The impact of cloud computing on supply chain performance the mediating role of knowledge sharing in utilities and energy sectors

Baha Aldeen Mohammad Fraihat[a*], Fauzi Zowid[b], Firas Tayseer Mohammad Ayasrah[c], Abedalqader Rababah[d], Ahmad Y. A. Bani Ahmad[e,f] and Othman Hussein othman Othman[g]

[a]*Assistant Professor, Department of Administrative Sciences, Business Faculty, Jerash University, PO. Box 26150, Jordan*
[b]*Assistant professor, Business Administration Department, College of Business and Economics, Umm Al-Qura University, Saudi Arabia*
[c]*College of Education, Humanities and Science, Al Ain University, Al Ain, United Arab Emirates*
[d]*Faculty of Business, Sohar University, P.O. Box 44, Sohar P.C 311, Oman*
[e]*Department of Accounting and Finance, Faculty of Business, Middle East University, Amman 11831, Jordan*
[f]*Applied Science Research Center, Applied Science Private University, Jordan*
[g]*Isra University Jordan*

CHRONICLE	ABSTRACT
	The purpose of this research was to analyze the increased performance improvement in the supply chain related to the energy and utilities sector of Jordan through cloud computing, also mediated by knowledge sharing. 150 respondents were analyzed. Research suggests that there was a strong positive relationship between cloud computing and supply chain performance. In addition, cloud computing had a strong and positive correlation with the practice of knowledge sharing. The result indicates that companies with a culture of knowledge sharing among employees were more likely to incorporate the use of cloud computing. The study also indicates that cloud computing adoption had enhanced supply chain performance in the utility and energy sector within Jordan. Therefore, the study also finds that there was a strong and positive relationship between knowledge sharing and well overall performance of supply chain activities. This points to the role that knowledge-sharing practices play in improving the performance of the supply chain within Jordanian utilities and energy sectors. Furthermore, the findings of the mediation study provide strong evidence in support of our hypothesis that knowledge sharing plays a major role as a mediator relating to the relationship between cloud computing adoption and supply chain performance. The observed mediation effect suggests that the positive impact of cloud computing implementation on supply chain performance can be attributed to some extent to its facilitating knowledge exchange practices. However, this research improves the understanding of relationships among cloud computing adoption implementations and information structure flow as well as supply chain performance within Utilities These results emphasize the importance of cloud technologies as information drivers that would lead to enhanced performance in terms of supply chain operations. These are insights that can be used by organizations and businesses aiming at improving their competitiveness and efficiency levels in these sectors.

1. Introduction

In recent years, there has been a fundamental change in the world landscape towards technology and digital integration. (Cestero et al., 2023). One of the most prominent developments that currently lead this evolution is cloud computing, a groundbreaking idea that changed how companies work and handle their data and procedures. One of the most important features of this transformation is Cloud computing, a revolutionary concept that has entirely transformed how businesses

carry out and deal with their data as well as processes. Cloud computing technology has had a significant influence on various sectors (Chanda et al., 2023), and utility, as well as the energy business of Jordan.

The Jordanian utilities and energy industries are key to the economic growth and development of any country as they provide lifeline services that every citizen or enterprise requires. As far as these sectors are concerned, effective management of supply chains should lead to seamless operations (Kimwaki, 2023), cost optimization thereof (Grewal & Mangla, with traditional supply chain models facing difficulties in the modern day, companies are seeking solutions through cloud computing to gain an edge and stay flexible when adapting to a market that is always changing (Fraihat et al., 2023a). This study is important because it can provide the experts, policymakers, and business professionals with meaningful information. With an adequate understanding of how knowledge sharing and cloud computing relate in terms of the Jordanian energy and utilities sectors, decision-makers are well placed to formulate informed strategies that will enhance supply chain efficiency as well as improve overall business performance. Additionally, this study can serve as a reference for other countries and industries that have similar problems in adopting digital technology to gain its benefits.

In conclusion, studying the influence of cloud computing on supply chain performance in the Jordanian utilities and energy sectors is an interesting area for research. This study aims at contributing to the body of knowledge by shedding light on the intricate connection between cloud computing, knowledge sharing and performance in supply chain in this significant field. The technology continues to redefine the future of organizations and industries across the world. By doing this we believe that the utilities and energy sector in Jordan and other places will be stronger and more competitive.

