

Identification of Factors Influencing Digital Innovation Ability of Manufacturing Enterprises Based on Organisational Resilience

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Abstract. To address the challenges of developing digital innovation (DI) capabilities in traditional manufacturing enterprises, this article explores the applications of situational awareness, adaptability, and resilience in improving the survival and competitive development of these enterprises. By analysing factors such as knowledge management that may affect DI capabilities, this paper explores the relationship and significance between DI capabilities and organisational resilience in manufacturing enterprises. This article investigates the impact of organizational resilience on personalised customization and networked collaborative manufacturing through comparative experiments. Quantitative research was used to measure the organisational resilience of manufacturing enterprises, further confirming their profound impact on DI capabilities. This article collected data on the network collaborative manufacturing rate of two organisations (A and B) in a manufacturing enterprise (C). After adopting organisational resilience in 2019 and 2020, the network collaborative manufacturing rate of organisation B increased by 5.66% and 6.57% compared with organisation A. Results indicate that organisational resilience plays a crucial role in improving direct investment capabilities and enhancing the competitiveness of manufacturing enterprises, thereby fulfilling their direct investment needs. The mutual influence of digital capabilities on the internal organisational resilience of manufacturing enterprises cannot be underestimated, as these two factors interact and complement each other.

Keywords: organizational resilience, manufacturing enterprises, digital innovation capabilities, influencing factors

1. Introduction

Digital transformation has become the key to the sustainable development of manufacturing enterprises, wherein numerous manufacturing enterprises are committed to improving their digital innovation capabilities. Digital innovation capability refers to the ability of enterprises to create and apply new IT solutions and business models continuously in the process of adapting to the needs and technological progress of the digital era. However, digital innovation capabilities have complex and highly correlated characteristics with the external environment, requiring identification and management of various influencing factors to effectively enhance them.

Organizational resilience, as one of the factors that affect the digital innovation capability of enterprises, can help enterprises adapt to market changes, alleviate organizational structure maladaptation, and face unknown challenges and risks in the process of change. Based on the perspective of organisational resilience, multiple factors within and outside the enterprise can be considered to fully evaluate the digital innovation capability of the enterprise. At the same time, when enterprises have stronger organisational resilience, their digital innovation capabilities will also be sustainable and strong in adapting to market changes. Therefore, identifying the influencing factors of manufacturing enterprises' digital innovation capability, and discussing and studying it from the perspective of organizational flexibility will provide important enlightenment to manufacturing enterprises' Digital transformation.

To address the challenges faced in developing digital innovation capabilities in traditional manufacturing enterprises, this article utilizes the situational awareness, adaptability, and resilience of organizational resilience to optimize the survival and competitive development space of manufacturing enterprises. This article analyses the factors that affect the development of DI capabilities in manufacturing enterprises, including the level of terminal data collection capabilities, the company's own reserves and data analysis capabilities, and explores the relationship between organizational resilience and DI capabilities in manufacturing enterprises, as well as the relationship between knowledge management and DI capabilities. Through experiments, organizational resilience has a positive impact on DI capabilities. DI capabilities can provide changes in quality, efficiency, and power for the manufacturing industry, and the application of organizational resilience is more powerful for the long-term stable development of manufacturing enterprises. DI capabilities can be highly integrated with various aspects of production and manufacturing, playing an important role in promoting innovation in manufacturing enterprises.

2. Literature review

In the rapidly changing global development trend, to seize limited resources and rare opportunities and create a more conducive environment for the development of enterprises themselves, organizational resilience is used to maintain the competitive advantage of manufacturing enterprises. The development of DI capabilities in manufacturing enterprises cannot be separated from the strong support of organizational resilience. Under the trend of global digital development, manufacturing enterprises have ushered in a new round of transformation trajectory. The manufacturing industry has played a crucial role in the development of the national economy, and competition in the high-end links of the value chain has become increasingly fierce. Many regions have begun to conduct DI for manufacturing enterprises.

