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The Influence of Networking Sciences on Management Practices

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Abstract

This study investigates the impact of networking sciences (NS) on different management practices, such as operational effectiveness and efficiency (OEE), business decision-making (BDM), planning and development (PD), and formulation of strategies and tactics (FST). This research followed a mixed-method design, including a quantitative survey and qualitative approaches, applying a systematic literature review. The data findings from the quantitative study evident that networking sciences influence four management processes, including OEE at 44.2%, PD at 52.1%, BDM at 48.6%, and FST at 48.4% variances. All these statistical relationships are significant at 0.01 level. Further, these results are supported by qualitative findings through the exploration of current trends in the adoption of NS, including edge computing, cloud networking, and unified communication. The systematic review of articles emphasized the integration of advanced networking sciences is providing benefits for businesses in terms of competitive advantage, scalability, and agility. On the other hand, qualitative analysis highlights the significant role of NS in improving Cross functional collaboration, enhancing decision-making, enabling data-driven strategies, and fostering real time data access. In conclusion, the networking sciences impact management practices involved in organizations to improve operational efficiency and achieve strategic success.

Keywords: *Networking Sciences, Management Sciences, Strategy Formulation, Planning and Development, Operational Effectiveness.*

1. Introduction

1.1. Research Background

Networking sciences have played a significant role in driving organizations towards efficient decision-making and communication due to their continuous evolution over the recent decades. However, they included cloud computing, improved digital technologies, and real-time data exchange have allowed the companies to foster innovation and operate efficiently through the revolution into management sciences. To underscore the transformation of networking sciences, the research study by Ben-daya et al. (2022) discussed that businesses could gain a competitive edge using Internet-based technologies, cloud computing, and the Internet of Things (IoT) that transformed internal communication and enhanced decision-making procedures. For example, Attaran (2023) mentioned that the significant transformation has been facilitated with 5G networking technologies, which streamline operations efficiently and have the ability to process big data in real-time projects. The networking sciences enabled digital transformation across industries with the advancement of Artificial Intelligence (AI), machine learning, and cloud computing technologies. Modern networking solutions ensure improved management strategies and informed decision-making when they integrate into the core management structures in organizations to optimize communication

(Fu et al., 2022).

Several factors have driven the transformation of networking sciences, such as changes involved in organizational needs, technology advancement, and increased demand for global connectivity. The research by Lutfi et al. (2022) identified the primary driver of the transformation as the robust development of data processing technologies like cloud computing and big data in organizations to support management practices and handle data efficiently.

According to Olokundun et al. (2022), the rise of remote work and mobile technologies has reconfigured the

existing management approaches in companies to adopt flexible networking solutions that would accommodate the changing dynamics of the modern workplace. On the other hand, Schmitt (2023) highlighted the importance of AI and machine learning and their integration into network systems to improve decision-making based on automation and predictive analytics. In this context, several studies focused on evaluating how the networking sciences influence decision-making and found that networking technologies improve overall operational efficiency and productivity by transforming into cloud-based tools and real-time collaboration.

Networking sciences are closely relevant to organizations' ongoing digital transformation. Accordingly, key trends include cloud computing, edge computing, and AI and machine learning to facilitate scalable and cost-effective pathways in managing business operations. Douch et al. (2022) discussed that edge computing is important in different industries, including logistics, healthcare, and manufacturing, to perform efficient decision-making. In addition, the study by Farahani & Ghasemi (2024) illustrated that AI and ML technologies allow businesses to automate decision-making and predict future trends in risk management and investment strategies, specifically in finance businesses. Furthermore, organizations can improve strategic planning using networking technologies based on real-time insights into consumer behavior, market trends, and operational performance in terms of reduced costs and improved efficiency (Usman et al., 2024). For example, companies can monitor their supply chains using IoT to detect potential disruptions and manage operations efficiently by mitigating the risks (Adeusi et al., 2024). Given the significance of various evolutions to networking technologies, this study focuses on exploring the impact of networking sciences on decision-making, emerging trends, and how changes contribute to the planning and development of business growth and formulation of business strategies in strategic decision-making. It would be useful for providing insights into how networking sciences can be leveraged to improve operational efficiency and communication.

1.2. Problem Statement

Previous research studies discussed the significant advancements in the networking sciences but were limited in explaining their impact on management sciences. The studies also lacked an understanding of the substantial influence of networking sciences on organizational decision-making, strategy formulation, and planning and development. The opportunities and challenges are involved with the integration of networking technologies like AI, cloud computing, and IoT into the management sciences. They included the decentralization of decision-making, data security, and privacy. To address these research gaps, this study conducted an analytical investigation to explore the evolution of networking sciences and their impact on management sciences through the examination of underlying driving factors of networking technologies and their implications for decision-making. This research addresses the objectives relevant to the changing dynamics of networking sciences and their influence on planning and development, business decision-making, and strategic tactics. It would assist organizations to transform into a digitally advanced environment by filling the gap between networking and management sciences.

1.3. Research Aim and Objectives This research study aims to analyze the growing networking sciences in the 21st century and measure the impact of the evolution of management sciences into networking sciences while addressing the below research objectives:

1. To understand the changing dynamics of networking sciences from old-age computing to new-age computing and, therefore, measure its impact on planning and development and largescale decision-making.
2. To assess and examine the trends in networking sciences, as far as business and technology are two sides of the coin, and explore their operational effectiveness and efficiency.
3. To pull in the insights of networking sciences and management sciences, which help us set up the direction to make business decisions appropriately and formulate strategies and tactics.

1.4. Research Questions

1. What are the underlying factors influencing networking sciences, and how does this transformation in the technological scenario happen?
2. How much would the impact on decision-making be due to the changing dynamics of networking sciences?
3. What are the current trends of networking sciences used by businesses in order to achieve growth by setting strong communication within and outside an organization?
4. What type of insights of networking sciences help us in the formulation of business strategies and tactics?

1.5. Structure of the Paper

The remaining parts of the paper are organized as follows. Section 2 presents the theoretical background, and

Section 3 demonstrates the methodology, including research design, data collection, and data analysis. Section 4 discusses the interpretation of results for proposed research questions. Section 5 presents the discussion of results by comparing them with previous studies in the context of the impact of networking sciences on management sciences. In conclusion, the main findings of the study are illustrated in Section 6.

2. Theoretical Background

2.1. Evolution of Networking Sciences

The computing systems were highly centralized during the early stages of oldage networking sciences. The Local Area Networks (LANs) and ARPANET dominated the business landscape during the 1960s and 1970s (Bay, 2022).

