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Leveraging Technology for Strategic Competitive Advantage

Akapo Oluwaseun Michael [1*], Asunmo Olakunle Olayide [2]
[1, 2] DBA Strategic Management, Eurasian Management and Administration School, 109004, Moscow, Aptekarsky Lane 9 2 Russia

Abstract:- This study explores the strategic implications of leveraging technology for competitive advantage, examining how companies harness digital tools and capabilities to enhance performance, differentiate offerings, and maintain market leadership. The study reviews theoretical frameworks such as the dynamic capabilities theory and contemporary business practices to analyze the multifaceted impact of technology on competitiveness. The study highlights key areas where technology creates value, including operational efficiency, customer experience, innovation, and strategic decision-making. Furthermore, the study emphasizes the importance of organizational agility, innovation culture, and strategic alignment. The results reveals that in today's rapidly evolving business landscape, organizations are increasingly turning to technology as a key driver of competitive advantage. By synthesizing insights from academic research and current practices, this study provides a comprehensive overview of the role of technology in driving competitive advantage and offers recommendations for organizations seeking to capitalize on digital opportunities in today's dynamic marketplace.

Keywords*:* Technology, Competitive Advantage, Dynamic Capability Theory, Innovation.

1. Introduction

In today's rapidly changing business world, organisations across industries are continuously looking for strategies to acquire a competitive advantage and sustain development amidst tough competition. Strategic technology utilisation is one of the most important drivers of competitive advantage in today's world. As digital transformation continues to alter industries and reinvent established business models, organisations that want to prosper in a fast-paced, interconnected world must embrace technology.

Technology has grown inextricably linked to all aspects of corporate operations, including product creation and marketing, supply chain management, and customer support (Flyverbom et al., 2019). Organisations now have unprecedented opportunity to optimise processes, streamline operations, and provide more value to consumers thanks to advances in digital technologies such as artificial intelligence, big data analytics, cloud computing, and the Internet of Things (IoT). At the heart of exploiting technology for competitive advantage is the capacity to use data-driven insights to inform strategic decision-making. Organisations that use sophisticated analytics and predictive modelling can acquire a better understanding of market trends, client preferences, and future prospects, allowing them to anticipate changes and adjust proactively (Ajah et al., 2019). In an increasingly digitalized and hyperconnected world, the capacity to effectively harness technology has become a vital success factor for organisations looking to stay ahead of the curve and preserve a competitive advantage in the marketplace.

Furthermore, technology acts as a catalyst for innovation, allowing companies to produce new goods, services, and business models that disrupt established industries and generate new revenue. Whether through digital platforms, mobile applications, or smart gadgets, technology enables businesses to interact with customers in novel ways, providing personalised experiences and increasing brand loyalty. However, realising the full potential of technology takes more than simply implementing the most recent tools and solutions, it needs a strategic approach to technology management, which includes elements such as digital strategy formation, IT infrastructure investment, talent development, and cybersecurity. Organisations should integrate technology projects with overall business goals to ensure that technology investments result in long-term competitive advantage (Hanelt et al., 2021).

Despite rising recognition of the necessity of using technology to gain a competitive edge, there is still a significant research vacuum in understanding the factors that influence the effective adoption and utilisation of technology initiatives within organisations. While existing literature sheds light on the potential benefits of technology adoption, there is little empirical research into the specific problems and hurdles that prevent organisations from effectively exploiting technology to create a competitive advantage. One notable study gap concerns the synchronisation of technological projects with broader corporate objectives. While research has highlighted the importance of strategic alignment in maximising the impact of technology expenditures, there has been no detailed systematic investigation of the elements that enable or impede alignment inside organisations. Furthermore, the literature lacks empirical information about the efficacy of various approaches to technology deployment and use. While theoretical frameworks and best practices exist, there is a scarcity of research that investigates organisations' real-world experiences in deploying technology solutions, overcoming implementation problems, and realising expected advantages. This gap impedes the creation of evidence-based plans and recommendations for organisations looking to use technology for competitive advantage.

Furthermore, there is a need for research into the effects of technology on labour dynamics and organisational capacity. Organisations encounter issues in talent acquisition, workforce development, and change management as operations become more automated and new digital skills are required. However, empirical research on these areas is still scarce, limiting our understanding of the consequences of technology for organisational structures, human resource practices, and worker dynamics. Addressing these research gaps necessitates multidisciplinary approaches that combine ideas from management, information systems, and organisational behaviour. Researchers can gain valuable insights into the complex dynamics of technology adoption by researching, which can then be used to develop effective strategies for leveraging technology for competitive advantage in a variety of organisational contexts.

In today's hypercompetitive business world, organisations from all industries face unprecedented obstacles in gaining and maintaining a competitive advantage (Azeem et al., 2021). With the rapid speed of technological innovation and digital disruption, organisations must leverage technology to remain relevant and achieve long-term success. Despite the potential benefits of technology adoption, many businesses struggle to successfully use technology to establish a competitive advantage.

Some organisations fail to integrate their technological projects with their overall company goals and strategic aspirations. As a result, technological investments may not directly contribute to increased competitiveness or meeting organisational objectives. This lack of congruence limits organisations' ability to fully leverage technology for strategic advantage. Inefficiencies, delays, and cost overruns are common issues while implementing technology solutions. Legacy system integration, insufficient technical competence, and opposition to change are all potential barriers to the successful deployment and utilisation of technology resources (Tabesh et al., 2019). These inefficiencies limit organisations' ability to reap the expected benefits of technology adoption.

Despite technology's promise as a catalyst of innovation, many organisations fail to cultivate an innovation and experimentation mindset. This could be due to organisational stagnation, risk aversion, or a lack of supportive environments for innovation and cooperation. As a result, businesses may miss out on opportunities to produce novel goods, services, or business models that set them apart from competitors and generate new sources of value. Organisations face increased risks associated with data security and privacy as they rely more on technology for data collecting, storage, and analytics (Tawalbeh et al., 2020). Cybersecurity concerns, data breaches, and regulatory compliance difficulties all present substantial obstacles for businesses looking to use technology for competitive advantage. Failure to appropriately address these concerns can undermine confidence, harm reputation, and subject organisations to legal and financial risks. The rapid growth of technology necessitates that organisations attract and retain talented personnel with experience in emerging technologies and digital skills. However, the demand for such expertise frequently exceeds supply, resulting in talent shortages and intense competition for elite talent. Furthermore, organisations may struggle to upskill existing personnel and develop a workforce capable of realising the full potential of technology (Hodder, 2020).