In response to the aforementioned understanding of organizational resilience, Hillmann Julia proposed that early reviews of resilience in organizational and business contexts indicated that although an increase in empirical research emerged on the concept of organizational resilience, there was still a need for clearer measurement (Hillmann & Edeltraud, 2021). Duchek Stephanie proposed that in the era of high turbulence and uncertainty, organizations needed to develop resilience wherein they could effectively respond to emergencies and recover from crises (Duchek, 2020). Ravichandran Thiagarajan

proposed that the innovation capability of enterprises was positively correlated with organizational agility, and enterprises with higher innovation capabilities could better utilize their digital platforms to improve agility (Ravichandran, 2018). Chan Calvin ML pointed out that for small and medium-sized enterprises, alleviating organizational rigidity was achieved through mechanisms for achieving open boundaries, while developing innovation capabilities was achieved through mechanisms for achieving organizational adaptability (Chan, 2019). Helfat Constance E pointed out that at least three types of dynamic capabilities were crucial for platform leaders: innovation capabilities, environmental scanning and perception capabilities, and comprehensive ecosystem coordination capabilities. Comprehensive capabilities played a crucial role in improving the ability of platform leaders to obtain value (Helfa & Ruth, 2018). Organizational resilience has a certain positive impact on the DI capability of manufacturing enterprises, but the above research is not in-depth.

Many scholars determined that the speed of enterprise development is positively correlated with the level of DI in the industry to a certain extent. Taghizadeh Seyedeh Khadijeh proposed that among the three dimensions of customer knowledge management, knowledge from customers was the strongest predictor of innovation quality and speed. The impact of innovation quality on the performance of the new service market was greater than the speed of innovation (Taghizadeh et. al., 2018). Hillmann Julia proposed that this rich perspective brought resilience. This was because it had an umbrella concept at the current stage and loosely covered a series of different organizational phenomena (Hillmann, 2021). Ardolino Marco pointed out that digitization was the foundation of any service transformation, although it most needed to become an availability provider (Ardolino, 2018). Warner Karl SR determined that digital transformation was defined as the use of new digital technologies, so as to achieve major business improvements, thereby enhancing customer experience, simplifying operations or creating new business models. Digital transformation was a continuous process of using new digital technology in daily organizational life. It regarded agility as the core mechanism of the organization's business model, collaboration method and final cultural strategy update (Warner & Maximilian, 2019). Vial Gregory proposed a framework to predict digital transformation as a process. Digital technology would cause damage in this process, which would trigger the strategic response of organizations. These organizations tried to change their value creation path, while managing structural changed and organizational barriers that affected the positive and negative results of this process (Vial, 2019). Nadeem Ayesha determined that digital transformation was widely affecting various industries. It realized innovative practices, improved design and new business models, and shaped how organizations created value on the Internet. Companies could use strong customer relationships to increase cross selling opportunities through successful digital transformation (Nadeem, 2018). Kohli Rajiv determined that organizations were facing increasing pressure and digital technology needed to be applied to update and transform their business models (Kohli & Nigel, 2019). The development speed of enterprises is affected by the Digital transformation of enterprises, but the business model of traditional manufacturing enterprises does not adapt to the development of the times. Therefore, traditional manufacturing enterprises urgently need to change their business model, give full play to their digital transformation and innovation capabilities and promote their long-term development (Hu et. al., 2021).

3. Analysis of the impact of organizational resilience on DI capabilities

3.1. Factors affecting the development of DI capabilities in manufacturing enterprises

With the rapid development of global digitization, the DI capability of manufacturing enterprises has become a new landmark in business models. Through the improvement of DI capability, the manufacturing documents of manufacturing enterprises are maximized, and related technologies and data are automatically analysed and calculated through data digitization.

The factors that affect the development of DI capabilities in manufacturing enterprises are mainly reflected in the following aspects: Firstly, the level of terminal data collection ability; secondly, the

strength of the enterprise's own reserves and analysis of data, as well as the ability to digitise operational processes; thirdly, enterprises can achieve platform-based participation. The DI capability has improved the ability to collect, store, and analyse data. On the one hand, it can collect the manufacturing data required for intelligent manufacturing. On the other hand, it can access the status information of concrete machinery, lifting machinery, pile foundation machinery and so on, thus providing customers with accurate data analysis reports, fault detection and prediction reports, and commercial innovation solutions, and further improving the one-stop service accuracy of manufacturing enterprises. With the specialization of knowledge, knowledge can help organizational members apply the latest theories to innovation. Effective management of knowledge resources has become one of the challenges faced by organizations and managers. The DI capability of manufacturing enterprises solves the potential risks of organizational themes and network systems. Knowledge-sharing amongst organisational members helps towards realising the value of digital information (Liang & Li, 2023). The factors that affect the development of DI capabilities in manufacturing enterprises cannot be separated from knowledge management and dual organisational theory innovation models.