2. Cloud computing

Cloud computing is a way of distributing the use of computer resources around it. Cloud computing provides people and organizations with the ability to obtain a pool of shared computing resources that include servers, storage, databases, networking, and software in addition to analytics on-demand over the internet based on pay as you use the pricing model. This reduces the need for local servers and hardware (Xiaolian, 2023; Ahmad et al., 2024). This on-demand access to a vast array of resources has transformed the way businesses operate, manage data, and deploy applications (Peredy & Feierzhati, 2023). Additionally, the main elements of cloud computing can be summarized as follows: On-demand self-service enables users to autonomously provision and manage computer resources. Human participation of service providers (Ahmad et al., 2023). Broad Network Access: Cloud services users can readily access resources using laptops, tablets and smartphones over the internet (Ogwo et al., 2023). Resource Pooling: Cloud service providers combine computing resources to serve multiple clients in order to improve cost-effectiveness and scalability. Rapid Elasticity: Cloud resources can easily be scaled up or down according to different requirements, ensuring the most efficient use of resources and cost efficiency (Manvi et al. 2014). Measured Service: This cloud usage is metered based on consumption and charged accordingly, allowing for open pricing structures including pay-per-use systems (Surianarayanan & Chelliah, 2023)

There are many Benefits of Cloud Computing in Business such as Cost Efficiency: Cloud computing eliminates the need for expensive upfront investments in hardware and infrastructure, enabling businesses to pay only for services used (Fraihat et al., 2023b), Scalability: cloud-based solutions are easily scalable to accommodate business needs as they develop over time – from small startups just beginning their journey into a larger company that demands… Enhanced Security: Reputable cloud providers put strong security measures in place to protect data, which is often better than what a single organization can provide on its own (Tiwari & Neogi, 2023) Automatic Updates: The underlying infrastructure and software are managed as well updated by cloud service providers, ensuring businesses access to the latest features and security patches (Fadhi et al., 2023).

3. Supply Chain Management

Supply chain management (SCM) is a coordinated handling of processes responsible for the sourcing, procurement, production and delivery or distribution of goods from suppliers to final consumers as denoted by Stan et al. 2023. Efficient supply chain management is crucial for businesses to increase productivity, reduce costs and address consumer demands with max efficiency (Dave et al., 2023). Therefore, supply chain management involves various factors such as Demand forecasting manufacturing schedule development, or inventory level optimization planning. Sourcing refers to the activity of finding suppliers, negotiating agreements and building long-term trusting relationships so as to ensure a steady flow of components and raw material supply. Manufacturing: An efficient means of turning raw materials into finished goods. Logistics: Facilitating the movement of goods from suppliers to production facilities, distribution points and retailers before they are handed over to end consumers. Distribution: Making sure the goods are delivered to consumers or merchants promptly and accurately.

Consequently, the following statements on the significance of effective supply chain management can be drawn: Cost management: Efficient supply chain operations can lead to lower production costs, optimised transportation charges and reduced stocks (Fu et al., 2023). A properly run supply chain increases customer happiness because items are always available when and where the customers need them (Setiawati et al., 2023). Agility and responsiveness: As Sattova (2023) notes, adaptive and flexible supply chain aids businesses in responding quickly to market disruptions, changes or client requests. Competitive advantage: Businesses can differentiate themselves in the market by leveraging a simplified supply

chain for competitive advantage (Sugiono et al., 2023). Sustainability: as per Khan et al 2023 sustainable supply chain practices can lead to a lower environmental impact and enhanced corporate social responsibility.

4. Literature review

Some of the benefits of cloud based supply chain management include real time visibility 2023 Puica , data analytics to enable optimal decision making 2023 Bharadiya, collaborative platforms for efficient communication Liao et al. Cloud Scalability and availability enable businesses to easily communicate with their partners across the supply chain as well as adapt quickly into new market conditions (Akkaya, 2023). Cloud computing has evolved into a groundbreaking resource for streamlining supply chain processes and enhancing the effectiveness of various businesses (Yun et al.2023) Researchers have looked into how cloud-based technology helps in the sharing of live data, greater visibility and better collaboration throughout the supply chain network (Hrouga , 2023).

The topic of knowledge sharing in supply chain management has been widely discussed. A supply chain ecosystem that is cooperative and creative has been shown by various studies to be highly dependent on good knowledge exchange. Exchange of knowledge between supply chain partners as well among different groups or departments in an organization can enhance coordination and decision-making skills, solve problems more efficiently (Yawar & Seuring This will enable them to coordinate its operations effectively. Reasons for sharing knowledge in SC Practitioners: Research has considered several factors such as trust Sarfaraz et al., 20 To create solutions that promote a culture of knowledge sharing and facilitate effective supply chain collaboration, one must understand these characteristics (Boamah et al., 2023).

Furthermore, as per the literature knowledge sharing enhances supply chain performance indicators such as lead times and customer satisfaction by lowering them and increasing efficiency (Fraihat et al., 2023c). Sharing knowledge supports a continuous learning process which helps supply chain partners in the successful acceptance of innovations and adaptation to changing market conditions (Sahoo et al., 2023).

Organizations that employ cloud-based solutions create a culture of knowledge sharing among staff, divisions, and supply chain partners. This in turn fosters a culture of creativity, education, and continuous improvement. The exchange of knowledge through cloud platforms enables organizations to leverage previous experiences, best practices, and new trends. With this new knowledge, they can now restructure their supply chain strategy to enhance performance consistently (Le, 2023). To allow for swift decision-making and problem resolution across the supply chain, cloud solutions facilitate instant dissemination of vital information (Rani & Srivastava, 2023). Increased Responsiveness A knowledgeable and well-informed supply chain that is faster to respond during disturbances, market changes or customer needs makes the entire supply chain more efficient (Zighan et al., 2023).