By aligning technology initiatives with strategic objectives, optimizing technology implementation processes, fostering a culture of innovation, prioritizing data security and privacy, and investing in talent development, organizations can overcome barriers and unlock the transformative potential of technology to gain a sustainable competitive edge in the marketplace (Broughel et al., 2019).

This study investigates the strategic role of technology in improving organisational performance, fostering innovation, and creating long-term value.

2. Literature Review

A. Concept of Technology

Technology conceptualization entails comprehending and defining the broad breadth of technology, its components, and its significance in numerous facets of human life and society. Technology is the application of scientific knowledge, tools, techniques, and procedures to solve practical issues, improve efficiency, and increase productivity in a variety of disciplines. It encompasses both concrete artefacts (machines, devices, and infrastructure) and intangible aspects (software, algorithms, and systems). Humayun (2021), opines that technology varies from traditional tools and machinery to cutting-edge digital advancements, with applications in healthcare, transportation, communication, agriculture, manufacturing, and other areas. Technology is made up of various fundamental components, including hardware, software, data, and human expertise. Physical items and equipment that enable the execution of technological functions are referred to as hardware. Examples include computers, smartphones, sensors, and machinery. Software consists of programmes, applications, and algorithms that control hardware operations and execute specified functions. Data is critical in technology because it serves as the foundation for analysis, decision-making, and innovation (Sami, 2019). Human expertise refers to the knowledge, skills, and creativity of those who design, develop, operate, and maintain technological systems.

Scientific discoveries, engineering advancements, market demands, and societal needs all drive the continuous evolution of technology. Innovation fuels technological progress by introducing novel ideas, methods, products, and services that push the boundaries of what is possible (Li et al., 2019). Technological innovation often results from interdisciplinary collaboration, combining insights from fields such as science, engineering, design, and business to address complex challenges and create transformative solutions. Technology has profound effects on individuals, communities, organizations, and societies, shaping behavior, lifestyles, economies, and cultures. It provides opportunities for empowerment, connectivity, and success by allowing people to access information, resources, and opportunities like never before. However, technology also creates obstacles and risks, such as ethical quandaries, privacy concerns, inequality, and environmental effect (Singh et al., 2020). Understanding technology's multiple consequences is critical for successfully navigating its benefits and difficulties.

Adoption and integration of technology refer to the process of implementing technological advancements into current systems, procedures, and workflows. Successful adoption necessitates resolving challenges such as cost, complexity, aversion to change, and skill gaps, as well as promoting usability, compatibility, and alignment with organisational goals. Integration entails using technology to optimise operations, improve performance, and achieve strategic goals, whether in business, education, healthcare, governance, or other fields. Technology conceptualization entails recognising its various components, comprehending its evolution and influence, encouraging innovation and acceptance, and addressing the issues and opportunities it provides in today's society. Adopting a comprehensive view of technology allows individuals, organisations, and communities to capitalise on its revolutionary potential while limiting its hazards and guaranteeing its ethical usage for the benefit of everyone. The concept of technology refers to the use of information, tools, and procedures to solve problems, achieve objectives, and better the human condition (Elia et al., 2020). It entails the methodical use of scientific ideas, engineering methods, and practical skills to produce artefacts, systems, and processes that serve a variety of functions. At its foundation, technology is about solving problems and meeting demands through innovation. It entails identifying problems, comprehending underlying ideas, and devising novel solutions using available resources and knowledge. Whether it's constructing a new medical gadget, optimising industrial processes, or developing digital communication platforms, technology seeks to increase efficiency, effectiveness, and outcomes in a variety of sectors.

Technology refers to a wide range of instruments, procedures, and methodologies that enable the completion of specific activities or goals (Mangal et al., 2019). These include physical devices, machinery, equipment, instruments, materials, software applications, algorithms, and systems. From simple hand tools like hammers and ploughs to sophisticated technologies like artificial intelligence and blockchain, technological instruments and procedures are evolving and expanding in complexity and capability.

Technology is distinguished by continual innovation and advancement, which are motivated by scientific discoveries, technical advances, and societal necessities. It refers to the process of developing new ideas, concepts, designs, and functionalities that push the limits of what is achievable (Warner et al., 2019). Technological innovations frequently result in increases in productivity, quality of life, sustainability, and human well-being, propelling societal growth and wealth. Technology has applications in almost every element of human life and activity, including communication, transportation, healthcare, education, entertainment, agriculture, finance, and governance (Balaji et al., 2019). Its impact is far-reaching and revolutionary, influencing how people live, work, interact, and organise themselves. From the internet and smartphones to renewable energy and biotechnology, technology has transformed civilization, allowing for unparalleled levels of connectivity, convenience, and potential. As technology improves and pervades all aspects of society, it creates significant ethical, social, and cultural concerns. Questions concerning privacy, security, equity, accountability, and sustainability arise as technology becomes more incorporated into daily life. To guarantee that technology serves the common good and supports human flourishing, it is necessary to balance its benefits with its possible hazards and unintended effects. This involves thoughtful deliberation, responsible governance, and ethical decision-making.

In essence, the concept of technology includes not only the actual artefacts and systems developed by human ingenuity, but also the underlying concepts, processes, and values that drive innovation and shape its influence on individuals, communities, and the world as a whole. Understanding technology entails acknowledging its dynamic nature, respecting its potential and limitations, and grappling with its ethical and societal implications in the search of a better future.

