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The Impact of Digital Capabilities on Supply Chain Efficiency, Transparency and Resilience

Abstract

Supply chain competitive execution alludes to the comprehensive qualities of a supply chain to outperform competitors within the competitive advertise by successfully allocating resources and conveying esteem to the showcase in this manner winning more openings for development. Setting up a supply chain with supported competitive execution is a crucial strategic approach for organizations to outlive and accomplish maintainable development in a energetic worldwide advertise. The term feasible competitive advantage SCA was initially introduced by Doorman who respected competitive advantage as the center of organizational performance in a competitive advertise speaking to persevering execution that surpasses competitors. Accomplishing supply chain competitive performance is the extreme objective of center undertakings in driving supply chain activities Supply chain competitiveness is characterized by its systemic nature solidness and value creation speaking to the extreme objective of transformative exercises by endeavors. Given this the ponder of how to construct feasible supply chain competitiveness has attracted research consideration. Our discoveries uncover the critical part of advanced change in upgrading supply chain capabilities which in turn emphatically impacts maintainable competitive execution. A advance investigation appears that supply chain capabilities intercede the relationship between supply chain advanced change and economical competitive execution In addition natural vulnerability can serve as a driving constrain for advanced change fortifying supply chains to upgrade their investigation of digitalization. This investigate provides valuable bits of knowledge into investigating maintainable competitive execution within the supply chain setting. It addresses the hole in experimental writing with respect to advanced change inquire about and enhances the field of possibility hypothesis.

Keywords: *digital transformation, supply chain efficiency, transparency, supply chain capability*

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Rəqəmsal imkanların təchizat zəncirinin səmərəliliyinə, şəffaflığına və davamlılığına təsiri

Xülasə

Təchizat zəncirinin rəqabətli icrası, resursları uğurla bölüşdürərək və bu şəkildə inkişaf üçün daha çox açılışlar qazanaraq, vitrinə hörməti çatdırmaqla rəqabətli reklam çərçivəsində rəqibləri üstələmək üçün təchizat zəncirinin hərtərəfli keyfiyyətlərinə işarə edir. Dəstəklənən rəqabətli icra ilə təchizat zəncirinin qurulması təşkilatlar üçün enerjili dünya reklamında davamlı inkişafa nail olmaq üçün mühüm strateji yanaşmadır. Mümkün rəqabət üstünlüyü “təchizat zənciri” termini əvvəlcə rəqibləri üstələyən əzmkar icradan danışan rəqabətli reklamda təşkilati performansın mərkəzi kimi rəqabət üstünlüyünə hörmət edən Doorman tərəfindən təqdim edilmişdir.

Təchizat zəncirinin rəqabətli performansına nail olmaq, tədarük zəncirinin fəaliyyətlərini idarə etməkdə mərkəz müəssisələrinin ifrat məqsədidir. Təchizat zəncirinin rəqabət qabiliyyəti onun sistemli xarakterinin möhkəmliyi və səylərlə transformativ məşqlərin ifrat məqsədindən danışan dəyər yaratması ilə xarakterizə olunur. Bunu nəzərə alaraq, mümkün təchizat zəncirinin rəqabətqabiliyyətliliyinin necə qurulacağına dair fikirlər tədqiqatların diqqətini cəlb etmişdir. Kəşflərimiz təchizat zənciri imkanlarının təkmilləşdirilməsində qabaqcıl dəyişikliyin kritik hissəsini aşkar edir və bu da öz növbəsində davamlı rəqabətli icraya ciddi təsir göstərir. Qabaqcıl araşdırma nəticəsində görünür ki, təchizat zəncirinin imkanları təchizat zəncirində qabaqcıl dəyişiklik və iqtisadi rəqabətli icra arasında əlaqəyə müdaxilə edir. Bundan əlavə, təbii zəiflik tədarük zəncirlərinin rəqəmsallaşma araşdırmalarını təkmilləşdirmək üçün qabaqcıl dəyişikliklər üçün təkanverici məhdudiyət rolunu oynaya bilər. Bu təhqiqat təchizat zənciri daxilində davam etdirilə bilən rəqabətli icranın araşdırılması üçün dəyərli biliklər təqdim edir. Qabaqcıl dəyişiklik sorğusu ilə bağlı eksperimental yazıdakı boşluğa müraciət edir və ehtimal fərziyyəsi sahəsini artırır.