Contrastingly, supply chain performance and cloud computing have a mediated relationship through information exchange in creating positive feedback loop. Cloud technology provides more efficient and adaptive processes for knowledge sharing practices in supply chain procedures. Moreover, making the cloud computing applications better and more efficient as supply chain performance gets enhanced results in a cycle of constant improvement (Gammelgaard & Nowicka 2023). The significance of knowledge sharing in supply chain management has been widely addressed. Research has shown that knowledge exchange is critical in building a cooperative and creative supply chain ecosystem. There is increased coordination, decision-making and problem solving skills in an organisation or among supply chain partners through knowledge exchange.

Researchers have considered a number of factors such as trust (Sarfaraz et al., 2023), communication To design solutions that promote knowledge sharing culture and facilitate successful supply chain collaboration, an insight into these qualities is necessary (Boamah et al., 2023).

Knowledge sharing promotes a virtuous circle that enhances the performance of the supply chain, providing competitive advantage to businesses within Jordanian utilities and energy sectors as well other industries worldwide through smooth collaboration, data-driven decisions making lessons Morgan Stanley. Furthermore, following the literature knowledge sharing enhances supply chain performance indicators including lead time and customer satisfaction by shortening them and raising efficiency (Fraihat et al., 2023c). Sharing knowledge aids in a process of continuous learning that enables supply chain partners to successfully accept innovations and adapt to shifting market conditions (Sahoo et al., 2023).Knowledge Sharing's Mediating Role in Cloud Computing and Supply Chain Performance: To specifically discuss the mediating role of knowledge sharing in the relationship between cloud computing and supply chain performance, this topic is rather new compared to what has already been studied (Tan et al., 2023). Researchers interested in the role of knowledge sharing as a mediator between cloud technology and supply chain performance may investigate ways that cloud-based technologies promote information exchange, group decision making, innovation within itsaments. Or, they could consider the impact of knowledge sharing on key performance indicators for supply chain recognition such as responsiveness, efficiency and competitiveness (Gammelgaard & Nowicka, 2023).

What are the Gaps in the literature? And how will this study address these gaps?

Only a few studies on supply chain management, cloud computing and knowledge sharing are conducted in the Jordanian environment (Dlamini 2023). This study can bridge this gap by shedding light on ways in which knowledge sharing and cloud computing adoption affect supply chain performance for organizations within the Jordanian context. Even though some studies might investigate these aspects individually, there is still a lack of research on the underlying mechanisms that facilitate connections between cloud computing, performance in supply chain management and knowledge sharing (Gao et al. 2023). As such, this study can contribute by investigating and describing the impact of cloud computing on knowledge sharing practices that directly influence supply chain performance.

Absence of Empirical Studies: Freixanet and Federo 2023 note that the literature may be theoretical or based on case studies from other industries but there is a lack of empirical data directly associated with utility energy sectors. By using primary data gathering techniques such as surveys, interviews or case studies your study will be able to provide useful empirical evidence which adds to the body of knowledge in that topic. Furthermore, by not focusing on industry-specific challenges and issues due to regulatory compliance, erratic demand and complicated logistics utilities energy sectors often face particular difficulties when it comes managing their supply chains in Current studies (Mohapatra & Mishra, 2023) may not fully address these issues for the specific sectors in question. This study helps to fill in these gaps by analyzing the approaches for understanding how cloud computing and information sharing contribute to overcoming industry-specific barriers, thus improving supply chain performance.

5. Study framework

A Handful of Studies Revealed the Impact of Cloud Computing on Supply Chain Performance While cloud computing has potential benefits for supply chain management, there is limited specific research that explores its impact on supply performance in a Jordanian context (Abdallah et al., 2023). This study can be helpful if the impact of cloud computing on key performance indicators in utilities and energy industries is investigated or measured. Thus, the first hypothesis of this study is as follows,

H$_1$: *The adoption of cloud computing enhances the performance of the supply chain in Jordan's utilities and energy industries.*

On the one hand, cloud-based supply chain management systems have been researched regarding their impact on supply agility and resilience (Shashi , 2023). 3) As cloud solutions are scalable and flexible, businesses can respond to disruptions promptly while tracking the activities of supply chain in real-time making informed choices,The idea of cloud has also been researched in the fields like data security Abdurakhmonov, 2023, privacy Magdy et al., Scholars have put in proposals regarding how to address these challenges in order maximize the advantages of cloud computing within supply chain operations (Abusaimeh, 2020; Ali et al., 2023). Thus, the second hypothesis of this study is as follows,

H$_2$: *Cloud computing adoption enhances knowledge sharing in Jordan's utilities and energy industries.*

