



# Digital Capability and Business Model Innovation by Big Data Technology: The Mediating Role of Resource Reconfiguration

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**Abstract:** Under the background of digital economy era, manufacturing enterprises are faced with complex and changeable economic environment, competitive market environment and policy environment for transformation and upgrading. In order to adapt to environmental development, maintain competitive advantages and achieve new value creation goals, it is necessary to cultivate and build appropriate digital capabilities, including digital opportunity identification and digital resource coordination. This paper takes resource reconstruction as a subdivision perspective, takes manufacturing enterprises as the research object, and takes enterprise innovation practice as the explained variable, and discusses the path mechanism of capability-resource-innovation. Therefore, this paper proposes a research hypothesis around the relationship among enterprise digital capability, resource reconstruction and business model innovation, constructs a theoretical model among the three, and applies the hierarchical regression analysis method to conduct an empirical study on the data of 210 enterprises obtained through questionnaire survey, and tests these hypotheses. The results show that digital opportunity identification ability and digital resource collaboration ability have significant positive impact on business model innovation. Resource restructuring also has a positive effect on business model innovation; Enterprise digital opportunity identification ability and digital resource collaboration ability positively influence resource restructuring. In addition, resource restructuring plays an intermediary role between digital capability and business model innovation.

**Keywords:** Digital Capability, Resource Reconfiguration, Business Model Innovation

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## 1. Introduction

In recent years, as the data analysis, artificial intelligence, Internet of things and 5 g with the rapid development of information and communication technology, the global storm triggered a new wave of industry technological change, in the technological change looms and emerging digital technology breakthrough growth, scale, and the new business model formats created drive enterprise value change [1], This marks that the global economy has entered the deep-seated digital economy era by the information age. Different from traditional economy, digital economy highly open, boundary ambiguity, interactive digital situations and environments

such as dynamic at any time, severity of competition, innovation, new features such as high frequency, which requires enterprises to change the traditional ideas, set up new digital strategic thinking, to improve its technology can cultivate large data fu digital capability at the same time, Based on digital capabilities, a new business model of ubiquitous perception, agile response, intelligent decision-making and dynamic optimization is built to enhance competitiveness and make itself invincible in market competition [2]. However, as a breakthrough technological development, can enterprises achieve business model innovation by cultivating digital capability based on big data technology at present? If so, what kind of capabilities do

enterprises need to build upon to reconstruct their business models? What are the key chains and realization paths of digital capabilities affecting business models? These are all worth discussing.

Based on this, this paper firstly studies the relationship between digital capability and business model innovation from the perspective of big data technology, and on this basis, studies the path mechanism of digital capability influencing business model innovation. Secondly, in a dynamic and highly open business environment, digital capability is conducive to the development of enterprises' dynamic capability [3, 4]. As an important component of dynamic capability, resource reconstruction is an important means for enterprises to cope with the dynamic changing and complex tortuous market environment and obtain competitive advantages. At the same time, it is also the basis for enterprises to optimize the existing business model and reconstruct the business model [5]. Therefore, this paper refines dynamic capability and introduces resource reconstruction as an intermediary variable to study the path mechanism of digital capability and business model innovation from its perspective.

## 2. Theoretical Background and Hypotheses

### 2.1. *Digital Capability and Business Model Innovation*

Digital capability, accompanied by digital economy, is a new support capability to help organizations face the digital economic environment. In essence, digital technology provides an enterprise-wide method to measure internal and external processes to add value to the organization. As for the definition of digital capability, scholars have given different definitions and emphasized different levels in different research perspectives and specific situations. Li Wen and Sun Li constructed a multi-dimensional digital resource collaboration system that spans various industries, enterprise value chains and production links, and emphasized the characteristics of resource collaboration of digital capability [6]. Ritter and Pedersen, on the basis of summarizing studies on digital capability in recent years, innovatively explained digital capability from the perspective of company development, which he believed included three dimensions of digital perception capability, digital capture capability and digital transformation capability [7]. In general, digital capability is a multidimensional variable. This paper, through literature review, puts forward two dimensions of digital capability: digital opportunity identification capability and digital resource coordination capability. Digital opportunity identification capability emphasizes the enterprise's high sensitivity to the environment, the ability to identify opportunities and threats in the external environment and evaluate and manage related changes. Digital resource collaboration ability is the ability of enterprises to integrate internal and external resources to realize resource sharing, construction and co-governance within and outside the entire

industrial chain.