B. Concept of Competitive Advantage

Competitive advantage is the cornerstone of success for businesses in all industries. It includes the distinctive qualities and capabilities that allow a company to outperform its competitors in the marketplace. Competitive advantage is fundamentally based on the concept of distinction (Agustian et al., 2023). Companies strive to stand out by providing something unique that distinguishes them from competition. This could be accomplished through new products or services that address client demands in novel ways. Companies can stay ahead of the curve by spending in research and development on a regular basis, releasing new features or technologies that capture customers while keeping competitors at away. However, differentiation is not the only way to gain a competitive edge. Some companies pursue a cost leadership strategy, aiming to be the lowest-cost producer in their field. They reduce costs through operational efficiencies, economies of scale, and technological advances, allowing them to provide products or services at lower prices than competitors (Juniarti et al., 2021). This strategy can be especially effective in price-sensitive economies where consumers value affordability.

Furthermore, niche tactics help businesses to establish a specialised position in the market. They may foster deep ties and brand loyalty by tailoring their products to certain customer categories. This technique enables businesses to better understand and address the specific needs of its niche, resulting in a competitive edge that larger competitors struggle to match. Innovation is another important source of economic advantage (Aharoni, 2024). Companies that push the limits of what is possible might pioneer new goods, methods, or business strategies that disrupt or establish totally new markets. This necessitates a culture of innovation and experimentation, in which risk-taking is encouraged and failure is regarded as a vital step towards success. Companies that embrace innovation not only distinguish themselves from competition, but also future-proof their operations against changing market conditions. Strategic alliances and partnerships can help businesses gain a competitive edge by combining complementary skills and resources. Companies can gain access to new markets, technologies, and distribution methods by collaborating with other organisations. These collaborations can help to encourage innovation, accelerate growth, and boost competitiveness in an increasingly interconnected global economy.

Furthermore, brand equity and reputation are important drivers of competitive advantage (Gupta et al., 2020). A successful brand connects with customers, inspiring trust, loyalty, and a readiness to pay higher costs.

Building a reputable brand necessitates constant delivery of high-quality products or services, efficient marketing and communication tactics, and an unwavering commitment to customer satisfaction. Companies that nurture great brands not only distinguish themselves from competition, but also establish long-term relationships with customers that go beyond transactional transactions (Iglesias et al., 2019). In essence, competitive advantage is dynamic and multidimensional, necessitating a comprehensive strategy that includes differentiation, cost leadership, innovation, strategic partnerships, brand equity, and supply chain planning. Companies that understand and effectively use their particular strengths are better positioned to flourish in today's highly competitive business environment. Competitive advantage refers to a company's distinct characteristics or capabilities that allow it to outperform its competitors in the marketplace (Tu et al., 2021). It is what distinguishes a firm and offers it an advantage over competitors, allowing it to attract customers, increase sales, and achieve superior profitability. Companies can differentiate themselves by providing distinctive products, services, or experiences that customers value. This could include innovative features, high-quality products, excellent customer service, or great brand recognition. Some companies get a competitive edge by becoming the lowest-cost producer in their field. They can attract price-sensitive clients by offering their products or services at cheaper rates than competitors thanks to efficient operations, economies of scale, or technology developments that reduce costs. Another option is to target a certain market segment or niche. Companies can design specialised products or services that resonate powerfully with their target audience by catering to their specific requirements or preferences, thereby increasing customer loyalty and boosting demand. Companies that innovate and constantly improve their offerings might acquire a competitive advantage by staying ahead of the pack (Abdulwase et al., 2020). This could entail creating new products, processes, or business models to disrupt existing markets or build wholly new ones, thereby gaining market share and generating growth. Strong brand equity and a strong reputation can provide significant competitive advantages. Trusted, respected, and well-known brands can fetch higher pricing, attract loyal customers, and outperform lesser-known competitors. Collaboration with other organisations via strategic alliances, partnerships, or joint ventures can provide access to complementary resources, competencies, or markets that would be difficult to obtain on their own. These collaborations can boost competitiveness by broadening reach, sharing risks, and accelerating innovation (Fontoura et al., 2022).

C. Dynamic Capabilities Theory of Leveraging Technology for Competitive Advantage

The Dynamic Capabilities theory can successfully explain how technology might be used to gain a competitive advantage. Teece, Pisano, and Shuen developed Dynamic Capabilities theory in the 1990s, which emphasises a firm's ability to adapt, innovate, and dynamically orchestrate resources and capabilities in order to respond to changing market conditions and gain a competitive edge. Dynamic capabilities are processes, routines, and managerial practices that allow companies to integrate, build, and reconfigure internal and external resources to adapt to changing situations (Chirumalla, 2021). These capabilities include identifying opportunities and threats, seizing opportunities through inventive actions, and restructuring resources and capabilities to capitalise on opportunities and mitigate threats. Dynamic capabilities are deemed vital for sustaining competitive advantage in dynamic, uncertain, rapidly changing market and traditional sources of competitive advantage may become outmoded or unsustainable.

In today's digital, global, and disruptive business contexts, technology is essential for enabling dynamic capabilities and achieving competitive advantage (Zhou et al., 2019). Technology provides firms with real-time data, analytics, and market insights, allowing them to better detect emerging trends, client preferences, and competition threats. Advanced technologies like big data analytics, artificial intelligence, machine learning, and the internet of things (IoT) make predictive analytics, trend analysis, and market segmentation easier, allowing businesses to uncover new prospects for innovation and growth. According to dynamic capabilities theory, once opportunities are discovered, organisations must act quickly and decisively to capitalise on them through innovative measures. Technology enables businesses to innovate more quickly by optimising product development processes, shortening time-to-market, and encouraging cooperation and co-creation with customers, partners, and stakeholders (Ranta et al., 2021). Agile approaches, rapid prototyping, and digital platforms enable

iterative experimentation, fast feedback loops, and agile decision-making, allowing businesses to respond swiftly to market changes and customer feedback.

