© MAY 2023 | IRE Journals | Volume 6 Issue 11 | ISSN: 2456-8880
DOI: https://doi.org/10.64388/IREV6I11-1714496

Smart Enterprises: A Tech-Driven Framework for Next-Generation Business Administration

OLOWO-IGBASAN GBEMISOLA ADEDOYIN
Federal University of Technology Akure (FUTA)

Abstract*—The blistering development and adoption of digital technologies are changing the modern business landscape and putting strain on traditional management methods based on hierarchy, linear decision-making, and siloed operations. Even though technologies have been widely adopted, including artificial intelligence, the Internet of Things, big data analytics, cloud computing, and intelligent automation, there is a pressing need for a comprehensive system to guide organisations in their transformation into smart organisations. The study develops a conceptually sound, theoretically significant framework for business administration in the next generation by synthesising knowledge from the resource-based perspective and dynamic capabilities theory. The eight thematic pillars, smart technology infrastructure, digital leadership and governance, data analytics and intelligence, human capital and digital skills, cybersecurity and risk governance, sustainable innovation, organisational agility, and customer-centric digital systems are the fundamental dimensions that allow the organisation to operate in adaptive, responsive, and value-creating modes. Agility in organisations is designed as a key mediating process that unites technological assets, leadership focus, human assets, and systemic capabilities to promote innovation, competitive edge, and sustainable performance. It is a framework that goes beyond technology-deterministic approaches in acknowledging socio-technical interdependencies, development of algorithmic capabilities, and ecosystem dynamics, which define digitally enabled organisations. To practitioners and policymakers, the framework provides a strategic roadmap of where to invest to determine organisational preparedness, prioritize investments, and to deploy holistic digital transformation initiatives and create responsible innovation, environmental stewardship, and social value generation. The research helps to fill the gaps in the theoretical base and operational and strategic directions of smart enterprise development and empowers business leaders to go through the challenges of technology-focused, dynamic, and globalized business environments.

***Keywords:* Smart Enterprises, Digital Transformation, Resource-Based View, Dynamic Capabilities Theory, Organisational Agility, Technology-Driven Business Administration, Data Analytics.**

I. INTRODUCTION

The modern business environment is experiencing a revolution due to the high-paced development and adoption of digital technologies. The digital transformation has grown to be a strategic necessity, not a competitive advantage, and is essentially reinventing the value creation process, engagement with stakeholders, and competitive positioning of organisations in rapidly changing markets (Warner and Wagner, 2019). The conventional business administration models with the hierarchical forms, linear decision-making, and functional departmentalised operations are not sufficient to meet the challenges faced by the digital economy. These traditional methods are incapable of being agile, responsive and integrative in order to exploit the new technological opportunities (Teece, 2007). The drawbacks become especially obvious in the failure of organisations to manage large amounts of real-time information, respond quickly to market shocks, and use the interlocked digital ecosystems to provide a strategic benefit.

The advent of intelligent technologies such as artificial intelligence, Internet of Things, big data analytics, cloud computing, and intelligent automation has provided people with unprecedented opportunities to rethink business administration (Mikalef & Gupta, 2021). They are technologies that make it possible to process data in real-time, anticipate, make decisions autonomously, and integrate across organisational borders. Nevertheless, even with the high level of technological development, there is still a major research gap, namely, the lack of an integrated, all-encompassing framework that would help organisations to go through the process of turning smart enterprises in a systematised manner. Current literature is biased towards a single technology or specific dimensions of an organisation, not taking into account the conceptualisation of the synergistic relationship between technological, organisational and strategic

aspects to form intelligent adaptive business systems (Nambisan et al., 2017).

This paper intends to fill this gap by coming up with a conceptually sound theoretically-driven framework of smart enterprises in the next generation of business management. The research hypotheses will be in three parts: to summarise the current knowledge base on digital transformation and smart technologies in businesses; to determine and examine the main dimensions, which make up smart enterprise architecture, and to develop a comprehensive framework that connects theoretical and practical implementation paths. The theoretical contribution is that it has contributed to the academic knowledge of the way organisations can strategically transform themselves, beyond the conventional models into technology-based intelligent systems (Teece et al., 1997). To practice, the study can offer strategic advice to business executives and policymakers who may be in the digital transformation processes. This paper constructs an idea of smart enterprises in the next-generation business management.

