key competitors, over the past three years our company has higher return on investment.
○ Strongly disagree ○ Disagree ○ general ○ agree ○ Strongly agree
24. In comparison to our key competitors, over the past three years our company has higher sales margins.
○Strongly disagree ○ Disagree ○ general ○ agree ○ Strongly agree
25. In comparison to our key competitors, over the past three years our company has higher market share.
○ Strongly disagree ○ Disagree ○ general ○ agree ○ Strongly agree
26. In comparison to our key competitors, over the past three years our company has higher customer satisfaction.
○ Strongly disagree ○ Disagree ○ general ○ agree ○ Strongly agree
27. In comparison to our key competitors, over the past three years our company has more successful implementation of new products and services.
○ Strongly disagree ○ Disagree ○ general ○ agree ○ Strongly agree
28. In comparison to our key competitors, over the past three years our company has faster Serve customers.
○ Strongly disagree ○ Disagree ○ general ○ agree ○ Strongly agree

This is the end of the questionnaire. Please check it again to make sure it is complete.

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