Technology also enables businesses to dynamically reconfigure internal and external resources and capabilities in order to capitalise on opportunities and mitigate threats. Cloud computing, software-as-a-service (SaaS), and platform ecosystems offer scalable and flexible infrastructure, allowing businesses to get processing power, storage, and software applications on demand and at a cheaper cost. Digital platforms and ecosystems make it easier to orchestrate resources and co-create value across organisational boundaries, allowing businesses to use complementary resources and competencies from partners, suppliers, and customers (Mukhopadhyay et al., 2019). Furthermore, blockchain and smart contracts offer secure and transparent transactions, supply chain optimisation, and decentralised governance, all of which improve the agility, resilience, and trust of business ecosystems. Companies can improve their competitiveness and establish long-term competitive advantage by using technology to dynamically sense, grasp, and reorganise resources. Technology enables businesses to continuously innovate, differentiate their offers, and develop distinct value propositions for their customers. Companies can use modern technologies like artificial intelligence, machine learning, and robots to produce novel goods, services, and business models that answer unmet customer requirements, disrupt existing markets, and open up new market opportunities (Crittenden et al., 2019). Technology helps businesses simplify operations, automate procedures, and increase efficiency and agility. Companies that use digital technologies such as robotic process automation, the internet of things (IoT), and autonomous systems can optimise production, logistics, and supply chain management, cut costs, and improve response to market changes and consumer needs. Technology enables businesses to improve customer engagement and experience by providing personalised, multichannel experiences. Companies can use digital platforms, social media, and customer relationship management (CRM) systems to communicate with customers in real time, deliver personalised products, services, and recommendations, and establish long-term relationships and brand loyalty.

Technology helps businesses increase their strategic flexibility and adaptability to changing market conditions, regulatory requirements, and competitive threats (Miroshnychenko et al., 2021). Companies that use digital technologies such as cloud computing, edge computing, and software-defined infrastructure can dynamically grow operations, pivot business models, and enter new markets or industries at a lower cost. Leveraging technology for competitive advantage entails using dynamic capabilities theory to detect opportunities, capitalise on them through innovation, and dynamically rearrange resources and capabilities. Companies can improve their competitiveness, gain a sustainable competitive advantage, and create long-term value for shareholders and stakeholders by employing innovative technologies to perceive market trends, innovate quickly, and effectively orchestrate resources (Fachrunnisa et al., 2020).

D. Empirical Review on Technology and Competitive Advantage

Pietrewicz (2019), investigated technology, business structures, and competitive advantage in the era of Industry 4.0. The study's goal is to examine how BMs and BMI relate to technological innovation in defining enterprises' competitive advantage in the era of Industry 4.0. Because the topic is far too wide for a single empirical investigation, the author's goal is to build the theoretical framework for future empirical research. To do this, the integration and reinterpretation of numerous distinct streams of managerial literature is necessary, and interpretative literature review has been chosen as the most appropriate research method. The study demonstrates that BMs (and hence BMI) mediate in the commercialization of innovative technologies, build on and utilise technological innovation, elicit and stimulate such innovation, and cause disruption, changing rules of the game and triggering new waves of technology innovation. BMI, as a distinct sort of innovation, has the potential to provide a greater competitive advantage than technology innovation. These findings imply that focusing on technical innovation while downplaying BMI will result in a limited understanding of the sources of competitive advantage in the age of Industry 4.0.

Saeidi et al. (2019), examined the impact of corporate risk management on competitive advantage through the moderating role of information technology. The primary goal of this study is to investigate the impact of Enterprise Risk Management (ERM) on Competitive Advantage (CA) by moderating the function of information technology

dimensions such as Information Technology (IT) strategy and Information Technology (IT) structure. A self-administered survey of Iranian financial institutions yielded a total of 84 valid questionnaires. The data analysis and hypothesis testing were carried out using the Partial Least Squares Structural Equation Modelling (PLS-SEM) technique. The findings of this study revealed that ERM has a favourable link with enterprises' competitive advantage. The findings also revealed that IT strategy and structure had a direct impact on competitive advantage as well as a moderating effect on the ERM-competitive advantage link. This study builds on earlier ERM studies by examining Iran as a developing country that has been overlooked in past empirical research. It also builds on earlier ERM research by experimentally examining ERM, IT, competitive advantage, and the relationships between them. The article gives insights on the importance of ERM implementation in organisations, which can lead to increased competitive advantage. Furthermore, this study has implications for manager planning and decision making by highlighting IT as one of the essential success aspects of ERM procedures.

Haseeb et al. (2019), analyzed the effect of social and technological hurdles in establishing a sustainable competitive advantage and business performance. The study's goal is to look into the roles that social and technological issues play in obtaining long-term competitive advantage and business performance. To achieve this goal, firsthand data were gathered from Malaysian SMEs. Managerial staff at these SMEs were asked about the roles of social and technological issues in attaining a sustained competitive advantage and business performance. Data was collected via an email survey. A total of 500 questionnaires were delivered to SMEs' managerial staff. The questionnaires were distributed using basic random sampling. The study's findings, which were based on structural equation modelling, demonstrated that social and technological obstacles played significant roles in improving long-term competitive advantage and performance. Furthermore, strategic alignment was critical in demonstrating the favourable effects of social and technological elements on long-term competitive advantage. The study's findings will help practitioners develop strategies that reflect long-term competitive advantages and corporate performance.

Distanont et al. (2020) studied the importance of innovation in achieving a competitive edge. The study looked at how small and medium-sized businesses use innovation to gain a competitive advantage in the frozen food industry. The study process was divided into three parts: 1) a literature review; 2) an empirical research study that used questionnaires to collect data; and 3) an analysis and conclusion of the research findings using exploratory factor analysis (EFA), confirmatory factor analysis (CFA), and structural equation modelling (SEM). The data revealed that innovation increased the advantages in competitiveness through external variables. These external elements were separated into two categories: micro-oriented and macro-oriented factors. External influences at the micro level had a greater impact on the innovation development of frozen food enterprises than those at the macro level. The results demonstrated that entrepreneurs, especially SME entrepreneurs, need to adjust and readily equip themselves to face impending economic changes, which would occur not only at the global level but also at the regional and the country levels. In addition to the internal contexts within the organisation, external influences are significant, particularly those that will lead to the creation of innovation. Innovation will become a strategic weapon in this critical competition for company improvement, creation, and enhancement in order to establish competitive advantages equivalent to or greater than those in foreign countries and achieve sustainable development.