The DI of manufacturing enterprises cannot be separated from knowledge, and knowledge management would also become an important asset for enterprises. Product categories and production processes can be continuously adjusted in the process of DI, which plays a driving role in the development of manufacturing enterprises (Li & Zhang, 2021). Knowledge management plays an important role in the DI process of manufacturing enterprises, thus improving DI collaboration and promoting the mutual transformation of implicit and explicit knowledge, thereby identifying knowledge blind spots and gaps to ensure the reliability and accessibility of knowledge. The application of knowledge contributes to the steady development of DI, whilst knowledge application must be closely related to knowledge creation, thus facilitating the formation of sustained innovation capabilities in manufacturing enterprises. Based on the understanding of the development of DI capabilities, knowledge can create new economic value chains and further enhance the enterprises' core competitiveness. Through knowledge management, manufacturing enterprises can be supported to develop, manage, and share scientific and technological information resource data, thereby achieving deep communication and integration of DI information in enterprises and further enhancing the height of DI.

In the increasingly fierce competition mode, the balance between development and exploratory dual innovation has become one of the factors affecting the development of DI capabilities in manufacturing enterprises (He, 2021). The dual organization theory can balance the effectiveness of development and exploration. The development of manufacturing enterprises may be constrained by internal resource endowments and dual governance capabilities. Both types of innovation activities have the potential to be enhanced. Through the operational innovation design mechanism within the manufacturing enterprise organization, the trade-off between open innovation and exploratory innovation can be alleviated.

Achieving full process coverage of product development, upgrade iterations, and digital services is crucial in the context of DI. In the development of manufacturing enterprises, they should gradually achieve the creation of design templates, production and reprocessing information, user usage and feedback information highly summarized intelligent integrated modules under the construction of digital intelligent systems (Wang & Han, 2021). They should shift from traditional demand production lines to innovative design data, and be committed to the implementation of digital user personalised customisation and the deployment of networked collaborative manufacturing.

3.2. Relationship between Organizational Resilience and DI Capability of Manufacturing Enterprises

3.2.1. Investigation on Organizational Resilience

Organizational resilience refers to the dynamic ability of an organization to continuously develop

and update its adaptability over time. Its essence is a dynamic itinerary that matches the organisation with the external environment. Enterprises with strong organisational resilience have a stronger ability to take timely action to respond to crises in the early, middle, and late stages of responding to emergencies (Zhang et. al., 2021; Werner et al., 2021). On the one hand, organisational resilience reflects the ability of enterprises to cope with difficulties. On the other hand, it reflects the resilience of enterprises in the face of DI challenges in manufacturing enterprises, and is one of the key elements to maintain sustainable development and growth of enterprises. By taking the adaptability of business models as an example, organisational resilience emphasises how manufacturing enterprises can adjust their digital development direction and design innovative business models, to restore the innovative development and performance level of manufacturing enterprises rapidly in the digital age crisis. Therefore, organisational resilience not only helps companies turn around in adversity, but also helps them enhance their DI capabilities to achieve leapfrog development.

3.2.2. DI capability

Static technological innovation capabilities have fallen far behind the pace of enterprise development nowadays, and the emergence of DI capabilities in manufacturing enterprises has effectively responded to the increasing competitive pressure and development bottlenecks among enterprises. DI capability refers to the ability of manufacturing enterprises to and accurately integrate effective information through the use of digital information processing technology, thus further promoting the development of innovation capabilities in manufacturing enterprises and playing a crucial role in improving enterprise efficiency and resource optimization. In short, DI capability refers to the new digital products, operational processes, and innovative business modules brought about by digital technologies such as network cloud computing, big data analysis, artificial intelligence control, and blockchain modules (Garcia, 2020). Combining knowledge management organisations can provide sufficient knowledge resources for relevant departments of manufacturing enterprises, thus promoting the achievement of DI goals within a limited time. Knowledge management autonomy can be written by the human resources department to design the personnel organization framework and evaluate the current level of management work jointly.

Digitalisation runs through the innovation and development of manufacturing enterprises, and DI capabilities become the backbone of enterprises in terms of acquiring resources and creating value. The DI capability of manufacturing enterprises refers to the ability of manufacturing enterprises from birth to initial scale and then to achieve DI. DI capability can be restructured and reused, thus allowing different levels of digital resources to reshape the physical appearance of products and the value creativity of enterprises (Wang, 2022).