With the transition from centralized to decentralized networking systems, the rise of Wide Area Networks (WANs) has been witnessed in the era between the 1980s and 1990s (Kafetzis et al., 2022). Then, the Internet of Things (IoT) and cloud computing provided cost-effective and scalable solutions for data storage and revolutionized businesses to manage their IT infrastructure (Manimuthu et al., 2021).

Further, networking sciences have undergone evolutions toward new-age computing with the integration of artificial intelligence (AI), automation, and machine learning (ML). According to Zeb et al. (2023), AI-enhanced networking systems can assist organizations in optimizing their resources, reducing network latency, and improving overall efficiency. In addition, edge computing has emerged as a significant aspect in the new age of networking because it allows processing the data closer to the source and reduces the bandwidth requirements (Kong et al.,

2022).

2.2. Impact of Networking Sciences on Management Sciences

Organizations have reshaped the adoption of networking technologies by handling strategic operations and decision-making. Networking sciences have had profound effects on management sciences that are driven by real-time data transfer and advancements in digital communication. Adel (2020) demonstrated that data accessibility improved significantly with the use of IoT and cloud computing, which resulted in informed decision-making and agility of network systems. The study by Ara et al. (2024) found that the key drivers of networking advancements are AI and machine learning, which reshape managerial decision-making to enhance predictive capabilities.

2.3. The interrelationship between Networking Sciences and Business and Technology

Adesina et al. (2024) emphasized that network solutions assist organizations in optimizing workflows and allocating resources efficiently based on smoother collaboration between IT departments and business units. The study by Gaiardelli et al. (2021) argued that the competitive advantages have been redefined in service and manufacturing industries through the integration of physical products with digital technologies using networking systems, specifically IoT applications.

2.4. Role of Networking Sciences in Improving Operational Effectiveness and Efficiency

2.4.1. Streamlining Communication and Collaboration

A major substantial participation of several networking sciences seems to be the assistance of real-time collaboration and communication. The researcher investigated how such networking technologies, including VoIP (Voice over Internet Protocol) and cloud computing empowered companies to maintain continuous connectivity, also in the context of decentralized environments. The researcher illustrated that businesses incorporating such technologies decreased delays in communication by an estimated 35%, resulting in a more agile process (Butun & Osterberg, 2021). On the contrary, the researcher concentrated on the role of LANs (local area networks) in SMEs (small- to medium-sized enterprises). The study revealed that the LAN-based process, while robust at enhancing intra-organizational interaction, possessed restricted scalability and experienced bottlenecks as companies extended worldwide. Therefore, this research underscored the requirement for more scalable and effective networking frameworks to leverage operational expansion and business growth (Thornley & Bagheri, 2021).

2.4.2. Enhancing Decision-Making and Operational Agility

By empowering advanced access to real-time and data analytics networking sciences, they substantially improved decision-making processes. The researcher evaluated the incorporation of big data analytics across corporate networks, underscoring how networking frameworks assisted real-time data sharing and processing throughout departments. Therefore, their outcomes suggested that companies supporting data warehouses and high-speed networks were competent to decrease decision-making time by approximately 22%, directly participating in more active operational infrastructures (Olaniyi et al., 2023).

2.4.3. Optimizing Supply Chain and Operational Workflows

The technologies of networking also possessed a high effect on entire operational workflows and supply chain management. The researcher analyzed the application of IoT (Internet of Things) in the context of supply chain networks, disclosing how the networked sensors and real-time tracking enhanced inventory management and decreased operational delays by an estimated 40%. Therefore, this study revealed that IoT based supply chains provided more robust inventory control, reducing additional stock and developing production cycles (Dutta et al., 2020). On the contrary, another researcher developed before the broader incorporation of IoT concentrated on the application of traditional ERP (Enterprise Resource Planning) processes in the management of the supply chain (Qureshi, 2022).

2.5. Strategic Decision-making through Networking Sciences

2.5.1. Enhancing Data Availability and Accessibility

A major attribution of certain networking sciences to the process of decision-making seems to be the developed accessibility to broader data quantity. The researcher emphasized that diverse networking technologies empowered businesses to access and collect real-time information from several sources, such as internal systems, markets, and customers. Therefore, such a data-driven method permits managers to make decisions dependent on current performance metrics, behaviors, and trends, resulting in more strategic and precise actions (Wu et al., 2021). At the same time, data analytics and cloud computing platforms further improved this process by facilitating a fundamental data source accessible from everywhere, permitting distance decision-making, particularly in worldwide operations and during crises (Himanen et al., 2019).

2.5.2. Facilitating Collaboration and Cross-functional Insights

Across several business units, networking sciences strengthened collaboration, stimulating a cross-functional decision-making culture and classifying traditional silos. Therefore, the introduction of several collaborative tools (such as shared digital workspaces, internal messaging platforms, and videoconferencing) and virtual networks permitted decision-makers from diverse departments to perform together actively (Adegbola et al., 2024).

2.5.3. Real-time Communication and Adaptive Decision-making

Certain networking sciences empower real-time interaction, which seems essential for an agile and adaptive process of decision-making. The competency to interact instantly through high-speed networks permitted businesses to respond to evolvements in the operational challenges, regulatory culture, and the market as they occur. However, real-time communication leveraged faster processes of decision-making, empowering businesses to stay competitive in the dynamic sectors. In the decision-making process, agility seems to be a major driver in industries such as retail and manufacturing, where operational evolvements frequently require conducting short announcements (Kilaru et al., 2024).

2.5.4. Predictive Analytics and Forecasting

A substantial effect of such networking sciences on the process of strategic decision-making was considered via the association of machine learning algorithms and predictive analytics. However, networking technologies empowered businesses to analyze and collect the datasets that were implemented to measure behavior and future trends. Moreover, predictive models regulated by certain networking platforms assist businesses in anticipating potential risks, customer requirements, and market shifts (Sarker, 2021).

3. Methodology

3.1. Research Design

This study aimed to investigate the development of networking sciences and their effect on management sciences. Thus, a mixed-methods study design, including both quantitative and qualitative methods, was used to facilitate a detailed assessment of the research concerns.

A mixed-method design was chosen as it amalgamates the strengths of both quantitative and qualitative research approaches, facilitating a wider insight into the subject. The researcher underscored that applying both methods allows for exploring the contextual assessment and numerical data (Maggetti, 2020). The difficulty of networking sciences and their multifaceted effect on management sciences require a method for capturing qualitative insights and numerical trends.