The role of knowledge sharing as a mechanism that works in the relationship between cloud computing adoption and utilization on one side, and influence supply chain performance – is called mediation. The primary mechanism for this is the enabling effective sharing and diffusion of knowledge within an organization or across its supply chain networkA cloud computing platform provides a centralized depository and access to data applications, resources. With this accessibility, the supply chain's multiple departments, teams and partners can more easily collaborate and share knowledge (Alotaibi, 2021; Dobilas , 2023). Cloud-based solutions such as shared documents, real time communication platforms and data analytics allow for a seamless flow of knowledge, the breakdown of information silos in favour of an ongoing culture or learning development. In a variety of ways, cloud computing improves supply chain effectiveness by encouraging information sharing: Improved Visibility Cloud-based platforms for supply chain management offer users the opportunity to view pertinent information on inventory levels, production statistics and distribution activities in real time. This transparency enables better decision making that reduces the likelihood of stockouts or excess inventory inventories (Gamal, 2023). Improved Collaboration: Cloud-based collaboration solutions contribute to efficient communication and coordination between supply chain partners, leading to better operations with less lead time and reaction times (Akkaya, 2023). Data-Driven Decision Making: With the help of cloud-based analytics and data storage organisations can gather extensive amounts of information, find out patterns in it and gain insightful knowledge. Li et al., 2023, noted that data-driven decision making improved the accuracy of supply chain planning and forecasting. Flexibility and Scalability: 2 When supply chain activities are handled through cloud computing, it is possible for them to scale up and down as required thus responding effectively based on changes in demand or of the state of the market. Thus, the third Hypothesis of this study is

H$_3$: *The relationship between Cloud computing adoption and Supply chain performance in the Organizations of Jordanian utilities and energy sectors is mediated by knowledge sharing.*
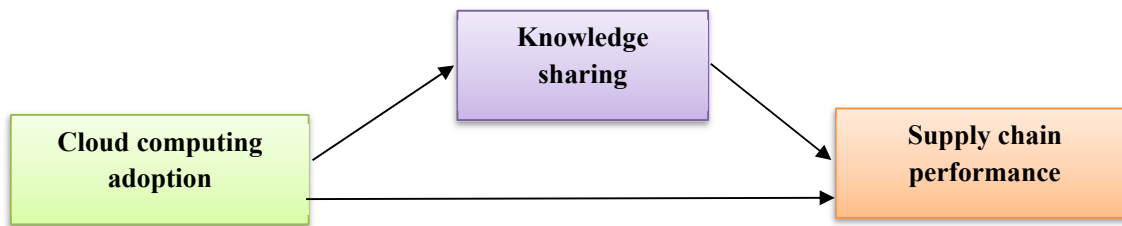
Fig. 1. The structure of the proposed method

5. Research Methodology

This study scrutinizes the effects of cloud computing on supply chain performance in Jordanian utility and energy sectors, while meditating through knowledge sharing. This research is causal relationships philosophy among variables and uses empirical data for analysis. Interest population implies managers and employees who work in the Jordanian utility and energy sector. 180 was the sample size to have adequate statistical power in identifying meaningful relationships and effects; hence, 150 respondents participated. CCA elements were adopted and adjusted from Khayer et al. (2020), Amini and Jahanbakhsh Javid (2023). We also adopted and adapted the knowledge sharing (KS) items from Tiwari (2022), Moreover, the study used Likert scales. Data collected was analyzed using PLS-SEM. Throughout the research process, ethical principles were strictly observed. All participants' informed consent was achieved to enable them to grasp the purpose and ramifications of the study. The anonymity and confidentiality of the respondents were ensured; their data was used for research only.

5.1 Data Analysis

5.2 Measurement Model

Table 1 presents the results of the measurement model assessment for the key constructs in the study: 7 Cloud Computing Adoption, Knowledge Sharing and Supply Chain Performance. Table 1 below shows several statistics which assist in assessing the goodness and dependability of the measurement model. Factor loading evaluates the strength of relationships between each indicator (item) and its corresponding construct. In this respect, factor loadings show how well each item is related to its respective construct. Stronger associations are indicated by higher factor loadings. The factor load is over 0.7, which shows a strong association with the construct (Mia et al., 2022). Cronbach's alpha is an internal consistency reliability measure. It evaluates how well the items in each construct are related to one another. High Cronbach's alpha value (near 1) indicates that the items of a construct are measuring one underlying concept consistently. 0.70 which indicates good internal consistency among its items.

Table 1
Measurement Model

Components	Factor Loading	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Cloud Computing Adoption		**0.895**	**0.907**	**0.917**	**0.583**
CCA1	0.806				
CCA2	0.865				
CCA3	0.858				
CCA4	0.809				
CCA5	0.741				
CCA6	0.69				
CCA7	0.668				
CCA8	0.635				
Knowledge Sharing		**0.888**	**0.893**	**0.914**	**0.604**
KS1	0.622				
KS2	0.707				
KS3	0.765				
KS4	0.791				
KS5	0.853				
KS6	0.849				
KS7	0.826				
Supply Chain Performance		**0.884**	**0.890**	**0.916**	**0.685**
SCP1	0.764				
SCP2	0.885				
SCP3	0.876				
SCP4	0.818				
SCP5	0.791				

Another measure for the reliability of a construct is composite reliability rho_a. It takes into account the loadings of items and their variances. A composite reliability value that is closer to one suggests that the construct, and thus it' The items are

reliable indicators of successful measurement. In this table, composite reliability values tend to be high for all constructs which is an indicator of good reliability. An alternative measure of composite reliability is when Composite Reliability (rho_c) accepts the number of items per each construct. Like composite reliability (rho_a), higher values mean more reliability. Values of rho_c are also high in this table (Cheung et al., 2023). That is what AVE does: Comparing the level of variance recorded by construct to measurement error. It demonstrates how closely the components of the construct are related to each other compared with a quantity of random error (Abdulhafedh, 2022).