Nimfa et al. (2020), examined manufacturing SMEs' fundamental dynamic competencies including innovation, competitive advantage, product quality, and technology adoption. The goal of this study was to look at the impact of two components of innovation competitive advantage, namely customer preference and strategic business model, on product quality for sustainable growth in SMEs. It also looked into the mediating effect of technology adoption on the relationship between innovation, competitive advantage, and product quality. Survey data from 245 Nigerian manufacturing SMEs was collected and analysed using partial least squares structural equation modelling. The findings demonstrated that while customer preference does not have a direct impact on product quality, technological adoption does. The strategic business model was found to have a considerable favourable impact on product quality, which was also mediated by technology adoption.

Azeem et al. (2021) conduct empirical research into the relationship between organisational culture, knowledge sharing, organisational innovation, and competitive advantage. Data were obtained from 294 industrial managers,

and PLS-SEM was utilised to validate the findings and investigate the hypothesised associations. The findings indicated that organisational culture, information sharing, and organisational innovation all had a favourable impact on competitive advantage. More specifically, organisational culture encourages knowledge sharing and creativity among employees and connects them to high-level business procedures that may be beneficial to obtaining sophisticated manufacturing capabilities. The current study found that organisational culture is critical to company operational performance, and knowledge-sharing and organisational innovation appear to be major drivers of competitive advantage.

Prabowo et al. (2021), investigated the impact of information and communication technology on the competitive advantage of foreign businesses in Indonesia. The study's goal is to look into the impact of ICT on the accounting practices of international enterprises in Indonesia. The data was gathered from 300 multinational company managers using a straightforward sampling technique. The study used a cross-sectional research design with a quantitative approach. The findings from Partial Least Squares (PLS)-Structural Equation Modelling (SEM) indicate that ICT has a favourable and significant impact on CA. These findings indicate that this study could assist owners or managers in understanding the value of investing in ICT, which could lead to an improvement in the organization's CA. Based on these findings, it is also suggested that if businesses focus more on the adoption of ICT in their operations, they can help to propel their countries' economies. Regardless, adequate procedures should be implemented to ensure effective monitoring and fortitude of the ideal size required to create a competitive advantage.

Farida et al. (2022), examined corporate strategies and competitive advantage, specifically the role of performance and innovation. The study's goal is to look into how business strategies might help small and medium-sized firms (SMEs) gain a competitive advantage. Furthermore, our research examines the role of performance and innovation as mediators in the relationship between corporate strategy and competitive advantage. The study's sample size is 150 small and medium-sized enterprises in the construction and real estate industries. The findings indicate that company strategies have a favourable effect on competitive advantage. Better business strategies boost SMEs' competitiveness. Furthermore, company performance and innovation serve as intermediaries between corporate strategy and competitive advantages. These findings demonstrate the relevance of performance and innovation in increasing competitive advantage. It is proposed that SMEs increase their performance and innovation capabilities in order to strengthen their competitive position.

Shah (2022), explored if big data analytics may help organisations attain a sustained competitive edge. According to the study, the digital revolution is causing a fundamental and rapid transformation in society. Firms are thus seeking for novel strategies to attract, please, and keep clients as their demands and expectations evolve. Such novel approaches represent the firms' pursuit for a competitive advantage. However, in this digital age, nearly all classic "Porterian" competitive advantage barriers are impossible to maintain. Furthermore, COVID has caused a significant increase in the speed of digitization. Can the massive data created by today's digitally equipped entities be judiciously coupled with other business resources? Can this vast data be converted into relevant knowledge that businesses can use to sustain and grow? Can big data offer a sustainable competitive advantage? The study uses a knowledge-based methodology examined through a resource-based view from the strategic management domain to arrive at the result and introduces a comprehensive framework that includes the following: (i) firm knowledge, (ii) managerial skills and decision-making, (iii) long-term competitive advantage, and (iv) big data analytics.

3. Method

The dynamic capabilities theory offers a robust methodology for analyzing leveraging technology on competitive advantage by focusing on the strategic management of resources and capabilities, innovation and learning processes, strategic decision-making, and long-term adaptation to changing environments. By analyzing this theory, researchers and practitioners can gain valuable insights into how technology influences competitiveness and inform strategic actions to enhance firm performance.

Utilizing the dynamic capabilities theory to analyze the leveraging of technology for competitive advantage reveals a multifaceted approach that encompasses sensing opportunities, seizing opportunities through innovation,

and reconfiguring resources to capitalize on technological advancements. The dynamic capabilities theory provides a comprehensive framework for analyzing the effect of technology on competitive advantage.

4. Results and Discussion

In today's hyper-competitive business environment, leveraging technology has become imperative for organizations seeking sustainable competitive advantage. This discussion explores the results of leveraging technology for competitive advantage, drawing insights from contemporary business practices and theoretical frameworks.