The goal of DI capability is to connect all aspects of manufacturing enterprise business together, with a focus on innovation in core applications. It enhances the efficiency of manufacturing enterprises and reduces their production costs, further enhances their profits, so as to further realize the radiation of DI capabilities. The largest problem faced by traditional manufacturing enterprises in the research and development process is how to solve the overall connection between research, production, and sales conveniently and rapidly to form better enterprise integration and optimisation. This can seamlessly connect the research and development, production, and sales processes, and achieve true DI and upgrading. By taking the corresponding interval time during the production process as an example, setting the interval time of checkpoints reasonably can not only reduce time costs, but also reduce the workload of each checkpoint. Therefore, setting the interval time of checkpoints reasonably and reducing the workload of checkpoints is one of the key factors in solving problems (Jiang & Li, 2021).

DI can help enterprises quickly adjust, process, integrate, and expand their digital core by utilizing the latest digital technologies, thus easily meeting the constantly changing flexibility needs of DI. The process of DI capability is divided into three stages: The first stage is in the innovative production stage. Manufacturing enterprises can enhance their DI production capacity and drive their development scale;

the second stage is in the stage of innovation and upgrading, and manufacturing enterprises cannot stop at the current development process. Manufacturing enterprises can upgrade their DI to keep up with the times and not be engulfed by the times; the third stage is in the stage of innovation qualitative transformation. Manufacturing enterprises achieve qualitative changes in innovation through quantitative accumulation, which helps them reach new heights of innovation. The specific stage flowchart is shown in Figure 1:

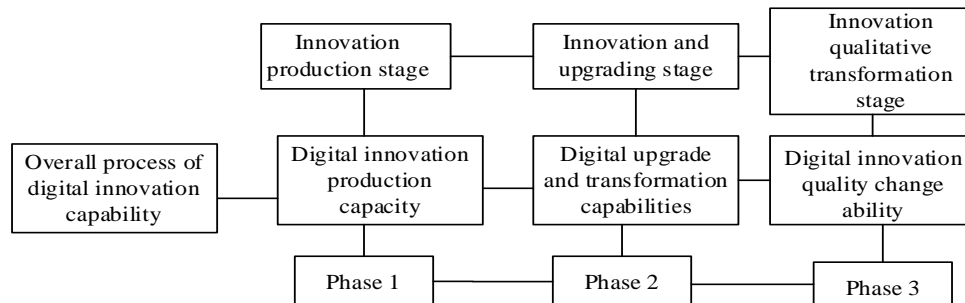


Fig.1: The process of DI capability

3.2.3. Relationship between Organisational Resilience and DI Capability of Manufacturing Enterprises

Organisational resilience is closely related to the DI capability of manufacturing enterprises. On the one hand, organizational resilience can enhance the organizational situational awareness of manufacturing enterprises and predict subtle changes in the current environment to resist potential risks; on the other hand, the upgrading of organizational resilience can help manufacturing enterprises more comprehensively cope with a series of issues such as digital technology upgrades and increasing global competitive pressure. Organisational resilience has brought a “baton” to the economic resilience and risk resistance of many regions through continuous learning and updating of dynamic capabilities to adapt to changes in turbulent environments. There needs to be a certain degree of self-control and balance between organisational resilience and DI ability. From the perspective of regulatory exhaustion theory, the application of self-control would consume regulatory resources, whilst excessive self-control would have a negative impact on behaviour (Ling & Li, 2022).

The DI capability of manufacturing enterprises is created by their organizational resilience to perceive the external environment anytime and anywhere, and is a perfect combination of their ability to apply digital technology and organizational resilience. Based on traditional innovation theories, manufacturing enterprises can no longer fulfil the needs of DI, and they have to possess DI capabilities to enhance organizational resilience. The realization of DI capability relies on the adjustment of organizational resilience, and the mobilization of organizational resilience further enhances the quality of DI capability. DI capability can quickly and sensitively identify potential crises in manufacturing enterprises through digitisation and innovation, as well as accurately identify the possibilities of market competition, or enhance the cohesion with relevant stakeholders. Enterprises use digital technology to continuously update and iterate, and use data to gain insight into the internal and external dynamics of the organization. This drives digital communication between the organization and the external environment, thus further improving the organisation’s organisational capabilities and resource acquisition advantages and enhancing the organisation’s risk management capabilities [18]. The DI capability reacts on organizational resilience, and helps the internal collaboration and cooperation of organizations to facilitate the timely adjustment of the organisational structure of manufacturing enterprises and further drive the fitness of the organisational environment. The specific content is shown in Figure 2:

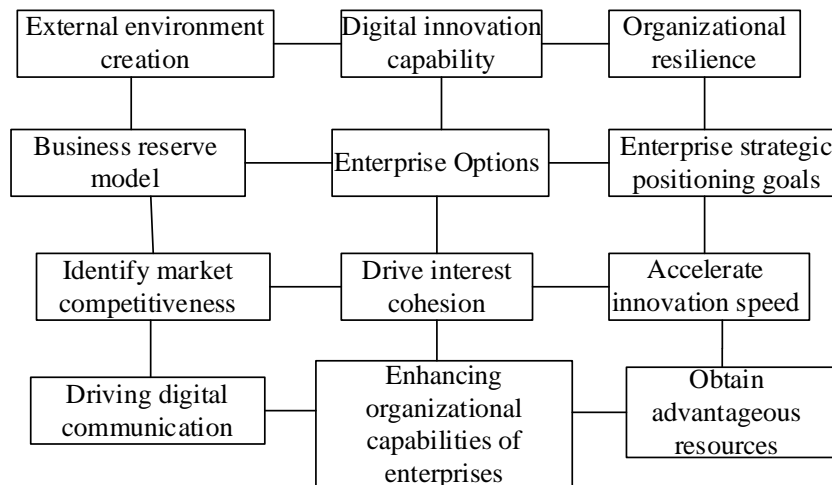


Fig.2: The relationship between organizational resilience and DI capability of manufacturing enterprises

The advantages of DI capability and the strength of organizational resilience enable manufacturing enterprises to be in a dynamic state of organizational recovery and rebound at any time when facing difficulties. Enterprises can remain calm and make decisions that are conducive to the development of the manufacturing industry when facing crises, such as dynamically allocating resources and balancing resource allocation. Organizational resilience has a significant impact on the strategic formulation and resource integration of DI capabilities in manufacturing enterprises.

3.3. Relationship between Knowledge Management and DI Capability

Knowledge management is the construction of a comprehensive knowledge system within a manufacturing enterprise organisation. By acquiring and accumulating knowledge, it creates collective wisdom within the organisation and deepens the connections between people within the organization to enhance the DI capabilities of manufacturing enterprises, thus making it easier for enterprises to make the most favourable decisions for enterprise development when facing problems.

3.3.1. Acquiring and Accumulating Knowledge to Enhance DI Capabilities

Knowledge acquisition is the process of systematically refining, processing, interpreting and reproduction of internal and external information and knowledge, which helps towards analysing the current situation of enterprises and make long-term plans for the future. The reserve of knowledge determines the initial conditions for manufacturing enterprises to have innovation capabilities, and the increase in knowledge accumulation determines the adjustment of dynamic innovation capabilities at any time, which is an essential growth condition for innovation capabilities. The improvement of DI capability not only requires enterprises to integrate existing knowledge reserves internally and externally, but also to absorb cutting-edge external knowledge. By dividing and organizing various complex knowledge and information through big data, the knowledge base is organised to facilitate the smooth process of DI, so as to facilitate the close and orderly promotion of various stages of DI in manufacturing enterprises. Manufacturing enterprises can combine information obtained from external sources with advanced technology and internal supporting knowledge to facilitate DI and iteration, thereby enhancing their ability to reserve and accumulate knowledge and further enhancing their DI capabilities.

3.3.2. Knowledge Transformation and Sharing to Enhance Innovation Capabilities

Knowledge transformation is a cyclic process of transforming external or explicit knowledge into

internal or tacit knowledge. That is, by exchanging, transforming, and sharing corresponding knowledge, internal members of the organization can absorb and digest new knowledge in a timely manner. Explicit knowledge creates new tacit knowledge in members' practice through reorganization and processing. The data-driven innovation capability can enable the internal and external transformation of knowledge, wherein enterprise leaders can see the essence through phenomena. Only when knowledge is truly transformed and internalized for use by the enterprise can it have a certain significance. Therefore, manufacturing enterprises need to fully transform knowledge into new knowledge used by the enterprise, and further internalize it into DI capabilities which can be used by the enterprise. The power of knowledge sharing and transformation can provide sufficient new knowledge for innovation in manufacturing enterprises to be applied in practice. By utilizing digital information technology of the current development status of the manufacturing industry, a comprehensive digital management database can be established to strengthen the integration of knowledge within the manufacturing enterprise. The process of knowledge transformation and sharing is also a process of knowledge appreciation, which can maximize the perfect fusion of knowledge and DI during the sharing process. The knowledge sharing mechanism provides new knowledge and methods for the improvement of DI. Therefore, knowledge management provides technical support for DI in manufacturing enterprises, whilst enterprises can closely integrate the entire process of knowledge application and business processes. It plays a role by integrating knowledge and information, and fully realizes innovation management in the process of DI. This makes manufacturing enterprises highly sensitive to changes in the internal and external environment, thereby constantly acquiring knowledge and information from the outside, and improving their adaptability and innovation capabilities.