Convergent validity is high if the percent of total variance in a construct explained by items The AVE should come close to one. all the structures in Table 1 have AVE values which are acceptable. Overall, the measurement model seems valid and reliable. Items with higher factor loadings are good representations of the constructs they represent. Otherwise, each construct has high Cronbach's alpha – hence showing high levels of internal consistency. Additionally, composite reliability scores (rho_a and rho c) which are higher than the recommended threshold of 0.70 give further support for dependability in relation to constructs. This offers support for the notion that the constructs are valid and reliable measures of target concepts. The AVE of Cloud Computing Adoption is (0.583), the values lower than that of Knowledge Sharing and Supply Chain Performance, but still within acceptable ranges While this is still a reasonable value it suggests that there may be some overlap variance with other constructs. However, the AVE values are over 0.50 indicating acceptable convergent validity (Cheung et al., 2023).

Table 2
Fornell-Larcker Criterion Discriminants Validity

Constructs	Cloud Computing Adoption	Knowledge Sharing	Supply Chain Performance
Cloud Computing Adoption	**0.763**		
Knowledge Sharing	0.640	**0.777**	
Supply Chain Performance	0.672	0.647	**0.828**

The Fornell-Larcker Criterion for discriminant validity assessment is shown in Table 2. This table would assist you to determine whether the constructs of your measurement model are separate or not. Discriminant validity ensures that each construct does not simply measure a highly correlated concept with other variables. The diagonal values (in bold) indicate the square root of Average Variance Extracted AVE for each construct. These diagonal values indicate the amount of variance within each construct that is explained by its own items. Off-diagonal values are correlations between constructs (correlation coefficients). These coefficients show how much of a shared variance construct they are sharing. In summary, the Fornell-Larcker Criterion indicates that constructs in the measurement model (Cloud Computing Adoption Knowledge Sharing and Supply Chain Performance) have discriminant validity. There is also little overlap between the various constructs (Cheung et al., 2023). This supports the notion that your measurement model effectively detects various facets of the constructs you are studying, thereby increasing this research validity.

6. Structural Results

The path analysis results of the research are captured in Table 3 and Fig. 2, along with coefficients, standard deviations t-statistics as well as p values for every one of such paths. The results showed that there was a positive and statistically significant relationship between CCA and SCP in the Jordanian utilities and energy sectors. 0.606 The path coefficient indicates that the connection between CCA and SCP is strong enough, heading in a favorable direction. An increase in the usage of Cloud may correspond to an enhancement in supply chain performance by contributing a positive coefficient with this instance. 0. 00 is so low that it demonstrates significant support for the fact of p-value, such an association occurring due to chance could not have happened at all. This outcome is in line with the results of Lee, et al., 2022 Chen, et al., The outcomes further showed that CCA was positively and significantly related to KS within Jordanian utilities and energy industries. 0.64 path coefficient indicates that CCA and KS are well related to each other 1 . More precisely, knowledge sharing becomes stronger as cloud computing is adopted. This association is very statistically significant because p=0.000 – it suggests that there's a large correlation between the two variables in question. This result goes in line with Saratchandra, and Shrestha (2021), as well as Arpaci et al.,(In the Jordanian utilities and Energy sectors, results revealed that KS and SCP demonstrate a positive relationship with statistical significance. The 0.259 board shows a positive relationship between KS and SCP . Rather, better supply chain performance is associated with increased levels of knowledge sharing. As this link has a p-value of 0.00, it is unlikely that the association was observed by chance. This result is in line with the results of Tang et al. (2023), and Ali et al. (2023).