Business model innovation is gradually developed from business model, which is a system framework that can be adjusted at any time to realize enterprise value orientation. The advent of digital economy is accompanied by more intense market competition. In order to gain the initiative advantage, enterprises must debug and reconstruct the original business model architecture, and the research on business model innovation is more and more valued. Business model innovation emphasizes change. Compared with the original benchmark model, any change in value positioning, value creation, value acquisition and other elements belongs to the category of business model innovation. Therefore, in the era of digital economy, if enterprises lack digital perception ability and digital acuity, they may not be able to identify the precious opportunities brought by industrial transformation, find it difficult to determine the direction of transformation, find new value creation points suitable for enterprise development, and complete business model innovation [8]. However, if internal and external resources are not integrated, coordinated and shared, they will only become information islands and have no motivation for innovation. In this digital world, enterprises need to use digital economy to break the structural inertia of organizations, overturn the outdated values, and reintegrate and allocate the resources they have, so as to promote the innovative development of business models. Before that, the integration of all aspects of digital transformation into the production factors of the digital economy, so as to cultivate various digital capabilities to promote business model innovation will be an important part of determining the survival of enterprises. On this basis the following hypothesis is proposed:

H1: The digitization capability of enterprises positively affects business model innovation;

H1a: Digital opportunity identification ability positively affects business model innovation;

H1b: Digital resource collaboration ability positively affects business model innovation;

### 2.2. *Digital Capability and Resource Reconfiguration*

Resource reconfiguration reflects the meaning of "breakthrough" and "start again", emphasizing the second design of some element units inside the organization to realize the recombination and allocation of resources. As an important part of dynamic capability, resource reconfiguration includes two kinds of changes. One is the physical increase or decrease of resources, by adding or reducing resources and reallocating them with original resources. The second is the chemical change of resources, integrating the resources obtained externally or extracted internally into the original resources to form the recombination of new resource units.

The digital capability born under big data technology is conducive to the absorption, acquisition and reconfiguration of enterprise resources. With digital opportunity recognition means fast one step of first-mover

advantage, insight into the current development trend of economic change, government policy tilt direction, change of emerging market opportunities and consumer demand, these advantages can help enterprises to accurately predict and adjust the future strategic direction and organizational goals, such as break the technical bottleneck, Optimize human resources, strip redundant resources and reconfigure resources. For example, in recent years, Xiaomi, Green and other enterprises, sensing the business opportunities of new energy vehicles, have invested large sums of money to recruit talents to set up new teams and establish car factories. However, the exchange and sharing of resources inside and outside the industrial chain often enables enterprises to obtain heterogeneous knowledge beyond the original scope. By applying the obtained knowledge to production management, it is beneficial to activate internal resources and strengthen the interaction between resources, thus achieving the effect of resource reorganization [9]. To sum up, hypotheses are proposed:

H2: The digitization capability of enterprises has a positive impact on resource reconfiguration;

H2a: Enterprise's digital opportunity identification ability has a positive impact on resource reconfiguration;

H2b: The enterprise's digital resource collaboration ability has a positive impact on resource reconfiguration.

### **2.3. Resource Reconfiguration and Business Model Innovation**

Resource reconfiguration is one of the constituent dimensions of dynamic capability, and dynamic capability plays an important role in changing value elements and realizing business model innovation. First of all, resources constitute the basic unit of the business model, and the change and realization of any business model elements cannot be separated from the support of resources. Therefore, the resource reconfiguring capability of an enterprise means that it can recombine, restructure and reconfigure resources [10], any change that causes resource reconfiguration will lead to the corresponding change and innovation of the business model [11]. Secondly, resource, as a special kind of knowledge, plays a huge role in the survival and development of enterprises. Review the past successful enterprise management cases, you can see many enterprises through the alliance resource replacement and complement each other knowledge, the knowledge in (resources) and internal knowledge fusion, improve, inspection and so on a series of work, the integration of internal and external resources reorganization help enterprises to realize the research and development of new products and technological breakthroughs in innovation, Then realized the business model innovation. We therefore hypothesise that:

H3: Resource reconfiguration has a positive impact on business model innovation.

### **2.4. The Mediating Role of Resource Reconfiguration**

In the digital economy environment, the digital capability

cultivated by enterprises can realize value creation and business model innovation through recombination, reallocation and utilization of the relevant resources of the organization. From the point of enterprise production chain, in order to grasp the competitive advantage in the flow of digital, better adapt to the digital world, companies often choose to speed up the production of digital technology in the system factor and other factors of production process, production will production conditions of the resources required to permutation and combination and refresh configuration, this is just the definition of "innovation" in the modern market [12]. From the point of global value chain, will be introduced to the new digital technology product development and design of the link, is to strengthen the information, resources, energy, rapid flow between the chain members, the "interactive information flow among the group of" collaborative model not only can increase the breadth and depth of their members to participate in the activities of innovation and active, can improve the efficiency of the innovation of the enterprise, Accelerate the pace of business model innovation. To sum up, hypotheses are proposed:

H4: Resource restructuring plays a mediating role between digital capability and business model innovation.