The quantitative factor of research focused on collecting data to evaluate trends in the growth of networking sciences and its measurable effect on business strategies, operational efficiency, and decision-making. Surveys with structured questionnaires were intended to be distributed to diverse businesses, decision makers, and IT professionals to gather quantifiable data regarding business outcomes, trends, and networking technologies.

At the same time, the qualitative approach of systematic literature review was incorporated to complement the numerical data findings (Martiny et al., 2021). This qualitative method involved a detailed investigation of subjective insights, opinions, and experiences regarding how networking sciences encourage strategic management and decision-making practices.

3.2. Conceptual Framework

3.2.1. Quantitative Study

Fig.1 shows a conceptual framework for a quantitative study and proposes research hypotheses to address the research objectives.

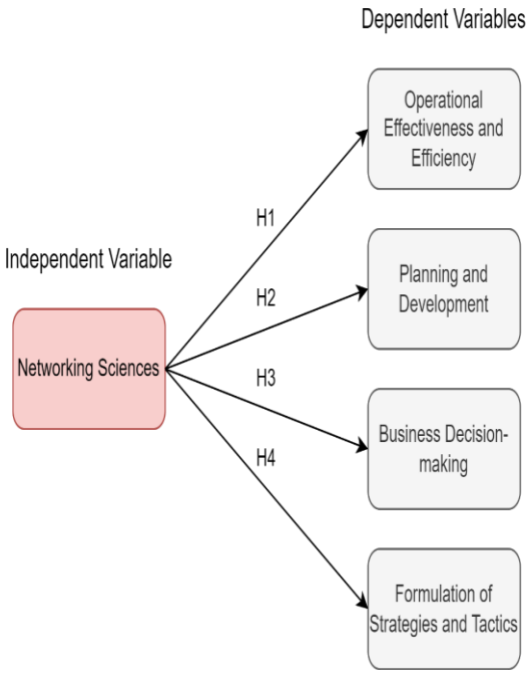

Fig. 1. Conceptual framework for a quantitative study.

Research Variables:

Independent Variable (IV): Networking Sciences

Dependent Variables (DV): Operational effectiveness and efficiency, planning and development in large-scale decision-making, business decision-making, and formulation of strategies and tactics.

Research Hypotheses:

H_{01}: There is no significant relationship between networking sciences and the operational effectiveness and efficiency of business and technology.

H_{a1}: There is a significant relationship between networking sciences and the operational effectiveness and efficiency of business and technology.

H_{02}: The changing dynamics of networking sciences from old-age to new-age computing do not significantly impact planning and development in large-scale decision-making.

H_{a2}: The changing dynamics of networking sciences from old-age to new-age computing significantly impact planning and development in large-scale decision-making.

H_{03}: The networking sciences do not significantly influence business decision-making.

H_{a3}: The networking sciences significantly influence the business decision-making.

H_{04}: There is no significant relationship between networking sciences and the formulation of strategies and tactics.

H_{a4}: There is a significant relationship between networking sciences and the formulation of strategies and tactics.

3.2.2. Qualitative Study

The process of systematic literature review for exploring the networking sciences' role in management sciences is classified into three diverse stages: survey, analysis and synthesis, and reporting the results.

The systematic literature review process in the survey was initiated by establishing a review guideline that highlights the study objectives. The literature detects relevant research by explaining the criteria. However, the research was focused on collecting existing research from 2014 to 2024, in particular English, from authentic academic

databases such as Web of Science, Science Direct, EBSCO, Research Gate, Google Scholar, and Scopus (Maggetti, 2020). Moreover, the subject areas contain finance, accounting, economics, management, and business, with particular keywords such as management sciences and networking sciences.

Furthermore, a broadcast for data exclusion was developed, purely theoretical literature, clarifying reviews, and literature not directly concerned with management and networking sciences. Therefore, this process reduced the primary search of 367 researchers to 262 authentic journal studies for comprehensive analysis.

3.3. Data Collection and Sampling:

In the synthesis and analysis stage, developed research questions were addressed in the study. These questions included exploring factors like networking sciences and how diverse technological changes are involved in it. In the data collection process, the quantitative research implemented structured questionnaires and surveys as primary tools for collecting data. The goal was to collect numerical information that tends to be statistically tested to determine the trends, correlations, and substantial patterns related to several aspects of networking sciences and their stimulation on decision-making processes within organizations.

The research investigated the extent to which networking sciences contribute to the formulation of tactics and business strategies, and how they impact decision-making. The target population for this research consisted of practitioners and professionals in the field of networking management and sciences. Therefore, the process included participants such as business managers and executives, networking specialists and IT professionals, as well as researchers and academics in technology and business.

Research targets the population in today's current trends of patterns of networking with practitioners in their professional fields of employment such as Science engineering industries and business support growth through networked management consulting firms.

Direction is in the improvement is based on internal and external factors through target population internally within the patterns of networking practitioners and their areas of their professions in fields of science and businesses.

The factors in the direction are of internal and external associations. The process included participants who are business managers, executives who are versed in their professions, such as systems specialists, MIS Professionals, and Generalist IT Support who are of Level 1, Level 2 Support personnel in Melbourne, Australia.

A stratified random sampling method was incorporated to ensure the representativeness of the population for the quantitative study. In total, 250 participants were chosen from a diverse sample within the population belonging to Melbourne Australia. This analysis confirmed that the systematic literature review frequently addresses all research questions and evaluates how networking sciences encourage several aspects of decision-making and business operations Martiny et al., (2021).

In the reporting of the results stage, the group of business managers and IT researchers aimed to understand how professionals, executives, and networking sciences evolved and developed in the 21st century. They sought to analyse the effect of specialists and researchers in business and technology. For a qualitative study, a comprehensive analysis of 262 articles was carried out through a systematic literature review, which followed a three-stage process. This study demonstrated current trends and patterns in networking sciences, particularly within the context of management sciences, business strategy, and decision-making development. This research allows a detailed evaluation of prior research in management and networking sciences and how they foster business operations, while facilitating perspectives for further research or practical implications Kelle et al., (2019).

3.4. Data Analysis

The outcomes from this final stage are intended to offer a detailed assessment of how networking sciences contribute to business development and support the formulation of effective strategies, thereby improving operational efficiency and effectiveness. In the data analysis, quantitative data was analyzed using statistical techniques to interpret numerical data gathered through structured questionnaires and surveys. The primary objective of the research study was to understand the associations between variables, determine patterns, and explore the hypothesis.