Table 3
Results

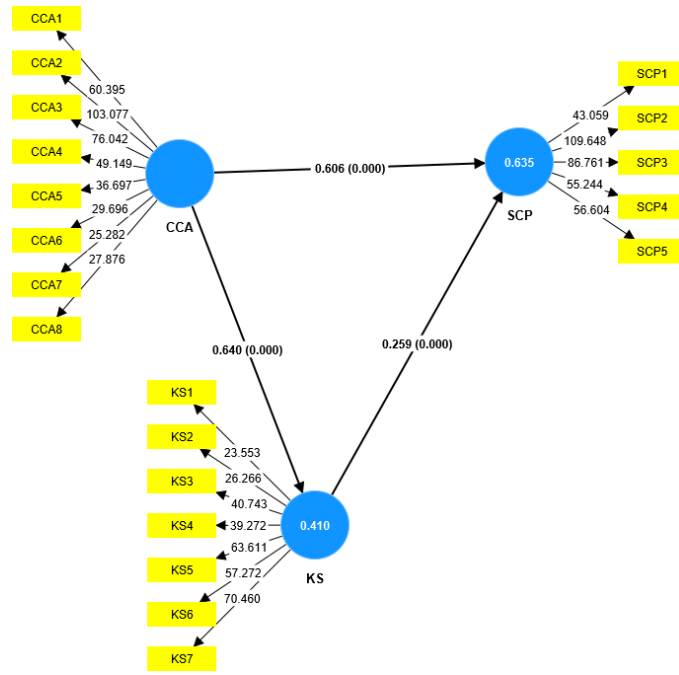| Path Analysis	Co-efficient	Standard Deviation	T-Statistics	P-Values
CCA → SCP	0.606	0.028	21.54	0.000
CCA → KS	0.640	0.022	29.7	0.000
KS → SCP	0.259	0.033	7.752	0.000

Fig. 2. Graphical Results

6.1 Mediating Role of Knowledge Sharing

This path illustrates the relationship between cloud computing adoption (CCA) and supply chain performance as mediated by knowledge-sharing KS. 0.166 is the coefficient indicating the strength of this mediation effect. The positive coefficient reveals that cloud computing facilitates knowledge sharing, which creates a good effect on supply chain performance. 0.00, the p-value is extremely low indicating that this mediation effect has a lot of statistical significance in terms of reliability and consistency tests. This mediation is also relevant because of the t-statistic 7.035. Mediation analysis reveals that the relationship between Supply Chain Performance and the Adoption of Cloud Computing is significantly mediated by Knowledge Sharing as suggested in this claim. About your research, this conclusion provides valuable information on how cloud computing adoption can impact the performance of the supply chain.

Table 4
Mediation Analysis

Path Analysis	Co-efficient	Standard Deviation	T-Statistics	P-Values
CCA → KS → SCP	0.166	0.024	7.035	0.000

7. Discussion

The results of our research indicate a very strong positive and statistically significant relationship between SCP CCA in the Jordanian utilities and energy sectors. The positive relationship between CCA and SCP indicates that companies in Jordan's utilities and energy sectors that use cloud computing technology may see better outcomes of supply chain performance. Some of the advantages that cloud computing can deliver to make supply chain operations more successful include real-time access to data, scalability and financial savings (Pal et al., 2022). Part of the reason for this beneficial association may be that cloud computing enhances visibility and coordination across the supply chain network. It facilitates easy data and information transfer between many parties from suppliers to distributors. Better visibility and the ability to make data-informed decisions can lead to more accurate demand forecasting, inventory control, and improved efficiency in other areas of logistics. Also, supply chain operations can facilitate the deployment of advanced technologies such as the Internet of Things IoT and AI by leveraging cloud computing (Lee et al., 2022).

These technologies also enable predictive maintenance, asset tracking and intelligent routing making the supply chain more efficient. The results demonstrate the importance of cloud computing adoption as a strategic move to improve efficiency in supply chains within Jordanian utilities and energy sectors. Organizations that have not, so far, used cloud technology should consider doing it for competitive advantage and enhanced supply chain effectiveness. However, it is worth noting that although this study found a positive correlation between CCA and SCP with regards to cloud computing in supply chain performance the different organizations would have varying methods and approaches for how such technology contributes

towards their supply chains. Future studies can delve further into these mechanisms and investigate the ways in which certain aspects of cloud computing adoption influence other areas of supply chain performance.

Based on our research's results, we found a positive and significant correlation between Knowledge Sharing (KS) and Cloud Computing Adoption(CCA) in the perspective of Jordan Utilities & Energy sectors. A positive correlation between CCA and KS indicates that businesses which implement cloud computing are likely to foster a culture of knowledge sharing in the organization. One possible reason this relationship is favorable may be that cloud-based solutions offer a centralized data and knowledge repository (Amini, & Bozorgasl, 2023). Shared information and resources availability promote inter-functional collaboration, thus improving sharing ideas among staff members. Additionally, it can provide staff members with an instant access to crucial information critical for informing them on how best they can make decisions and contribute towards organisational development. Furthermore, some cloud computing technologies include collaboration tools and capabilities such as document sharing, video conferencing or communicating through real-time platforms (Ahmad, 2024). These solutions facilitate communication even in teams that are not located close geographically. Knowledge sharing, thus, becomes a crucial part of organizational culture (Wang et al., 2023).

As a consequence, this study has significant implications for Jordan's utilities and energy sectors. On the other hand, effective sharing of information within an organization can foster innovation, improved decision-making and overall organizational agility. Industries where keeping updated with the latest technological innovations and market tendencies is crucial benefit from creating a culture of sharing information through adopting cloud computing. The specific recycling procedures and tactics that foster knowledge sharing may differ from one organization to another, but the results of this research show a positive correlation between CCA and KS. Further research into these mechanisms might consider how various aspects of cloud computing adoption influence the patterns of sharing knowledge in organizations.