## **3. Research Methodology**

### **3.1. Data Collection and Sample**

The research method adopted in this paper is questionnaire collection. The questionnaire is mainly limited to managers and front-line employees. Before filling in the questionnaire on a large scale, 5 experts were invited to evaluate the questionnaire, and 5 nearby enterprises were selected for pre-test to further improve and modify the questionnaire. Finally, questionnaires were collected from friends circle, questionnaire and other platforms by giving full play to social relations of tutors, alumni of MBA class and family relations. A total of 383 questionnaires were sent out, and 276 were recovered, excluding incomplete and unqualified questionnaires, the actual number of valid questionnaires was 210, and the effective questionnaire recovery was 54.8%. The basic information of recovered samples is shown in Table 1.

### **3.2. Measurement of Variables**

Likert 5-point scale was used to measure variables, and the measurement items were all from the maturity scale in previous studies. Digital ability refers to Reeves et al. [13] and Chen Liping [14], which is divided into two dimensions of digital opportunity identification ability and digital resource coordination ability, including 6 questions respectively. Business model innovation refers to the research of Zott and Amit [15], and there are 7 measurement items. For resource reconfiguration, refer to Zhou Dan [9], with a total of 8 questions. In addition, enterprise size and enterprise age were selected as control variables.

*Table 1. Sample descriptive statistics.*

variable	indicator	Number of Responses	Percent of Responses
Age	Under 3 years	12	5.71%
	4-under 6 years	103	49.05%
	7 to under 9 years	80	38.10%
	ten years and over	15	7.14%
Scale	under 1000 persons	12	5.71%
	101- under 500 persons	120	57.14%
	501 to under 1000 persons	64	30.48%
	1000 persons and over	14	6.67%
Nature	public	11	5.24%
	private	143	68.10%
	Foreign-funded or joint	47	22.38%
	others	9	4.29%

### 3.3. Reliability and Validity Analysis

SPSS26.0 was used for reliability and validity analysis of the scale, and the results were shown in Table 2. First of all, Cronbach's  $\alpha$  coefficient values of each variable were 0.831, 0.801, 0.746 and 0.846 respectively, which were all greater than the standard value of 0.7, indicating good measurement reliability. Secondly, content validity is considered good because the scales used are mature scales that have been repeatedly verified. In addition, the exploratory factor analysis results show that the KMO values of digitalization capability, resource restructuring and business model innovation are 0.938, 0.772 and 0.902, respectively, which are all higher than the minimum standard value. Bartlett sphericity test results are significant, indicating that the variable measurement validity is acceptable.

*Table 2. Reliability analysis results of variables.*

Variable	Dimension item	Item number	Cronbach's $\alpha$
Digital capability	Digital opportunity identification ability	6	0.831
	Digital resource collaboration ability	6	0.801
Resource reconfiguration	—	8	0.746
Business model innovation	—	7	0.846

## 4. Statistical Analysis and Results

### 4.1. Descriptive Statistical Analysis

*Table 3. Descriptive statistics and correlation analysis of variables.*

Variable	BMI	DOI	DRC	RR
BMI	1			
DOI	.878**	1		
DRC	.804**	.830**	1	
RR	.830**	.826**	.767**	1
Mean	4.154	4.149	4.141	4.017
S. D.	0.622	0.645	0.595	0.499

DC: Digital capability, DOI: Digital opportunity identification ability, DRC: Digital resource collaboration ability, RR: Resource reconfiguration, BMI: Business model innovation.

Notes: \*\* at 0.01 level (two-tailed), the correlation was significant.

In order to facilitate data analysis, this paper takes the average value of the three main indicators of the sample data. The correlation coefficient matrix, mean value and standard deviation among variables are shown in Table 3. It can be seen that there is a significant correlation between digital capability, various dimensions, resource reconfiguration and business model innovation, which provides a testing basis for

the above assumptions.

### 4.2. Regression Results

This paper adopts hierarchical regression method to test the hypothesis. The regression model and results are shown in Table 4 and Table 5.