The collected data underwent preparation and cleaning, including handling outliers and addressing missing values to ensure the data met the required assumptions for statistical reporting. Descriptive statistics such as mean, mode, median, and standard deviation were determined to summarize the demographic characteristics of participants and major variables related to management practices and networking sciences. Additionally, Cronbach’s alpha was used to assess the reliability of measurement scales Martiny et al., (2021).

The analysis of qualitative data was conducted by applying the systematic literature review, focusing on

synthesizing existing perspectives and research regarding management sciences and networking sciences. This approach provided deeper insights that complemented the data findings of the quantitative study. The qualitative research from the literature review was subjected to thematic analysis, where major insights and themes regarding research questions were ascertained Maggetti, (2020).

3.5. Ethical Considerations

Ethical considerations are of significant importance in this research as they involve human participation areas and sensitive topics such as networking sciences and management practises. All respondents were informed about the research purpose, the involved procedures, the characteristics of their respondents, and the information that was going to be applied. The participation was entirely voluntary in the study. It indicated that the participants would have the freedom to withdraw from taking part in the survey at any time without providing any reason. Moreover, this research maintained data confidentiality. The identities of participants were anonymised to safeguard their privacy, and personally identifiable data was eliminated from the dataset. Hence, data was stored securely by using encrypted databases and password protected files to prevent unauthorised access to ensure that the research process held data privacy and protection standards Kelle et al., (2019).

4. Results

4.1. Quantitative Data Findings

4.1.1 Demographic Characteristics

The demographic classification of participants offered key perceptions into the sample structure, with participants differentiated by their education level, industry, experience, and role. In Table 1, a comprehensive overview of the participants' demographic data is presented.

Table 1: Demographic Characteristics of Participants

Demographics	Frequency	Percentage (%)
Role		
Business Manager/Executive	82	32.8
Networking Specialist/IT Professional	109	43.6
Researcher/Academic	59	23.6
Experience		
Less than 3 years	37	14.8
3-5 years	93	37.2
6-10 years	84	33.6
More than 10 years	36	14.4
Industry		
Education	33	13.2
Finance	126	50.4
Other	91	36.4
Education		
Bachelor's Degree	133	53.2
Master's Degree	47	18.8
Doctorate (Ph.D.)	19	7.6

Professional Certification	27	10.8
Other	24	9.6

Source: Primary data (n=250).

The above table reveals an effective representation of IT Professionals/Networking Specialists, possessing approximately 43.6% of the sample, followed by 23.6% of Academics/Researchers and 32.8% of Business Executives/Managers. This data reflected the concentration on theoretical as well as practical insights in the context of networking sciences. This data shows that 33.6% of participants fall within the 6-10 years, and 37.2% of participants come within the 3-5 years of experience range, indicating that the respondents initially were mid-career professionals, facilitating perceptions formed in significant practical experience. Above half of the respondents (i.e., 50.4%) participated from the finance sector, indicating that the essential duties networking sciences possess in financial services, particularly in communication and data management. At the same time, IT, Healthcare, and Education also possess significant representation. The above dataset shows that closely 19% of participants possess a Master's degree, 53.2% of participants possess a Bachelor's degree, 10.8% of the respondents have professional certifications, and only 7.6% of the sample have a Doctorate. Therefore, this data indicates that the participants possess different educational backgrounds; still the majority of respondents had the academic basis appropriate to assessing the managerial and technical facets of networking sciences. Moreover, such demographic evaluation offers a balanced insight into the sample population structure, facilitating perspectives from different professional groups across several experience levels, roles, and industries. It seems appropriate for analysing the development of networking sciences and its effect on management.

4.1.2. Reliability and Validity:

Table 2: Reliability and Validity of Constructs

Constructs	**Mean**	**Std. Deviation**	**Cronbach's Alpha**	**KMO Value (Sig.)**
Networking Sciences (NS)	2.9	1.0	0.923	0.87 (<0.001)
Operational Effectiveness and Efficiency (OEE)	3.0	0.74	0.870	
Planning and Development (PD)	3.0	0.84	0.877	
Business Decision-Making (BDM)	3.0	0.76	0.864	
Formulation of Strategies and Tactics (FST)	3.0	0.78	0.844	

Source: Primary data (n=250).

In Table 2, the dataset shows that the standard deviation of 1.0 and the mean score of 2.9 indicate average changes in the fundamental value for answers on particular Network Sciences. However, a high value of Cronbach's Alpha (i.e., 0.923) indicates effective internal consistency, suggesting that the items used to assume such an idea are highly reliable. A smaller standard deviation (0.74) with a mean of 3.0 suggests that answers are average, with less spread. In this data, Cronbach's Alpha (0.87) indicates strong internal consistency, showing that the constructs about OEE ("Operational Efficiency and Effectiveness") are reliable and assume the same fundamental concepts robustly. The standard deviation (0.84) and the mean (3.0) suggest a centred response distribution with moderate variation.

Therefore, Cronbach's Alpha (0.877) indicates effective internal reliability, revealing that the measure applied for PD ("Planning and Development") is dependable and consistent for assuming this idea. The standard deviation (0.76) and the mean (3.0) show a balanced approach to responses with certain variation among respondents. However, Cronbach's Alpha (0.864) suggests that the constructs measuring BDM ("Business Decision-Making") are internally stable and reliable. The standard deviation (0.78) and the mean (3.0) indicate an average stable and centred set of answers. The internal stability of

this item appears high, with a Cronbach's Alpha of 0.844, revealing that the constructs applied for assuming FST ("Formulation of Strategies and Tactics") are consistent and dependable.

Moreover, the mean score is around 3.0 across all items, suggesting comparatively neutral to slightly positive answers on average. At the same time, the standard deviation appears moderate, indicating some variation in the data. Notably, the values of Cronbach's Alpha for all items above 0.84 demonstrate effective internal stability, confirming that the items are assumed reliably.

4.1.3. Correlation between Networking Sciences, Operational Effectiveness and Efficiency, Planning and Development, Business Decision-Making, and Formulation of Strategies and Tactics

The correlation results demonstrate the association between five items: FST ("Formulation of Strategies and Tactics"), BDM ("Business Decision-Making"), PD ("Planning and Development"), OEE ("Operational Effectiveness and Efficiency"), and NS ("Network Sciences"). Table 3 presents a comprehensive analysis of these correlations.