Findings of our study showed that there was a remarkable and statistically significant relationship between Knowledge Sharing (KS) and Supply Chain Performance (SCP) in the context of Jordanian utilities and energy sectors. This research indicated the importance of knowledge exchange in enhancing supply chain performance within these industries. This relationship is particularly important in sectors such as utilities and energy where supply chain effectiveness plays a crucial role to ensure consumer needs are met and operational efficacy is maintained. Several factors may be responsible for this beneficial link. Knowledge sharing fosters collaboration and communication between different supply chain players such as suppliers, manufacturers, distributors etc. If insights, best practices and relevant information are shared among personnel working on various segments of the supply chain in such forums they tend to lead towards simplified processes , reduced waiting times as well as improved efficiency levels overall (Khraishi et al., 2023). In addition, knowledge transfer can provide the supply chain specialists with important information and insights that enhance decision making. In the utilities and energy sectors where problems such as availability of an energy source, price fluctuations and issues with regulations can have significant effects on business operations, quality access to current shared knowledge is essential for making well-informed decisions.

Plus, the positive correlation between KS and SCP means that businesses which support a lifelong learning culture of knowledge sharing are more able to adapt their offerings based on changing consumer preferences as well market situations. Because of such versatility, supply chain performance indicators like lead times, costs and the level of customer satisfaction may be improved. This discovery has considerable consequences for businesses involved in Jordan's utilities and energy sectors (Cahyono, et al., 2023). In order to show improvements in the performance of the supply chain, a culture that promotes information sharing through several conduits like training programs and collaborative platforms as well as using knowledge management systems can be established. But it's significant to understand that each of the organizations might have its own knowledge sharing practices in terms of what they entail and how effective they are. Future research should pay more attention to identifying specific practices and mechanisms that enhance supply chain performance in these industries.

The mediation analysis has shown that indeed KS does play a significant mediating role between SCP and CCA in the case of Utilities and Energy sectors across Jordan. This conclusion strongly supports the importance of both CCA and KS in facilitating supply chain operations, with essential consequences for companies working within these industries. As the mediating effect of knowledge sharing in this relationship, one can conclude that enhanced practice within an organization for better sharing of knowledge serves as a conduit through which some causes on supply chain performance may direct their networks by adopting cloud computing technologies. This mediation effect shows the important medium through which cloud computing adoption contributes to supply chain efficiency. A number of variables influence this mediating relationship.

The primary reason for adoption of cloud computing is that it helps in easy storage, access and sharing data and information across different segments of the supply chain. The data is accessible and exchangeable, making it easy for workers as well as stakeholders involved in activities surrounding the supply chain to share knowledge. Moreover, it is not an uncommon practice for cloud computing technologies to provide platforms and tools of collaboration that allow immediate communication and data sharing as well as cooperatively solve problems (Lin & Huang, 2023). By the trouble-free exchange of knowledge, best practices and crucial data these features allow supply chain experts to make more informed decisions on running their businesses efficiently.

On the other hand, cloud computing technology might also promote knowledge sharing and learning culture in organizations. Such a culture fosters the sharing of knowledge, intelligence and experiences among staff members which in turn creates an innovative and adaptable environment for the supply chain. They also emphasize the importance of proactively promoting information-sharing culture within an organization along with cloud computing technology (Nizam, & Hameed hance, 2023). By doing so, businesses may utilize cloud computing to its fullest potential in enhancing supply chain performance. This study highlights the mediating role of knowledge sharing but it should be noted that more studies are still needed to find out specific processes and tactics for promoting information sharing in relation to cloud computing. Studies in the future can take further steps to pinpoint best methods and initiatives that foster a knowledge-sharing culture within supply chain management.

8. Implications of the Study

This study provides insights into the relationships between supply chain performance, cloud computing adoption, information exchange and academia as well practitioners in the Jordanian utilities and energy industries. The productive collaboration between CCA and SCP demonstrates how cloud technologies can benefit the Jordanian Energy and Utilities sectors. Firms in these industries should consider using cloud-based supply chain management solutions to help enhance their productivity, adaptability and responsiveness. This study highlights KS's significant role in the positive relationship between CCA and SCP. Organizations must learn to foster a culture of knowledge sharing in order to fully tap into the advantages that cloud computing provides. Those outcomes of supply chain performance can be improved if the employees collaborate, share insights and pass on best practices. An organization should incorporate cloud computing adoption and knowledge sharing into its strategic planning to execution procedures.

This involves creating initiatives aimed at promoting knowledge sharing among the staff and alignment of technology investments with supply chain objectives. Here, there can be helpful training and awareness campaigns. Decision-makers in the utilities and energy sector can use these results from the study to inform their choices related to cloud technology investments. Data-driven insights from cloud based technologies allows for making better decisions in such areas as demand forecasting, inventory management and supplier engagement. Adopting cloud computing and knowledge sharing can give organizations a competitive edge. Users who manage to employ these resources effectively are likely to outperform their competitors in terms of supply chain effectiveness, customer satisfaction and overall operational efficiency.