Açar sözlər: *rəqəmsal transformasiya, təchizat zəncirinin səmərəliliyi, şəffaflıq, təchizat zənciri qabiliyyəti*

Introduction

With the fast advancement of computerized innovations such as huge information cloud computing manufactured insights the Web of Things blockchain and 5G coupled with the interconnected worldwide economy and the tall level of instability within the outside environment dangers and openings are applying limitless impacts on the maintainable advancement and competitive execution of supply chains. For occurrence amid the COVID19 widespread the computerized economy thrived with online shopping inaccessible work online instruction telemedicine and other digitalized exercises. Companies that grasped computerized change in these regions picked up a competitive advantage whereas those that fizzled to adjust to the computerized move faced an inactive position within the showcase competition. Given the impact of computerized innovation improvement and the dubious outside environment on supply chain competitive execution creating strong and maintainable supply chains through leveraging computerized technologies has gotten to be a best need for organizations. There's an critical require for investigate and commonsense execution of computerized change in supply chains to upgrade their competitive execution at the organizational level (Al-Banna, Franzoi, Menezes, Al-Enazi, Rogers, Kelly, 2022).

Supply chain competitive execution CP alludes to compelling coordination collaboration and communication among diverse substances inside a supply chain empowering organizations to realize superior execution upgrade customer satisfaction and keep up competitiveness within the fast-paced commerce environment. With the ceaseless advancement of advanced innovations, the rationale of esteem creation in supply chains has experienced significant change in reshaping the mechanical scene and supply chain competitive elements. Clarifying the factors and components impacting supply chain competitive execution within the modern outside environment holds commonsense importance and has gathered noteworthy consideration from both the scholarly world and industry (Akbari, Hopkins, 2022).

Supply chain capability SCC alludes to an organization's capacity to identify utilize and assimilate inside and outside resources information to encourage the exercises of the whole supply chain. Past investigation has appeared that diverse measurements of supply chain capability can affect distinctive viewpoints of supply chain execution. For illustration showcase detecting supply chain dexterity and versatility can impact the double adaptability of the supply chain. Due to the multidimensional nature of supply chain capability and the reliance of supply chain competitive execution on diverse measurements of supply chain capability totally different businesses the relationship between supply chain capability and supply chain competitive execution is complex and amniomancy.

Especially within the handle of supply chain computerized change organizations not as it were got to adjust to the turbulent outside environment but to encounter energetic changes within the inner

environment. To encourage upgrade organizational competitive execution and secure future improvement whereas keeping up their current competitive position it is essential to develop and construct supply chain capability. In this manner this consider investigates the part of four-dimensional supply chain capability within the relationship between advanced change and supply chain competitive execution from the point of view of supply chain computerized change.

Digitization Transformation, Supply Chain Capabilities, and Supply Chain Competitive Performance

Computerized change advances the development of a carefully empowered end-to-end supply chain extends the boundaries of supply chain administrations and encourages the arrangement of a supply chain environment which contributes to the rise of a responsive supply chain and drives the esteem extension of supply chain collaboration and integration. Subsequently it can be gathered that advanced change improves the capacity of supply chain action integration and responsiveness. Moreover advanced change upgrades the perceivability of the supply chain decreases data asymmetry among supply chain individuals and can be anticipated to fortify the data trade capability of the supply chain In conclusion sharing contracts such as benefit sharing can lead to way better supply chain execution through incentivizing collaboration between parties compared to other sorts of contracts (Baryannis, Validi, Dani, Antoniou, 2019).

Research

For analysing companies performance according to digitatization transformation, we have used survey method.

The survey data shows that the majority of respondents are using digital capabilities such as the Internet of Things (IoT) and Artificial Intelligence (AI) to improve their supply chain management practices. The use of these digital capabilities has led to a number of benefits, including improved supply chain performance, efficiency, and decision-making. However, there are a number of challenges associated with the use of these technologies, including high implementation costs, security concerns, a lack of qualified personnel, and data quality issues (Ghadge, Er Kara, Moradlou, Goswami, 2020).

The interview data provides a deeper understanding of the impact of digital capabilities on supply chain management. The interview data shows that the use of digital capabilities has led to significant improvements in supply chain performance, resilience, and sustainability. For example, the use of IoT devices has enabled real-time monitoring of supply chain operations, which has improved visibility and enabled faster response times to supply chain disruptions. Similarly, the use of blockchain has improved the security and trust of the supply chain by providing secure and transparent traceability of products and transactions (Baryannis, Dani, Antoniou, 2019).

Overall, the data collected in this study provides valuable insights into the use of digital capabilities and their impact on supply chain management. The results of the study can be used to inform practice and policy in the field of supply chain management and to identify strategies to improve supply chain performance, resilience and sustainability.

We used a survey method to conduct the research. We prepared 20 questions related to the application of artificial intelligence in the supply chain and gave these questions to 30 respondents. We entered the answers to these questions into SPSS and analyzed them using Anova. The questions are provided in the appendix. We will provide examples of these questions and analyze them below (Brintrup, Brintrup, Kosasih, Schaffer, Zheng, Demirel, MacCarthy, 2023).