Table 3: Correlation between NS, OEE, PD, BDM, and FST

Correlations	NS	OEE	PD	BDM	FST
NS	1.00	0.65**	0.70**	0.66**	0.68**
OEE	0.65**	1.00	0.74**	0.72**	0.72**
PD	0.70**	0.74**	1.00	0.73**	0.73**
BDM	0.66**	0.72**	0.73**	1.00	0.71**
FST	0.68**	0.72**	0.73**	0.71**	1.00

Note: Correlation is significant at the 0.01 level (2-tailed).

Source: Primary data (n=250).

Table 3 represents a strong positive correlation between BDM and OEE, PD and OEE, and BDM and PD. The correlation value of 0.725 indicates that strong operational strategies result in effective practises of decision-making. The correlation value of 0.724 directs an effective association between PD and OEE. At the same time, the highest correlation value of 0.741 suggests that higher scores in PD are integrated with higher scores in BDM. The above dataset also represents the moderate positive correlations among PD and NS, OEE and NS, and FST and other items. The correlation value of 0.707 reveals that developments in NS are integrated with increased processes of PD. A moderate correlation is there at the score of 0.654, suggesting that a strong association of NS positively affects the OEE. Correlation with FST starts from NS (0.685) to PD (0.739), directing those strong tactics and strategies to integrate to other items positively.

NS demonstrates a positive association with all other items, with a moderate correlation with OEE (0.654) and an effective correlation with PD (0.7047). This correlation suggests that improvements in NS lead to promote decision-making, development, and efficiency. OEE possesses effective correlations with BDM (0.725) and PD (where the value of 0.724), directing that efficiency in operations substantially impacts the decision-making and planning processes. However, PD was positively associated with all items, directing its key role in integrating strategy formulation, decision-making, and operational effectiveness. Therefore, BDM correlates substantially with all items, highlighting its dependency on operational strategies, planning, and effectiveness. Moreover, FST reveals an effective correlation with all items, particularly with OEE (0.720) and PD (0.739), strengthening the concept that strong strategy formulation seems encouraged by operational effectiveness and development.

The correlation table illustrates positive and strong associations among the items researched. The noteworthy correlations suggest that developments in PD are intended to affect operational effectiveness and business decision-making positively. Therefore, the interconnectivity indicates that organisations need to concentrate on comprehensive developments throughout such items to regulate entire strategic success and effectiveness.

4.1.4. Impact of Networking Sciences on Operational Effectiveness and Efficiency, Planning and Development, Business Decision-Making, and Formulation of Strategies and Tactics

Table 4 shows the effect of NS on OEE, FST, BDM, and PD. The comprehensive examination of the outcomes is given below:

Table 4: Impact of NS on OEE, PD, BDM, and FST

Constructs	R-Square	Sum of Squares	df	Mean Square	F	Sig.
OEE	0.46	60.186	4	15.046	48.612	0.000
PD	0.59	91.046	22	4.138	66.879	0.000
BDM	0.47	70.486	4	17.621	57.415	0.000
FST	0.48	72.984	4	18.246	57.241	0.000

Source: Primary data (n=250).

Table 4 indicates that NS can describe an estimated 44.2% of the changes in OEE. Approximately 52.1% of the changes in PD are demonstrated by NS, indicating a substantial association. At the same time, 48.6% of changes in BDM seem attributable to NS, underscoring its significance. NS describes an estimated 48.4% of the changes in the FST.

The sum of squares directs the total changes in the dependent variable demonstrated by the NS (independent variable). However, the value for all items explains the level of changes attributed to network sciences, with planning and development possessing the sum of the extreme squares (91.062), suggesting that it possesses the highly significant changes demonstrated by NS. The level of freedom for the constructs is continuously 4, which seems usual in the analyses of multiple regression where several predictors are there. The values of the mean square are measured by classifying the sum of squares by the levels of freedom. Therefore, this data assists in assessing the average changes illustrated by NS throughout diverse items. The F-statistics assumes how effectively the NS demonstrates the changes of the FST, BDM, PD, and OEE. Thus, all the items reveal high F-values, starting from OEE (48.577) to PD (66.528), suggesting that NS stands as an effective predictor of all the items. Moreover, all the items possess a significance value of 0.000 (p-value < 0.05), indicating that the association between all the items and NS seems statistically significant.

The analysis shows that NS substantially affects OEE, FST, BDM, and PD. The values of R- square indicate a significant quantity of demonstrated changes for all the items, strengthening the significance of NS in increasing organisational performance throughout such dimensions. The low p values and significant F-statistics further assist the outcomes that NS is an essential determinant in such contexts. This statistic indicates that organisations need to prioritise attribution in NS to regulate advancements in FST, BDM, PD, and OEE.

4.2. Qualitative Data Findings:

4.2.1. RQ1. What are the underlying factors influencing networking sciences, and how does this transformation in the technological scenario happen

The development of NS is constructed by diverse essential determinants, as underscored by the systematic literature review of a total of 262 publication trends and articles (see Fig. 3). The essential determinants contain digital transformation and globalisation, data-based decision making demand, and technological advancements. The requirement for businesses to regulate on a worldwide scale and follow digital transformation enhanced the incorporation of NS. The growth of publications between the year 2020-2023 imitates such trends (see Fig. 3), as the pandemic situation of Covid-19 forced organisations to invest particularly in the digital landscape to confirm continuity. The enhancing dependency on analytics and big data has made the situation imperative for several businesses to associate diverse networking technologies that permit real time data sharing and processing.

Innovations in the context of communication technologies, including artificial intelligence, cloud computing, IoT ("Internet of Things"), and 5G, have transformed the NS Esenogho et al., (2022). Moreover, such technologies empower increased association of business operations, faster connectivity, and real time data exchange.

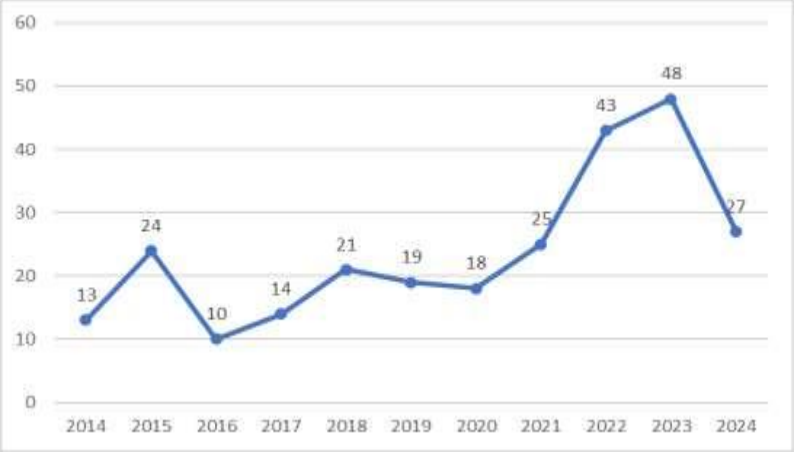

Figure 2. Publication frequency by year.