The positive correlation obtained between CCA, KS and SCP suggests the possibility of cross industry cooperation. In the Jordanian utilities and energy sector, companies are encouraged to pursue joint ventures and knowledge-sharing programmers with competitors as well as trade associations in order to enhance supply chain performance. An organization's supply chain efficiency can also be enhanced by the constant appraisal of cloud computing and knowledge-sharing practices. With the help of regular monitoring, feedback and modifications these projects can be linked to organizational goals. This research contributes to the increasing number of academic literature on knowledge management, cloud computing and supply chain management. Researchers can go further and look at similar links within other industries or regions.

9. Limitations and Future research

However, there are several limitations that this study should address. To begin with, since the scope of research was limited to just Jordanian utilities and energy sectors it may not be possible to generalize these results for other quarters or different geographical regions. To see how robust these links are, future studies should be able to replicate this research in different industries and various geographic locations. Second, a sample of 150 respondents provided self-reported information for the study. Although every possible effort has been made in order to ensure that the sample is representative, it cannot be entirely excluded from possibility of response bias and common-method variance. Future research might use greater, more diverse population samples or data gathered from additional sources using multiple methods to improve the validity and dependability of results. As a result, the main aim of this study was to assess correlations that were present directly and indirectly between the relevant variables. Could there be more? To provide a deeper insight into the dynamics that are involved in adopting cloud computing and knowledge sharing with regard to supply chain management, future studies should focus on more aspects of both contextual and organizational nature.

Comparing and contrasting the impact of cloud computing to that involving information sharing on supply chain performance in different industries can provide valuable insights into industry dynamics as well as trends unique to each sector. Longitudinal research could also be done in order to monitor the change over time of such a thing as supply chain performance, knowledge sharing and ways of cloud computing adoption are interacting within organizations. Although cross-sectional data may not always be clear to show the patterns and trends, longitudinal research can help. Addition of qualitative research methods to the quantitative findings like focus groups and interviews can furthermore give a better understanding on how knowledge sharing mediates its influence between supply chain performance having adopted the need for cloud computing. Quantitative data might overlook subtleties and contextual considerations that qualitative one would bring. In relation to cloud computing usage, research the distinct mechanisms of knowledge sharing that impacts supply chain performance. Organizations can also design tailored strategies and interventions by identifying the pathways and processes through which sharing of information enhances supply chain performance. Identify any possible moderators

that may affect the direction or strength of relationships being observed. As supply chain performance might be affected by cloud computing and knowledge sharing the impact of organizational culture, IT infrastructure is likely to moderate these effects.

10. Conclusion

This study aimed to identify the impact of adopting cloud computing on supply chain performance in Jordan. Knowledge sharing was used as a mediating variable. The study population consisted of the energy and utilities sector. The study followed the descriptive analytical approach, relying on primary data collected through a questionnaire distributed to a sample of 180 respondents. There were 150 questionnaires suitable for analysis. The collected data was analyzed using PLS-SEM. This study derives its importance from the benefits that can be achieved for policymakers and business professionals in terms of enhancing their ability to understand the role of knowledge management and exchange in linking the adoption of cloud computing to enhancing supply chain performance.

The results of the study indicated that there is an important relationship between the adoption of cloud computing and supply chain performance, and it was also shown that knowledge exchange mediates the relationship between the adoption of cloud computing and supply chain performance. This result is attributed to the fact that the use and adoption of cloud computing in companies in the services and energy sectors enhances the performance of supply chain operations and improves their efficiency and effectiveness. In addition, the research found that there was a statistically significant and positive relationship between cloud computing adoption implementation within corresponding industries and knowledge sharing practices. This discovery indicates that organizations adopting cloud computing technology does tend to develop an information-knowledge dissemination culture among their employees and stakeholders. It seems that the accessibility features and collaborative functions of these cloud platforms facilitate knowledge exchange within an organization by encouraging sharing ideas, information, as well as best practices. Additionally, the research findings showed a statistically significant and positive relationship between knowledge sharing (KS) act with supply chain performance SCP within Utilities and Energy industries in Jordan. This brings out the importance of information transfer as a vital managerial resource to enhance supply chain performance. The act of sharing knowledge between employees and stakeholders when they are actively involved leads to improved capacity in making informed decisions, streamlining processes as well as the ability to effectively address challenges on supply issues. The mediation analysis results provided in this study offer strong evidence supporting the hypothesis that knowledge sharing is a significant mediator, contributing to the relationship between cloud computing adoption (CCA) and supply chain performance (SCP).

One can figure out that the positive impact cloud computing has on supply chain efficiency is somewhat facilitated by enhancing knowledge exchange practices inside an organization as its observed mediation effect shows. With cloud computing technology becoming increasingly widespread among different organizations in various industries, it is essential for them to pay attention and pursue knowledge-sharing activities that can help fully tap into the potential advantages of using this technology.

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