Dynamic Capabilities	Description	Current Happenings	Comparison
Sensing Opportunities	Emphasizes the importance of continuously monitoring the market, industry trends, and customer preferences to identify emerging opportunities. This capability involves the ability of a firm to detect changes in the external environment and identify emerging opportunities before competitors do. It requires continuous scanning of the market, monitoring of industry trends, and analysis of customer needs and preferences. Involves the ability to sense changes in the business environment and identify opportunities for competitive advantage.	Many companies are investing in advanced data analytics, AI, and machine learning to gain insights into consumer behavior, market trends, and competitive dynamics. Real-time data analytics and predictive modeling are increasingly used to stay ahead in dynamic and competitive markets.	The theory aligns with current practices, emphasizing the value of data-driven insights in identifying and capitalizing on market opportunities. However, there's a growing emphasis on real-time analytics and predictive modeling for agility and competitiveness. - Companies invest in sophisticated data analytics tools, artificial intelligence (AI), and machine learning algorithms to analyze vast amounts of data and extract actionable insights about market trends, consumer behavior, and competitive dynamics. - Utilizing customer relationship management (CRM) systems and social media monitoring tools to gather real-time feedback from customers, understand their preferences, and identify emerging trends or unmet needs. - Engaging in technology scouting programs to monitor advancements in relevant fields, such as emerging technologies, disruptive innovations, and regulatory changes, and assessing their potential impact on the industry and the firm's competitive position.
Seizing Opportunities through Innovation	Highlights the need for creativity, agility, and collaboration to develop novel products, services, or business models that differentiate the firm from competitors. This capability involves the ability of a firm to translate identified opportunities into innovative products, services, or business models that create value for customers and differentiate the firm from competitors. It requires creativity, agility, and a willingness to experiment and take calculated risks.	Companies across industries are leveraging emerging technologies such as blockchain, IoT, and augmented reality to innovate and differentiate themselves. Disruptive innovation and breakthrough technologies are increasingly used to create new market opportunities and challenge established incumbents.	The theory remains relevant, emphasizing innovation as a key driver of competitive advantage. However, there's an increasing emphasis on disruptive innovation and breakthrough technologies for market disruption and differentiation. Companies foster a culture of innovation, invest in research and development, and collaborate with external partners to develop new products, services, or business models that leverage cutting-edge technologies. - Fostering a culture of innovation by encouraging employees to generate and share ideas, experiment with new technologies, and collaborate across functions and departments. - Investing in research and development (R&D) activities to explore new technologies, develop prototypes, and test innovative solutions that

Dynamic Capabilities	Description	Current Happenings	Comparison
			address identified market needs or capitalize on emerging trends. - Collaborating with external partners, such as startups, research institutions, or technology vendors, to access complementary expertise, resources, and technologies, and co-create innovative products or services.
Reconfiguring Resources	Stresses the importance of dynamically reconfiguring resources to adapt to changing market conditions and exploit emerging opportunities. This involves investing in digital transformation, adopting agile methodologies, and upskilling employees in digital competencies. This capability involves the ability of a firm to reconfigure its internal and external resources and capabilities dynamically to adapt to changing market conditions and exploit emerging opportunities. It requires flexibility, agility, and the ability to integrate and leverage diverse assets effectively.	Companies are undergoing digital transformation initiatives to modernize operations, enhance agility, and improve customer experiences. Traditional retailers are investing in e-commerce platforms, while manufacturing companies adopt Industry 4.0 technologies.	The theory resonates with current trends, highlighting the importance of agility and flexibility in responding to technological disruptions and market shifts. There's also an emphasis on organizational culture and change management for successful digital transformations. - Investing in digital transformation initiatives to modernize IT infrastructure, migrate to cloud-based systems, and digitize business processes, enabling greater agility, scalability, and responsiveness to market changes. - Adopting agile methodologies and cross-functional collaboration practices to enable faster decision-making, iterative development, and continuous improvement of products, services, and processes. - Upskilling employees in digital competencies, such as data analytics, programming, and cybersecurity, to enhance their ability to leverage technology effectively and drive innovation across the organization.

This detailed matrix table provides a comprehensive comparison of the dynamic capabilities theory with current happenings in the business world, outlining specific examples and highlighting the relevance of the theory in understanding and navigating technological change and competitive dynamics.

From the matrix table it is revealed that the dynamic capabilities theory emphasizes the importance of sensing opportunities through continuous monitoring of the market, industry trends, and customer preferences. In today's business landscape, companies are increasingly investing in advanced data analytics, AI, and machine learning to gain insights into consumer behavior, market trends, and competitive dynamics. For example, companies like Amazon and Netflix use sophisticated algorithms to analyze customer data and personalize recommendations, enhancing customer experience and driving competitive advantage. The theory aligns with current practices, as companies recognize the value of data-driven insights in identifying and capitalizing on market opportunities. However, there's a growing emphasis on real-time data analytics and predictive modeling to stay ahead in dynamic and competitive markets.

Dynamic capabilities theory underscores the importance of seizing opportunities through innovation, involving creativity, agility, and collaboration to develop novel products, services, or business models. Many companies are leveraging emerging technologies such as blockchain, IoT, and augmented reality to innovate and differentiate themselves in the market. For instance, companies like Tesla disrupt the automotive industry by introducing electric vehicles and self-driving technology, while fintech startups revolutionize banking and finance through digital payment solutions and blockchain-based platforms.

The theory remains relevant in today's context, as innovation continues to be a key driver of competitive advantage. However, there's an increasing emphasis on disruptive innovation and breakthrough technologies to create new market opportunities and challenge established incumbents. The dynamic capabilities theory emphasizes the need for companies to reconfigure resources dynamically to adapt to changing market conditions and exploit emerging opportunities. This involves investing in digital transformation, adopting agile methodologies, and upskilling employees in digital competencies.

Companies across industries are undergoing digital transformation initiatives to modernize their operations, enhance agility, and improve customer experiences. For example, traditional retailers are investing in e-commerce platforms and omnichannel strategies to compete with online giants like Amazon, while manufacturing companies adopt Industry 4.0 technologies to optimize production processes and supply chain operations. The theory resonates with current trends, as companies recognize the importance of agility and flexibility in responding to technological disruptions and market shifts. However, there's a growing emphasis on organizational culture and change management to foster a digital-ready workforce and facilitate successful digital transformations.

Technology serves as a catalyst for innovation, enabling organizations to develop novel products, services, and business models that differentiate them from competitors. Emerging technologies such as artificial intelligence, Internet of Things (IoT), and blockchain empower companies to reimagine processes, create disruptive solutions, and capitalize on new market opportunities.

Innovation ecosystems, open innovation initiatives, and collaboration with startups and technology partners foster creativity and experimentation. By embracing a culture of innovation and investing in research and development (R&D), organizations can drive continuous improvement and stay ahead of the competition.

Organizations that effectively leverage technology establish a sustainable competitive advantage by continuously adapting to market changes, anticipating customer needs, and innovating at scale. By building dynamic capabilities and embracing digital transformation, companies create barriers to entry, strengthen market position, and drive long-term value creation. Strategic investments in technology infrastructure, talent development, and innovation initiatives enable organizations to future-proof their businesses and maintain relevance in rapidly evolving markets. By aligning technology initiatives with business strategy and customer-centricity, companies can achieve sustainable growth and competitive resilience.