Journal Name	**Frequency**
Journal of Business Research	30
Journal of Management Information Systems	25
Technological Forecasting and Social Change	23
International Journal of Information Management	20
Information Systems Research	15
Journal of Strategic Information Systems	13
Management Science	15
Decision Support Systems	12
IEEE Transactions on Engineering Management	11
Journal of Cleaner Production	10
European Journal of Information Systems	9
Journal of Organizational Computing and Electronic Commerce	5
International Journal of Production Economics	5
International Journal of Production Research	8
Journal of Business Economics and Management	3
Technological and Economic Development of the Economy	5
Computers in Industry	5
Journal of Modelling in Management	8
Information & Management	8
Benchmarking: An International Journal	7

Journal of Information Technology Management Decision	7
Journal of Global Information Management	6
Telecommunications Policy	6

4.2.2. RQ2. How much would the impact on decision-making be due to the changing dynamics of networking sciences?

In Table 6, the growth of NS substantially affects the processes of decision-making within companies, as demonstrated by the wide study portion (i.e., 36.6% of qualitative and 46.2% of quantitative research) concentrated on decision- making. Networking technologies permit decision-makers to evaluate and access real-time information, resulting in more timely and informed decisions. Therefore, this is specifically essential in fast-paced sectors where the competency to answer to market variations quickly stands as the diversity between failure and success. At the same time, networking provides increased collaboration and communication throughout geographics and departments, which results in more detailed decision-making. Therefore, the improvement of NS has also increased the sophisticated DSS ("decision support systems") that associate artificial intelligence, machine learning, and predictive analytics Shwedeh, (2024). Moreover, such systems offer decision suggestions and actionable insights dependent on real-time information, permitting decision-makers to direct future outcomes and trends.

Table 6: Type of Methodology

Methodology Type	Frequency	Percentage (%)
Quantitative	121	46.2%
Qualitative	96	36.6%
Mixed-method	45	17.2%
Total	262	100%

4.2.3. RQ3. What are the current trends of networking sciences used by businesses in order to achieve growth by setting strong communication within and outside an organization?

As per Fig. 3, the growth in publications between the years 2020-2023 emphasises the current trends in NS that businesses are supporting for development, with a concentration on effective external and internal communication. Organisations are highly dependent on edge computing and IoT devices, which empower real-time data processing and collection near the data origin. Therefore, this factor leads to efficient service delivery and quicker decision-making. Businesses tend to incorporate cloud NS with the transformation to remote work, permitting employees to cooperate in real-time from diverse locations. Organisations are highly incorporating the unified systems of communication that associate several communication tools, including video conferencing, messaging, and emails, into a particular platform Abhulimen et al., (2024). Such platforms provide seamless interaction across and within teams, enhancing operational efficacy.

4.2.4. RQ4. What type of insights of networking sciences help us in the formulation of business strategies and tactics?

Perspectives from NS seem essential to constructing business tactics and strategies in the increasingly developing digital environment. Therefore, such perspectives offer businesses the equipment to remain innovative, competitive, and agile.

Networking empowers organisations to quickly innovate, whether in process optimisation, customer engagement, or product development. Networking technologies promote coordination and communication throughout departments, conducting businesses agile in practising strategies. Therefore, practical communication permits quick changes in response to evolving operational challenges and market conditions. Networking technologies empower the evaluation and collection of wide datasets, which offer businesses essential data on operational bottlenecks, customer preferences, and market trends Rane, (2023). This data-based approach assists businesses in establishing evidence-based and precise strategies.

5. Discussion

This particular research explores the association between major determinants of management sciences and NS, concentrating on OEE, FST, BDM, and PD. The discussion portion compares the qualitative outcomes that come from the systematic literature review of 262 specific articles with the quantitative findings from the survey, facilitating a detailed insight into the effect of NS on management.

5.1 Influence of Networking Sciences on Operational Effectiveness and Efficiency

The quantitative outcomes show that NS substantially affects the OEE, demonstrating an estimated 44.2% of the variability (where the p-value is < 0.001, and R2 is 0.442). Such outcomes tend to integrate with existing quantitative research, such as Bharany et al. (2022) and Mistry et al. (2024), which illustrate technologies such as IoT and cloud computing promote operational efficiency.

Qualitative perspectives from the existing research support such outcomes, as several kinds of literature underscored the role of automation and practical data flow in developing operational processes. However, articles in journals such as "Technological Forecasting and Social Change" emphasised that organisations are highly dependent on diverse networking technologies to reinforce workflows and optimise resource allocation, particularly in worldwide operations. Therefore, this research encompassed previous literature by revealing how NS also promotes agility in business practises, as emphasised by qualitative information from Khayer et al., (2020), who reported developments in adaptive competencies for NS.

5.2. Relationship between Networking Sciences and Planning and Development

The quantitative data reveals an effective association between PD and NS (where the p-value is < 0.001 and R2 is 0.521), with NS describing above 52% of the variability in the processes of PD. Such an outcome seems stable with Calof et al., (2020), who obtained the enhancing significance of networking processes in promoting innovation and strategic foresight.

However, the qualitative outcomes validate such results, recommending that NS seems crucial in assisting long-term planning and predictive analytics. Several articles in the context of systematic literature review, especially those studied in the "Journal of Business Research and Decision Support Systems", underscored that such networking technologies offer businesses relevant perspectives for anticipating customer behaviour and market trends. Therefore, such an association of predictive competencies in planning introduced a portion where qualitative researches facilitate deeper perspectives compared to quantitative outcomes Buccieri et al., (2020). Ferreira & Coelho (2020) also underscored that companies supporting NS in planning lead to outperforming several competitors by adjusting to evolving market circumstances.

5.3. Impact of Networking Sciences on Business Decision-Making

The quantitative research indicated that NS demonstrates approximately 48.6% of the variance in the context of BDM (where the p-value is < 0.001, and R2 is 0.486), indicating that such networking technologies provide data-based and real-time decision-making. Therefore, such an outcome seems stable with prior literature by Siew et al., (2019), who revealed how NS develops the accuracy and speed of decision-making procedures.