4. Experiment on the Impact of Organizational Resilience on DI Capability

In the development of DI capabilities in manufacturing enterprises, experiments were conducted to compare the impact of organizational resilience on the development of DI capabilities amongst various enterprises or various organizations of the same enterprise. Data experiments were conducted on personalized customization and networked collaborative manufacturing based on organizational resilience as follows:

4.1. Personalised Customization

In the DI of manufacturing enterprises, the adoption of organizational resilience can be tailored to fulfil the personalized needs of customers to fulfil their consumption needs. Manufacturing enterprise A adopted organizational resilience to address the issue of supply-demand imbalance and overcapacity in traditional manufacturing enterprises. Personalised products could greatly increase the sales volume of manufacturing enterprises by enhancing customer satisfaction, thereby gaining more customer loyalty and timely building an interactive platform for manufacturing enterprises and customers, and further enhancing the competitiveness of the enterprise. However, manufacturing enterprise B did not adopt organisational resilience compared to the development of manufacturing enterprise A, as shown in Figure 3:

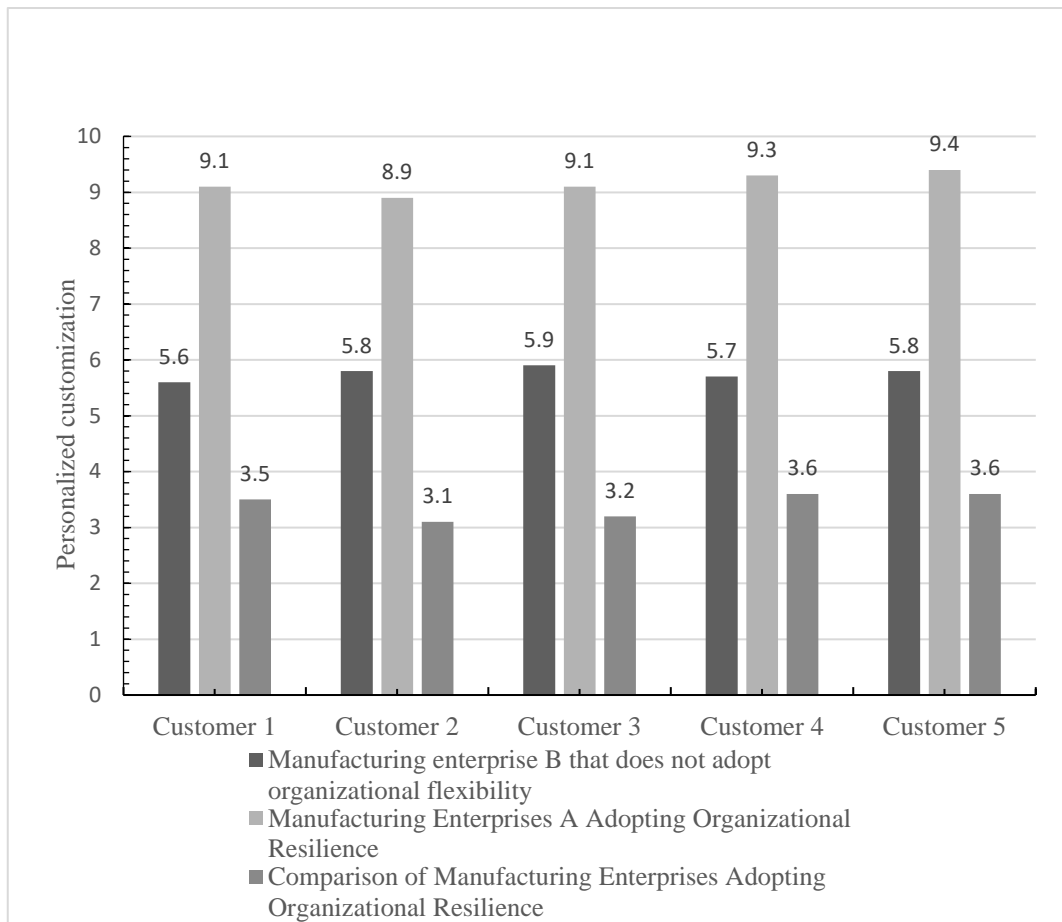


Figure 3: Regarding whether enterprises A and B adopt customer personalized customization using organizational resilience