5. Conclusion and Recommendations

In conclusion, the dynamic capabilities theory remains highly relevant in today's business environment, as evidenced by the ongoing emphasis on sensing opportunities, seizing opportunities through innovation, and reconfiguring resources to leverage technology for competitive advantage. However, there are nuances and evolving dynamics in how companies implement these principles, reflecting the rapidly changing nature of technology and markets. Overall, the theory provides a robust framework for understanding and navigating the complexities of technological change and competitive dynamics in the modern business landscape.

Leveraging technology for competitive advantage is essential for organizations navigating the complexities of the modern business landscape. Through the adoption of advanced technologies, organizations can enhance operational efficiency, improve customer experience, drive innovation, and achieve sustainable growth. The results of leveraging technology for competitive advantage are evident across various facets of business operations, from streamlined processes and enhanced agility to personalized customer interactions and strategic decision-making. The results of leveraging technology for competitive advantage are multifaceted, encompassing enhanced operational efficiency, improved customer experience, innovation-driven differentiation, data-driven decision-making, and sustainable competitive advantage. By embracing technology as a strategic enabler and investing in digital capabilities, organizations can thrive in today's digital economy and position themselves for long-term success.

Furthermore, technology serves as a catalyst for organizational transformation, enabling companies to adapt to changing market dynamics, capitalize on emerging opportunities, and differentiate themselves from competitors.

By investing in digital capabilities, fostering a culture of innovation, and aligning technology initiatives with business strategy, organizations can establish a strong foundation for long-term success in today's digital economy.

Based on the insights gathered from the discussion on leveraging technology for competitive advantage, the following recommendations are proposed:

Organizations should prioritize investments in digital transformation initiatives to modernize infrastructure, digitize processes, and build agile capabilities. This includes adopting cloud computing, implementing data analytics tools, and leveraging emerging technologies such as AI, IoT, and blockchain to drive innovation and operational excellence.

To enhance competitive advantage, organizations should prioritize customer-centric strategies and leverage technology to deliver personalized, seamless experiences across all touchpoints. This involves investing in CRM systems, data analytics, and omnichannel platforms to understand customer needs, anticipate preferences, and build lasting relationships.

Cultivating a culture of innovation is essential for driving continuous improvement and differentiation. Organizations should encourage experimentation, reward creative thinking, and provide employees with the resources and support needed to pursue innovative ideas. Collaboration with external partners, such as startups and research institutions, can also foster a culture of innovation and accelerate the development of disruptive solutions.

Data-driven decision-making is critical for informed strategic planning and performance optimization. Organizations should invest in business intelligence tools, predictive analytics, and data visualization platforms to transform data into actionable insights. Real-time monitoring of key performance indicators (KPIs) and market trends enables agile decision-making and proactive risk management.

In today's rapidly changing business environment, organizations must remain agile and adaptable to stay ahead of the competition. This involves monitoring market trends, evaluating competitive threats, and proactively adjusting strategies and operations to capitalize on emerging opportunities. By embracing change and embracing a mindset of continuous improvement, organizations can maintain a competitive edge in the digital era.

Declaration of Competing Interest:

No conflicts declared.

References

[1] Abdulwase, R., Ahmed, F., Nasr, F., Abdulwase, A., Alyousofi, A., & Yan, S. (2020). The role of business strategy to create a competitive advantage in the organization. *Open Access J Sci*, *4*(4), 135-138.

[2] Agustian, K., Mubarok, E. S., Zen, A., Wiwin, W., & Malik, A. J. (2023). The Impact of Digital Transformation on Business Models and Competitive Advantage. *Technology and Society Perspectives (TACIT)*, *1*(2), 79-93.

[3] Aharoni, Y. (2024). How small firms can achieve competitive advantage in an interdependent world. In *Standing on the Shoulders of International Business Giants* (pp. 263-274).

[4] Ajah, I. A., & Nweke, H. F. (2019). Big data and business analytics: Trends, platforms, success factors and applications. *Big data and cognitive computing*, *3*(2), 32.

[5] Azeem, M., Ahmed, M., Haider, S., & Sajjad, M. (2021). Expanding competitive advantage through organizational culture, knowledge sharing and organizational innovation. *Technology in Society*, *66*, 101635.

[6] Azeem, M., Ahmed, M., Haider, S., & Sajjad, M. (2021). Expanding competitive advantage through organizational culture, knowledge sharing and organizational innovation. *Technology in Society*, *66*, 101635.

[7] Balaji, S., Nathani, K., & Santhakumar, R. (2019). IoT technology, applications and challenges: a contemporary survey. *Wireless personal communications*, *108*, 363-388.

[8] Broughel, J., & Thierer, A. D. (2019). Technological innovation and economic growth: A brief report on the evidence. *Mercatus Research Paper*.