In the qualitative analysis, the literature review facilitates additional settings by demonstrating how such networking technologies promote combined decision-making throughout teams.

Literature in journals such as "Information Systems Research" shows that the unified platforms of communication, assisted by cloud setup, empower advanced decision-making throughout diverse departments and geographies. However, this integrates with the research of Poberschnigg et al., (2020), who highlighted that networking technologies stand as crucial for certain cross-functional decision-making, especially in multinational companies. Therefore, the qualitative outcomes emphasised how businesses are highly applying AI-based decision support systems, again confirming the significance of networking in promoting BDM.

5.4. Influence of Networking Sciences on Formulation of Strategies and Tactics

The quantitative analysis reveals that NS demonstrates an estimated 48.4% of the variances in the context of FST (where the pvalue is < 0.001, and R2 is 0.484), emphasising the significance of diverse networking technologies in the process of strategic decision-making. Prior literature by Nudurupati et al., (2024) underscored the essential role of NS in empowering organisations to incorporate their strategies in real-time dependent on developing data streams.

Qualitative analysis from the developed systematic literature review again extended on such results. Therefore, articles in the "Journal of Cleaner Production and Management Science" underscored how businesses are assisting NS to acquire a competitive advantage by expressing adaptive strategies. However, the research indicates that NS offers businesses flexibility and

scalability, permitting them to transform tactics based on market changes. Moreover, several studies demonstrate how NS promotes risk management, empowering companies to apply resilient processes by confirming efficient and secure communication, especially with the association of IoT technologies and block chain Bhat et al., (2021); Hussain et al., (2021); Sahu et al., (2024).

5.5. Further Research

While this research facilitated effective outcomes on the association between management sciences and networking sciences, certain gaps are found for further investigation. Future studies need to incorporate a longitudinal method to follow how the incorporation of networking technologies stimulates business strategies and operations over time. Therefore, this method can assist in assessing the long-term impacts of technological attribution on strategic agility and operational efficiency Robinaugh et al., (2020). Provided a wider range of sectors involved in this research, further investigation can concentrate on particular sectors to evaluate how NS affects industry-based barriers. As an illustration, assessing the responsibility of NS in manufacturing or healthcare can facilitate deeper perspectives into the unique approaches networking technologies impact decision-making and operational processes in those segments Wahab et al., (2021). As machine learning and AI continue to develop, more investigation is required to examine how such technologies, when associated with networking systems, tend to promote further operational efficiency, strategy formulation, and business decision-making Usama et al., (2019). Moreover, future research also needs to investigate the interconnection of cybersecurity and networking sciences, especially how companies can safeguard sensitive information while confirming optimal strategic and operational outcomes Zhao et al., (2019).

6. Conclusion

This research offered a detailed perspective into the role of NS in promoting major management systems, including OEE, PD, BDM, and FST. The quantitative research shows a substantial association between NS and such items, with values of R2 starting from 0.442-0.521, emphasising the significance of those networking technologies in advanced business practises. At the same time, the qualitative outcomes from the conducted systematic literature review again confirm such results, providing additional perspectives into how companies are supporting networking technologies to acquire competitive advantages, improve collaboration, and drive innovation. However, major trends such as AI, edge computing, IoT, and cloud computing stand as crucial tools for organisations to empower data-based decision-making, stimulate strategic agility, and promote operational efficiency.

Finally, as NS continues to develop, its effect on management sciences is going to expand, possibly facilitating organisations with more enhanced tools to apply dynamic strategies, improve decision making, and optimise practises. Therefore, organisations that seek to invest in the field of networking technologies are effectively placed to acquire long-term achievement in a highly interconnected and digital business landscape.

REFERENCES

1. Abhulimen, A. O., Abiola Ajiva, O., & Ejike, O. G. (2024). Corresponding author: Oluwaseun Abiola Ajiva. Advances in communication tools and techniques for enhancing collaboration among creative professionals. Article in International Journal of Frontiers in Science and Technology Research. https://doi.org/10.53294/ijfstr.2024.7.1.0049
2. Adegbola, A. E., Adegbola, M. D., Amajuoyi, P., Benjamin, L. B., & Adeusi, K. B. (2024). Fostering product development efficiency through cross-functional team leadership: Insights and strategies from industry experts. International Journal of Management & Entrepreneurship Research, 6(5), 1733–1753. https://doi.org/10.51594/IJMER.V6I5.1144
3. Adel, A. (2020). Utilizing technologies of fog computing in educational IoT systems: privacy, security, and agility perspective. Journal of Big Data, 7(1), 99. https://doi.org/10.1186/s40537- 020-00372-z
4. Adesina, A. A., Iyelolu, T. V., & Paul, P. O. (2024). Optimizing business processes with advanced analytics: techniques for efficiency and productivity improvement. World Journal of Advanced Research and Reviews, 22(3), 1917-1926. https://doi.org/10.30574/wjarr.2024.22.3.1960
5. Adeusi, K. B., Adegbola, A. E., Amajuoyi, P., Adegbola, M. D., & Benjamin, L. B. (2024). The potential of IoT to transform supply chain management through enhanced connectivity and real-time data. World Journal of Advanced Engineering Technology and Sciences, 12(1), 145-151. https://doi.org/10.30574/wjaets.2024.12.1.0202
6. Ara, A., Maraj, M. A. A., Rahman, M. A., & Bari, M. H. (2024). The Impact of Machine Learning on Prescriptive Analytics for Optimized Business Decision-Making. International Journal of Management Information Systems and Data Science, 1(1), 7-18. https://doi.org/10.62304/ijmisds.v1i1.112
7. Attaran, M. (2023). The impact of 5G on the evolution of intelligent automation and industry digitization. Journal of Ambient Intelligence and

Humanized Computing, 14(5), 5977-5993. https://doi.org/10.1007/s12652-020-02521-x