*Table 4. Impact of digital capability and resource reconfiguration on business model innovation.*

Variable	Dependent variable				
	Business model innovation				
	Model 1	Model 2	Model 3	Model 4	Model 5
Age	0.086	0.073	0.070	0.048	0.071
Scale	-0.121	-0.022	-0.046	0.006	-0.022
DOI		0.874***			0.675***
DRC			0.798***		0.239***
RR				0.829***	
R2	0.022	0.776	0.653	0.692	0.794
Adjusted R2	0.013	0.773	0.648	0.687	0.790
F	2.342	238.148***	129.092***	153.933***	197.537***

Legend: \*\*\*  $p < .001$

Model 1 is the basic model of the study, which is used to test the influence of two control variables, enterprise age and enterprise size, on business model innovation. On this basis, the two variables of digital opportunity identification ability and digital resource coordination ability are added to model 2 and Model 3 to test H1a and H1b. It can be seen that  $\Delta R^2$  increases significantly after the addition of these two variables, indicating better fitting degree of model 2 and model 3. Secondly, Digital opportunity identification ability ( $\beta = 0.874$ ,  $P < 0.001$ ) and Digital resource collaboration ability ( $\beta = 0.798$ ,  $P < 0.001$ ) had a significant positive impact on business model innovation, and H1a and H1b were supported. Model 5 again verifies that digital capability positively affects business model innovation. Therefore, H1, H1a and H1b are all valid. In model 4, resource reconfiguration was added on the basis of Model 1, and the results were obtained ( $\Delta R^2=67\%$ ,  $\beta = 0.692$ ,  $P < 0.001$ ), indicating that resource reconfiguration had a significant positive impact on business model innovation, and H3 was established.

In order to study the influence of independent variables on intermediary variables, digital opportunity identification ability and digital resource coordination ability were added to model 1, respectively, to establish model 6 and Model 7. The regression results are shown in Table 5. The fitting degree of the two models becomes better, and model 6 ( $\beta = 0.819$ ,  $P < 0.001$ ) all showed that digitization capability had a positive impact on resource reconfiguration, and H2, H2a and H2b were valid. In order to study the mediating effect of resource restructuring, models 8 and 9 were designed on the basis of models 6 and 7. It can be seen that when models 2-7 were both valid, the  $\beta$  value of model 8 decreased from 0.819 to 0.609, indicating that resource restructuring plays a partial mediating role in the digital opportunity identification ability and business model innovation. Similarly, the  $\beta$  value of model 9 decreased from 0.758 to 0.408, and part of the mediation effect still existed. In conclusion. Resource reconfiguration plays an intermediary role in enterprise digital capability and business model innovation, and H4 is established. Model 10 verifies H4 again.

*Table 5. Mediating role of resource reconfiguration.*

Variable	Dependent variable				
	Resource reconfiguration		Business model innovation		
	Model 6	Model 7	Model 8	Model 9	Model 10
Age	0.034	0.031	0.062	0.054	0.062*
Scale	-0.06	-0.081	-0.003	-0.004	-0.005
DOI	0.819***		0.609***		0.506***
DRC		0.758***		0.408***	0.167**
RR			0.323***	0.515***	0.281***
R2	0.688	0.595	0.809	0.76	0.817
Adjusted R2	0.683	0.589	0.805	0.755	0.812
F	151.272***	100.957***	216.871***	162.234***	182.083***

Legend: \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

## 5. Conclusions and Implications

### 5.1. Research Conclusions

This paper discusses the path mechanism of enterprise digitization capability affecting business model innovation under big data technology and draws the following conclusions: First, enterprise digital capability positively affects business model innovation. This means that in the era of digital economy, cultivating the corresponding digital ability is beneficial to enterprises to change the traditional value structure and achieve business model innovation. Secondly, resource reconfiguration positively affects business model innovation. This proves that resource is the foundation of innovation, and since resource reconfiguration is a dimension of dynamic capability, it deepens the research on antecedents of business model innovation.

### 5.2. Theoretical Contributions and Implications

First of all, this paper explores the role of Resource reconfiguration as an intermediary variable, and finds

another new path between enterprise digital capability and business model innovation under big data technology, which enriches the path choice between digital capability and business model innovation and makes the conduction chain between the two variables clearer. Secondly, in the context of the digital economy era, it explains the urgent need for enterprises to improve their coping ability to maintain their competitive advantages, and introduces the dynamic capability theory to expand its application scope and show its richer application scenarios and understanding perspectives.

The implications includes: first, cultivating digital capability is the primary choice for enterprises in the face of dynamic change and fierce competition in the market environment, and it is an important means to protect enterprises from being eliminated and to stand on the forefront of reform. Second, attach importance to the role of resource reconfiguration, and actively integrate into the industrial chain, acquire more internal and external heterogeneous resources, attach importance to the introduction and learning of advanced technology, and at the same time emphasize the optimization and integration of

organizational resources, and peel off redundant resources as soon as possible to avoid adverse effects.

### 5.3. Limitations and Future Research Directions

First, the research on business model innovation is relatively weak and does not take into account more dimensions, which can be further refined in the future. Secondly, the sample data adopted in this study is cross-sectional data, which does not have dynamic characteristics. Therefore, dynamic research can be considered in the future.

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