[9] Chatterjee, S., Moody, G., Lowry, P. B., Chakraborty, S., & Hardin, A. (2020). Information Technology and organizational innovation: Harmonious information technology affordance and courage-based actualization. *The Journal of Strategic Information Systems*, *29*(1), 101596.
[10] Chirumalla, K. (2021). Building digitally-enabled process innovation in the process industries: A dynamic capabilities approach. *Technovation*, *105*, 102256.
[11] Crittenden, W. F., Biel, I. K., & Lovely III, W. A. (2019). Embracing digitalization: Student learning and new technologies. *Journal of marketing education*, *41*(1), 5-14.
[12] Distanont, A., & Khongmalai, O. (2020). The role of innovation in creating a competitive advantage. *Kasetsart Journal of Social Sciences*, *41*(1), 15-21.
[13] Elia, G., Margherita, A., & Passiante, G. (2020). Digital entrepreneurship ecosystem: How digital technologies and collective intelligence are reshaping the entrepreneurial process. *Technological forecasting and social change*, *150*, 119791.
[14] Fachrunnisa, O., Adhiatma, A., Lukman, N., & Ab Majid, M. N. (2020). Towards SMEs' digital transformation: The role of agile leadership and strategic flexibility. *Journal of Small Business Strategy*, *30*(3), 65-85.
[15] Farida, I., & Setiawan, D. (2022). Business strategies and competitive advantage: the role of performance and innovation. *Journal of Open Innovation: Technology, Market, and Complexity*, *8*(3), 163.
[16] Flyverbom, M., Deibert, R., & Matten, D. (2019). The governance of digital technology, big data, and the internet: New roles and responsibilities for business. *Business & Society*, *58*(1), 3-19.
[17] Fontoura, P., & Coelho, A. (2022). More cooperative... more competitive? Improving competitiveness by sharing value through the supply chain. *Management Decision*, *60*(3), 758-783.
[18] Gupta, S., Gallear, D., Rudd, J., & Foroudi, P. (2020). The impact of brand value on brand competitiveness. *Journal of Business Research*, *112*, 210-222.
[19] Hanelt, A., Bohnsack, R., Marz, D., & Antunes Marante, C. (2021). A systematic review of the literature on digital transformation: Insights and implications for strategy and organizational change. *Journal of management studies*, *58*(5), 1159-1197.
[20] Haseeb, M., Hussain, H. I., Kot, S., Androniceanu, A., & Jermsittiparsert, K. (2019). Role of social and technological challenges in achieving a sustainable competitive advantage and sustainable business performance. *Sustainability*, *11*(14), 3811.
[21] Hodder, A. (2020). New Technology, Work and Employment in the era of COVID-19: reflecting on legacies of research. *New technology, work and employment*, *35*(3), 262-275.
[22] Humayun, M. (2021). Industrial revolution 5.0 and the role of cutting edge technologies. *International Journal of Advanced Computer Science and Applications*, *12*(12).
[23] Iglesias, O., Markovic, S., Singh, J. J., & Sierra, V. (2019). Do customer perceptions of corporate services brand ethicality improve brand equity? Considering the roles of brand heritage, brand image, and recognition benefits. *Journal of business ethics*, *154*, 441-459.
[24] Juniarti, J., Simanjaya, C., Chandra, M., & Soesetyo, Z. E. (2021, March). Differentiation strategy and cost leadership strategy: Their contribution to achieving sustainable financial performance. In *International Conference on Business Excellence* (pp. 197-219). Cham: Springer International Publishing.
[25] Li, K., Qiu, J., & Wang, J. (2019). Technology conglomeration, strategic alliances, and corporate innovation. *Management Science*, *65*(11), 5065-5090.
[26] Mangal, S. K., & Mangal, U. (2019). *Essentials of educational technology*. PHI Learning Pvt. Ltd.
[27] Miroshnychenko, I., Strobl, A., Matzler, K., & De Massis, A. (2021). Absorptive capacity, strategic flexibility, and business model innovation: Empirical evidence from Italian SMEs. *Journal of Business Research*, *130*, 670-682.
[28] Mukhopadhyay, S., & Bouwman, H. (2019). Orchestration and governance in digital platform ecosystems: a literature review and trends. *Digital Policy, Regulation and Governance*, *21*(4), 329-351.
[29] Nimfa, D. T., Uzir, M. U. H., Maimako, L. N., Eneizan, B., Latiff, A. S. A., & Wahab, S. A. (2021). The impact of innovation competitive advantage on product quality for sustainable growth among SMES: An

empirical analysis. *International Journal of Business Science & Applied Management (IJBSAM)*, *16*(3), 39-62.

[30] Pietrewicz, L. (2019). Technology, business models and competitive advantage in the age of industry 4.0. *Problemy Zarządzania*, *17*(2 (82)), 32-52.

[31] Prabowo, H., & Sinaga, O. (2021). The Effect of Information and Communication Technology on Competitive Advantage of International Business in Indonesia. *Croatian International Relations Review*, *27*(88).

[32] Ranta, V., Aarikka-Stenroos, L., & Väisänen, J. M. (2021). Digital technologies catalyzing business model innovation for circular economy—Multiple case study. *Resources, conservation and recycling*, *164*, 105155.

[33] Saeidi, P., Saeidi, S. P., Sofian, S., Saeidi, S. P., Nilashi, M., & Mardani, A. (2019). The impact of enterprise risk management on competitive advantage by moderating role of information technology. *Computer standards & interfaces*, *63*, 67-82.

[34] Sami, A. (2019). SCADA (Supervisory Control and Data Acquisition).

[35] Shah, T. R. (2022). Can big data analytics help organisations achieve sustainable competitive advantage? A developmental enquiry. *Technology in Society*, *68*, 101801.

[36] Singh, S., Sharma, P. K., Yoon, B., Shojafar, M., Cho, G. H., & Ra, I. H. (2020). Convergence of blockchain and artificial intelligence in IoT network for the sustainable smart city. *Sustainable cities and society*, *63*, 102364.

[37] Tabesh, P., Mousavidin, E., & Hasani, S. (2019). Implementing big data strategies: A managerial perspective. *Business Horizons*, *62*(3), 347-358.

[38] Tawalbeh, L. A., Muheidat, F., Tawalbeh, M., & Quwaider, M. (2020). IoT Privacy and security: Challenges and solutions. *Applied Sciences*, *10*(12), 4102.

[39] Teece, D. J., & Pisano, G. (1994). The dynamic capabilities of firms: An introduction. Industrial and Corporate Change, 3(3), 537–556.Google Scholar

[40] Teece, D., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. Strategic Management Journal, 18(7), 509–533.Google Scholar

[41] Tu, Y., & Wu, W. (2021). How does green innovation improve enterprises' competitive advantage? The role of organizational learning. *Sustainable Production and Consumption*, *26*, 504-516.

[42] Warner, K. S., & Wäger, M. (2019). Building dynamic capabilities for digital transformation: An ongoing process of strategic renewal. *Long range planning*, *52*(3), 326-349.

[43] Zhou, S. S., Zhou, A. J., Feng, J., & Jiang, S. (2019). Dynamic capabilities and organizational performance: The mediating role of innovation. *Journal of management & organization*, *25*(5), 731-747.