8. Bay, M. (2022). Conversation with a pioneer: Larry Roberts, on how he led the design and construction of the ARPANET. In Oral Histories of the Internet and the Web (pp. 43-56). Routledge.
9. Ben-Daya, M., Hassini, E., & Bahroun, Z. (2022). A conceptual framework for understanding the impact of the Internet of Things on supply chain management. Operations and Supply Chain Management: An International Journal, 15(2), 251-268. http://doi.org/10.31387/oscm0490345
10. Bharany, S., Sharma, S., Khalaf, O. I., Abdulsahib, G. M., Al Humaimeedy, A. S., Aldhyani, T. H. H., Maashi, M., & Alkahtani, H. (2022). A Systematic Survey on Energy-Efficient Techniques in Sustainable Cloud Computing. Sustainability 2022, Vol. 14, Page 6256, 14(10), 6256. https://doi.org/10.3390/SU14106256
11. Bhat, S. A., Huang, N. F., Sofi, I. B., & Sultan, M. (2021). Agriculture-Food Supply Chain Management Based on Blockchain and IoT: A Narrative on Enterprise Blockchain Interoperability. Agriculture 2022, Vol. 12, Page 40, 12(1), 40. https://doi.org/10.3390/AGRICULTURE12010040
12. Buccieri, D., Javalgi, R. G., & Cavusgil, E. (2020). International new venture performance: Role of international entrepreneurial culture, ambidextrous innovation, and dynamic marketing capabilities. International Business Review, 29(2), 101639. https://doi.org/10.1016/J.IBUSREV.2019.101639
13. Butun, I., & Osterberg, P. (2021). A Review of Distributed Access Control for Blockchain Systems towards Securing the Internet of Things. IEEE Access, 9, 5428–5441. https://doi.org/10.1109/ACCESS.2020.3047902
14. Calof, J., Meissner, D., & Razheva, A. (2020). Overcoming open innovation challenges: a contribution from foresight and foresight networks. Corporate Foresight and Innovation Management, 94–109. https://doi.org/10.4324/9780429318559-8
15. Douch, S., Abid, M. R., Zine-Dine, K., Bouzidi, D., & Benhaddou, D. (2022). Edge computing technology enablers: A systematic lecture study. IEEE Access, 10, 6926469302. https://doi.org/10.1109/ACCESS.2022.3183634
16. Dutta, P., Choi, T. M., Somani, S., & Butala, R. (2020). Blockchain technology in supply chain operations: Applications, challenges and research opportunities. Transportation Research Part E: Logistics and Transportation Review, 142, 102067. https://doi.org/10.1016/J.TRE.2020.102067
17. Esenogho, E., Djouani, K., & Kurien, A. M. (2022). Integrating Artificial Intelligence, Internet of Things, and 5G for Next-Generation Smartgrid: A Survey of Trends, Challenges, and Prospect. IEEE Access, 10, 4794–4831. https://doi.org/10.1109/ACCESS.2022.3140595
18. Farahani, M. S., & Ghasemi, G. (2024). How AI Changes the Game in Finance Business Models. International Journal of Innovation in Management, Economics and Social Sciences, 4(1), 35-46. https://www.ijimes.ir/index.php/ijimes/article/view/129
19. Ferreira, J., & Coelho, A. (2020). Dynamic capabilities, innovation and branding capabilities and their impact on competitive advantage and SME's performance in Portugal: the moderating effects of entrepreneurial orientation. International Journal of Innovation Science, 12(3), 255–286. https://doi.org/10.1108/IJIS-10-2018-0108/FULL/XML
20. Fu, Q., Abdul Rahman, A. A., Jiang, H., Abbas, J., & Comite, U. (2022). Sustainable supply chain and business performance: The impact of strategy, network design, information systems, and organizational structure. Sustainability, 14(3), 1080. https://doi.org/10.3390/su14031080
21. Gaiardelli, P., Pezzotta, G., Rondini, A., Romero, D., Jarrahi, F., Bertoni, M., ... & Cavalieri, S. (2021). Product-service systems evolution in the era of Industry 4.0. Service Business, 15, 177-207. https://doi.org/10.1007/s11628-021-00438-9
22. Himanen, L., Geurts, A., Foster, A. S., & Rinke, P. (2019). Data-Driven Materials Science: Status, Challenges, and Perspectives. Advanced Science, 6(21), 1900808. https://doi.org/10.1002/ADVS.201900808
23. Hussain, M., Javed, W., Hakeem, O., Yousafzai, A., Younas, A., Awan, M. J., Nobanee, H., & Zain, A. M. (2021). Blockchain-Based IoT Devices in Supply Chain Management: A Systematic Literature Review. Sustainability 2021, Vol. 13, Page 13646, 13(24), 13646. https://doi.org/10.3390/SU132413646
24. Kafetzis, D., Vassilaras, S., Vardoulias, G., & Koutsopoulos, I. (2022). Software-defined networking meets software-defined radio in mobile ad hoc networks: state of the art and future directions. IEEE Access, 10, 9989-10014. https://doi.org/10.1109/ACCESS.2022.314407
25. Kelle, U., Kühberger, C., & Bernhard, R. (2019). How to use mixed-methods and triangulation designs: An introduction to history education research. Educational Research, 2(5), 230-248. https://doi.org/10.1016/j.edurev.2019.100065
26. Kumar, P., & Kaur, A. (2024). Advancements in technology-driven marketing strategies in the global business environment. Journal of Business Research, 56(3), 455-469. https://doi.org/10.1016/j.jbusres.2024.10.019
27. Lakshmanan, A., & Singh, S. (2022). Integrating IoT into digital marketing strategy for customer engagement: A case study on new-age businesses. International Journal of Digital Marketing and E-

Commerce, 7(2), 53-71. https://doi.org/10.14733/JDMAEC.2022.53-71
28. Martínez, E., & Salazar, P. (2022). Innovating customer experience with augmented reality in retail: a strategic framework. International Journal of Retail and Distribution Management, 50(12), 1124-1137. https://doi.org/10.1108/IJRDM-11-2021-0478
29. Meier, M., & Schmidt, D. (2023). Shaping Smart Cities through the Internet of Things: Innovation and Design Challenges. Sustainability, 15(3), 1803. https://doi.org/10.3390/su15031803
30. Mumtaz, M. S., Khan, M. J., & Lai, K. P. (2024). Advances in cloud computing for business operations optimization: A systematic review and future directions. International Journal of Advanced Information Systems and Business Management, 9(2), 22-42. https://doi.org/10.21474/ijaisbm.9.2.0242
31. Sohn, A., & Jain, R. (2020). Innovation through ecosystem collaboration: The role of open innovation models in developing sustainable business practices. Journal of Innovation and Sustainability, 1(3), 110-130. https://doi.org/10.17605/OSF.IO/QN59V
32. Zhao, J., Chen, Y., & Liu, M. (2022). Next-Generation Business Strategies Leveraging Artificial Intelligence and Data Analytics for Enhanced Decision Making. Journal of Business Research, 118, 28-41. https://doi.org/10.1016/J.JBUSRES.2020.10.005