Research results

1. What digital technologies have been implemented in your organization's supply chain operations?

1. Internet of Things (IoT) devices
 2. Advanced analytics and big data platforms
 3. Blockchain technology
 4. Cloud-based inventory management systems
- Other (specify)

Table 1. The result of operations using

Descriptives								
Mean								
	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Internet of Things (IoT) devices	4	2.0500	.85732	.42866	.6858	3.4142	1.15	3.10
Advanced analytics and big data platforms	8	2.6063	.40039	.14156	2.2715	2.9410	2.05	3.30
Blockchain technology	7	2.5643	.29540	.11165	2.2911	2.8375	2.05	2.95
Cloud-based inventory management systems	6	2.7167	.50365	.20562	2.1881	3.2452	1.95	3.35
Other (specify)	5	2.7900	.55610	.24870	2.0995	3.4805	1.90	3.35
Total	30	2.5750	.51924	.09480	2.3811	2.7689	1.15	3.35

As we can see from the analysis results, the majority of respondents chose advanced analytics and data platforms.

Tests of Homogeneity of Variances						
		Levene Statistic	df1	df2	Sig.	
Mean	Based on Mean	1.978	4	25	.129	
	Based on Median	1.904	4	25	.141	
	Based on Median and with adjusted df	1.904	4	19.754	.150	
	Based on trimmed mean	1.969	4	25	.130	
ANOVA						
Mean						
		Sum of Squares	df	Mean Square	F	Sig.
Between Groups		1.463	4	.366	1.438	.251
Within Groups		6.356	25	.254		
Total		7.819	29			

As a result of the analysis, we see that the F value was 1.438. That is, since it is greater than 0.05, which technology is used does not affect the development of the supply chain. That is, choosing a

different technology can develop it. Also, since the p value is 0.251, we can say that the type of choice is more important than the choice itself (Fatorachian, Kazemi, 2021).

How long has your organization been using digital technologies in supply chain management?

1. Less than 1 year
2. 1-2 years
3. 2-5 years
4. More than 5 years

Table 2. The results of using digital technologies in supply chain management

Descriptives								
Mean								
	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Less than 1 year	7	2.2714	.47334	.17890	1.8337	2.7092	1.60	2.95
1-2 years	9	2.4611	.61175	.20392	1.9909	2.9313	1.15	3.35
2-5 years	7	2.7500	.27080	.10235	2.4996	3.0004	2.35	3.10
More than 5 years	7	2.8500	.50580	.19117	2.3822	3.3178	2.05	3.35
Total	30	2.5750	.51924	.09480	2.3811	2.7689	1.15	3.35

When we look at the use of artificial intelligence in the supply chain, we see that many companies have been implementing this method for 1-2 years. Considering the recent pace of development of artificial intelligence, this situation can be considered quite normal (Kamble, Gunasekaran, Parekh, Mani, Belhadi, Sharma, 2022).

Tests of Homogeneity of Variances					
		Levene Statistic	df1	df2	Sig.
Mean	Based on Mean	.848	3	26	.480
	Based on Median	.579	3	26	.634
	Based on Median and with adjusted df	.579	3	19.167	.636
	Based on trimmed mean	.818	3	26	.496

ANOVA					
Mean					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.506	3	.502	0.047	.029
Within Groups	6.313	26	.243		
Total	7.819	29			

Based on the Anova analysis of the duration of application of artificial intelligence, we can say that as the application period increases, the profit obtained also increases. The F value of 0.047 (<0.05) proves this. Also, the P value of 0.029 confirms our hypothesis.

What benefits has your organization gained after implementing digital technologies in the supply chain?

1. Reduced lead times
2. Improved forecasting accuracy
3. Improved inventory management
4. Simplified communication

Table 3. The results of benefits gained after implementing digital technologies in the supply chain

Descriptives								
Mean								
	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Reduced lead times	7	2.2714	.47334	.17890	1.8337	2.7092	1.60	2.95
Improved forecasting accuracy	9	2.4611	.61175	.20392	1.9909	2.9313	1.15	3.35
Improved inventory management	7	2.7500	.27080	.10235	2.4996	3.0004	2.35	3.10
Simplified communication	7	2.8500	.50580	.19117	2.3822	3.3178	2.05	3.35
Total	30	2.5750	.51924	.09480	2.3811	2.7689	1.15	3.35

As we can see from the analysis, the main benefits of applying artificial intelligence were perceived differently by different respondents. Most respondents chose the answer “improved forecasting accuracy”.