From Figure 3, the personalized customization needs of B manufacturing enterprise, which did not adopt organizational resilience, were in a low stage. The personalised customisation needs of customers 1, 2, 3, 4 and 5 were 5.6, 5.8, 5.9, 5.7 and 5.8 (Full score was 10 points.); manufacturing enterprise A was in the stage of high-quality development by adopting organizational resilience and personalised customer customisation needs. The personalised customisation needs of customers 1, 2, 3, 4 and 5 were 9.1, 8.9, 9.1, 9.3 and 9.4 (Full score was 10 points.). The adoption of organisational resilience by manufacturing enterprises significantly improved customer personalized customization. Each customer received better one-on-one services, thus further enhancing the core competitiveness of manufacturing enterprises.

4.2. Networked Collaborative Manufacturing

DI capability and organizational resilience work together to promote the development of manufacturing enterprises, and digitalization can create greater value for manufacturing enterprises through networked collaborative manufacturing. The application of networked collaboration in manufacturing enterprises can change the production process from traditional top-down to bottom-up, thus fulfilling customer needs. Comparing whether different manufacturing enterprises adopt organizational resilience for networked collaborative manufacturing had certain practical significance for order completion. The impact of organizational resilience on networked collaborative manufacturing in organisations a and b of manufacturing enterprise C is shown in Figure 4:

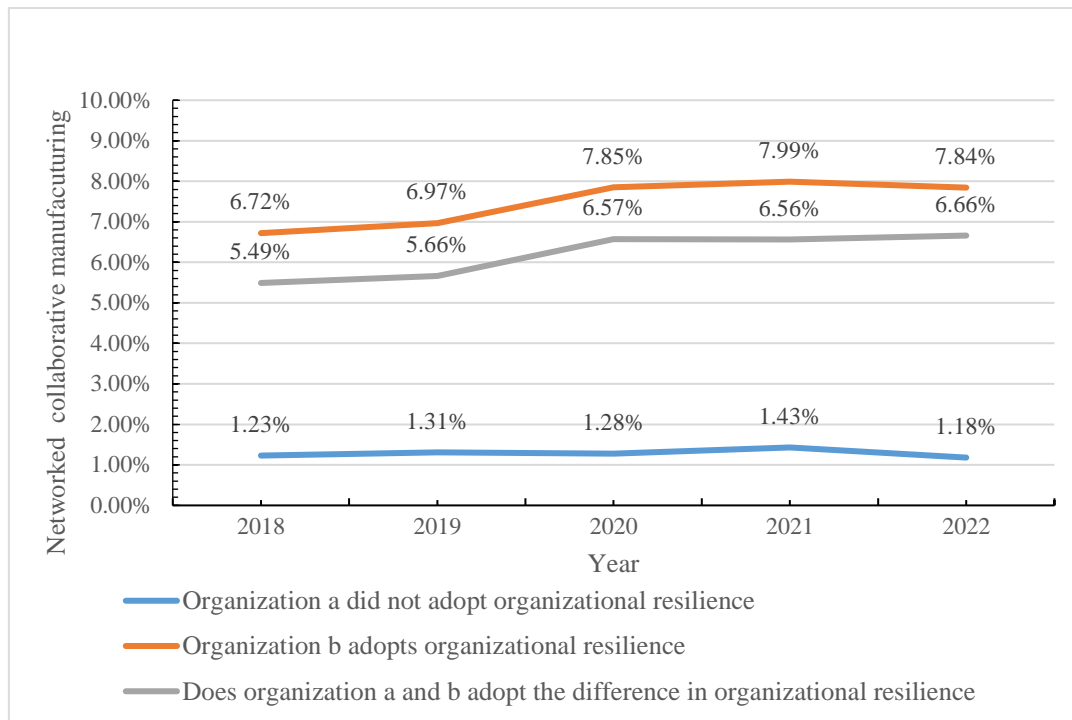


Figure 4: Whether company a and b of company C would adopt networked collaborative manufacturing with organisational resilience from 2018 to 2022

From Figure 4, the collaborative manufacturing rates of organisation A of manufacturing company C, which did not adopt organizational resilience networking, were 1.23%, 1.31%, 1.28%, 1.43%, and 1.18% from 2018 to 2022, respectively; the B organization of C manufacturing enterprise adopted organizational resilience networking, with collaborative manufacturing rates of 6.72%, 6.97%, 7.85%, 7.99% and 7.84% from 2018 to 2022, respectively. Figure 4 shows that in 2018, the networked collaborative manufacturing rate of organization B increased by 5.49% compared to organization A. In 2019, the networked collaborative manufacturing rate of organisation B increased by 5.66% compared with organisation A. In 2020, the networked collaborative manufacturing rate of organisation B increased by 6.57% compared with organisation A. In 2021, the networked collaborative manufacturing rate of organisation B increased by 6.56% compared with organisation A. In 2022, the networked collaborative manufacturing rate of organisation B increased by 6.66% compared with organisation A. Even under the normal global epidemic situation, the networked collaborative manufacturing of manufacturing enterprise B organization was still steadily improving, thus greatly promoting the development of manufacturing enterprise C.

5. Repositioning Organisational Resilience through Quantitative Investigation

This article adopts a quantitative research method and a subjective sampling method of non-probability sampling to conduct a questionnaire survey to measure the organizational resilience of manufacturing enterprises. This article selects five manufacturing enterprises with similar production scales, ranging from the highest score of 5 to the lowest score of 1. They express strong agreement, some agreement, reservation, some disagreement, and strong disagreement in order. The method of quantitative research was used to analyse the collected data and provide solutions. The measurement of organizational resilience adopted a scale of nine items, amongst which the adaptability of the organization included three items. For example, when necessary, manufacturing enterprise organizations could flexibly take necessary actions; the recovery ability of the organisation also comprised four items. For example, manufacturing enterprises could solve problems that arose according to local conditions; the situational

awareness of an organisation included two questions, such as attempting to achieve clear division of labour amongst all employees in the enterprise to do their job well. Finally, the three dimensions of organizational resilience were attempted to merge into one of the core DI capabilities of manufacturing enterprises. The questionnaire survey results of manufacturing enterprises D (without adopting organisational resilience), E (without adopting DI capability), F, G, and H on organisational adaptability, resilience, and situational patterns are shown in Table 1:

Table 1. Questionnaire survey on whether enterprises D, E, F, G, and H adopt the adaptability, resilience and situational patterns of organisational resilience

	Manufacturing enterprise D	Manufacturing enterprise E	Manufacturing enterprise F	Manufacturing enterprise G	Manufacturing enterprise H
Organizational adaptability	2	1	3	5	5
Resiliency	1	2	3	4	5
Scene mode	2	2	3	3	4

Table 1 shows that manufacturing company D did not adopt organizational resilience, and its organizational adaptability, resilience, and situational patterns were in a low state of disagreement; E manufacturing enterprise did not adopt DI capabilities, whilst its organizational adaptability, resilience, and situational patterns were also in a state of low disagreement; F, G and H manufacturing enterprises adopted an organisational resilience model and updated their internal DI capabilities, thus resulting in a great deal of internal and external approval for the organisation’s adaptability, resilience and situational patterns.

How can manufacturing enterprises harness organisational resilience to leverage their DI capabilities? On the one hand, clarifying the direction and positioning through digital data analysis, diagnosis, and evaluation is necessary. On the other hand, it is necessary to clarify the methods and steps for transformation, and diagnose gaps with big data, so as to conduct in-depth research on strategic deployment and organizational resilience in response to external threats, organizational reliability, employee advantages, business model adaptability and resilient supply chain design. The development process of manufacturing enterprises is not overnight. The more fully empowered they are, the more unrestricted they are.

6. Conclusion

In the current trend of global digital development, various industries have also taken advantage of the digital age, and manufacturing enterprises are no exception, thus greatly improving the modernisation process of the development of the manufacturing enterprise field. After analysing the factors which might affect the development of manufacturing enterprises, this article found that DI capability played an important role in the development of manufacturing enterprises. Furthermore, it deeply analysed the relationship between organisational resilience and DI capability, as well as the relationship between organisational resilience and knowledge management on DI capability of manufacturing enterprises. The impact of organisational resilience, situational awareness, adaptability and resilience on DI capabilities was clarified, thus further optimising the survival and development space of manufacturing enterprises. Each organisation has its own specific foundation and environmental prerequisites, leading to differences in the factors influencing its digital innovation capabilities. Therefore, tailoring solutions based on the actual situation and internal characteristics of the enterprise is recommended to maximize the organization's digital innovation capabilities when utilising identified influencing factors. Although this article concludes that there is a positive relationship between organizational resilience and DI capability, providing relevant reference for the identification of factors affecting the digital innovation capability of manufacturing enterprises, limitations exist in this study. The sample size of manufacturing enterprises surveyed in this article is too small, and the quantitative standards of the study are still not precise enough. These issues will be addressed in future research.

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