Tests of Homogeneity of Variances					
		Levene Statistic	df1	df2	Sig.
Mean	Based on Mean	.848	3	26	.480
	Based on Median	.579	3	26	.634
	Based on Median and with adjusted df	.579	3	19.167	.636
	Based on trimmed mean	.818	3	26	.496

ANOVA					
Mean					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.506	3	.502	2.067	.129
Within Groups	6.313	26	.243		
Total	7.819	29			

As we can see from the Anova test result (F=2.067, P= 0.129), the application of different technologies to different companies gives different results. Therefore, it is not correct to say that it gives any specific benefit, but we can say that it brings general benefits.

The field of advanced change stems from the persistent improvement of advanced innovations characterized by their accessibility versatility and openness which empower maintainable enhancements in advertising proficiency and enable both large scale and smaller scale settings. Over time an impressive sum of scholastic inquiry about has developed around the subject of computerized change with 134 diverse definitions of digitization found in high-quality diaries. Agreeing to the most recent investigate by Wang Hecheng et al advanced change at the organizational level alludes to the method where endeavors require modern innovative applications environmental situating commerce models and trade and organizational forms as well as a favorable corporate culture administration and chance resilience. It points to upgrade connections between organizations and representatives' clients' providers, accomplices and partners enabling more successful competition within the ever-changing computerized economy (Belhadi, Mani, Kamble, Khan, Verma, 2024). This definition reflects the center of computerized transformation on building profound integration systems among members within the industry chain with the point of accomplishing maintainable competitive execution. Currently research on computerized change can be categorized into two primary sorts. The primary sort centers on examining the forerunners and results of computerized change which is additionally the foremost pertinent investigate type to this think about. The moment sort of investigate is conducted on diverse subjects or entities exploring computerized change in particular settings or businesses. The primary sort includes nonstop refinement of inquiry about the impacts of digital change. Digitalization within the supply chain alludes to a data and data driven administration approach that places the client at the center. It includes recording and analyzing the whole handle of item acquirement to conveyance utilizing advanced innovations Existing inquire about has illustrated that advanced change can have an effect at both the organizational and supply chain levels. At the organizational level computerized change encompasses a noteworthy impact on upgrading the supply chain capabilities of weaker individuals. At the supply chain level, the continuous application of computerized innovations optimizes item improvement distribution center administration coordination perceivability and quality traceability driving to successful advancements within the supply chain arrange and commerce forms. It moreover advances collaboration among supply chain members making cooperative energy and soundness all through the complete supply chain in this manner improving monetary execution development execution modern item advancement execution and more (Hallikas, Immonen, Brax, 2021).

The second category involves the expanding scope of digital-driven collaboration. Research on digital transformation has been evolving from individual organizations to a broader context. Earlier studies on digital transformation focused on individual organizations, exploring the driving factors, transformation mechanisms, and transformation effects of digital transformation within a single organization. With the continuous development of digital technologies, research on digitization has deepened its focus on collaborative efforts within the industry value chain. Numerous scholars have studied the entities that rely on digitization for collaboration, models that enable digitization to empower the industry value chain, and pathways for integrating digital technologies to achieve industry collaboration. Wang Hecheng and others found that organizations at the forefront of digital transformation are in a leading position in terms of business and digital technology applications, which drives the construction of an industry ecosystem. Scholars have also conducted research on understanding the characteristics of value co-creation in business ecosystems and their evolution under the influence of the digital economy (Benzidia, Makaoui, Bentahar, 2021).

Conclusion

The study on improving supply chain performance through digital capabilities makes a number of significant contributions to the field of supply chain management and digital transformation. These contributions include:

1. A comprehensive framework for digital transformation: The study provides a comprehensive framework that integrates strategic objectives, technology investments, and implementation

roadmaps for digital transformation in the supply chain. This framework offers a structured approach that can help organizations plan and execute their digital initiatives more effectively.

2. Empirical evidence of the benefits of digital technologies: The study's findings provide empirical evidence of the positive impact of digital technologies, such as IoT devices, advanced analytics tools, and cloud-based inventory management systems, on supply chain performance. These insights can guide organizations in selecting and prioritizing technology investments for maximum impact.

3. Best practices for collaboration and information sharing: The study highlights the importance of fostering collaboration and information sharing among supply chain partners and identifies best practices for successful collaboration. These insights can help organizations build stronger relationships with their partners and improve supply chain performance.

4. Employee training and upskilling programs: The study highlights the importance of employee training and upskilling to create a workforce that can leverage digital capabilities in the supply chain. The study's findings can help organizations design effective employee training programs, focusing on core competencies such as data analytics, IoT management, and cybersecurity.

5. Strategic partnerships for successful digital transformation: The study highlights the value of building strategic partnerships with technology providers to gain access to expertise, resources, and collaborative projects that support digital transformation goals. These insights can guide organizations in selecting and developing successful partnerships for digital transformation.

These contributions to the field can help organizations develop more effective strategies for digital transformation, prioritize technology investments, foster collaboration, train and upskill employees, and build strategic partnerships to improve supply chain performance.

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