II. CONCEPTUAL CLARIFICATIONS

An intelligent enterprise is a smart approach that provides a company with a strategic use of innovative digital technologies, data analytics, and intelligent systems to facilitate adaptive, responsive, and value-generating operations (Mikalef & Gupta, 2021). It is also characterised by connected processes, real-time decision making, autonomous systems and continuous learning processes unlike its traditional counterparts. Intelligent businesses go beyond the use of technology, representing a shift in culture, philosophy, and architecture. Its main features are built-in technological functionality of functions and capabilities, strategic planning based on data, predictive capabilities, automated decision-making, and collaboration in ecosystem (Nambisan et al., 2017). These organisations exhibit increased situational awareness, proactive management as well as self-optimisation on environmental feedback and internal analytics.

Digital transformation involves the extensive deployment of digital technologies to all organisational processes, which is a foundational change in the value creation and delivery (Warner and Wäger, 2019). Other than technological upgrading it consists of cultural change, process redesign, business model innovation as well as strategic repositioning. Change involves questioning assumptions, testability and constant changes. It is expressed in the form of customer experience improvement by means of personalisation and omnichannel interaction, operational efficiency by means of automation, innovation of business models as new sources of revenue and culture shifts towards agility and experimentation (Nambisan et al., 2017). Leadership dedication, staff capacity, technology infrastructure and change management skill are the keys to success.

The fourth industrial revolution (Industry 4.0) focuses on the automation of processes, data sharing, and smart production with the help of cyber-physical systems, IoT, cloud computing, and cognitive computing. It fosters interconnectedness, openness and decentralised decision making. Industry 5.0 goes further by enhancing the efficiency of technology with that of human-centricity, sustainability, and resilience. It appreciates the human creativity, judgment, and ethical reasoning and automation with an emphasis on collaborative human-machine intelligence, sustainable manufacture, individual customer experiences, and a responsible approach to innovation. Technology is also aligned to be the facilitator of human potential to enhance inclusive growth and environmental stewardship in addition to economic performance (Xu et al., 2021).

The management principles are redefined to be in line with the capabilities of technology that is presented in the digital age administration (Teece, 2007). Planning involves predictive analytics, design focuses on networked forms, leadership involves digital literacy and control has the power of real-time dashboards and automation. Focus is put on speed, experimentation, collaboration, and continuous adaptation (Warner and Wäger, 2019) and the issues of data privacy, cybersecurity, algorithmic bias, and ethical governance.

The governance through technology incorporates the elements of algorithmic decision support, blockchain openness, automated audit trails, and AI-based risk evaluation. It provides a balance between automation and human control, makes it possible to proactively manage risks, monitor constantly, implement adaptive policies, and make ethical decisions based on strategic alignment. Agility allows quick sensing about the environment, decisions and reconfiguration

of resources to seize opportunities or to counter threats in a timely manner (Teece, 2007). Through modular architectures, cloud infrastructure and real-time analytics, it is cross-strategic, operational and portfolio agile, and enabled by decentralised authority, cross-functional collaboration, continuous learning, and tolerance to experimentation (Warner & Wäger, 2019). Data-Driven Decision-Making operates by relying on empirical data, analytics, predictive models and visualisation to optimise decisions, increase accuracy, decrease bias and create personalisation in scale. Strong data management, analytics, technological platform, and ethical protection are essential (Mikalef and Gupta, 2021).

III. THEORETICAL FOUNDATIONS

Teece et al. (1997) developed dynamic capabilities theory to offer a leading perspective of comprehending the ways in which organisations maintain competitive advantage in a swiftly evolving environment. According to the theory, sustained competitive advantage occurs not when an organisation is at a constant position over its resources but when it is able to integrate, develop, and restructure internal and external competences to meet the evolving needs of the environment. The three processes involved in dynamic capabilities are sensing the opportunities and threat by market scanning, searching and exploring technologies and markets; capturing the opportunities through mobilising resources and making timely and market-oriented decisions; and transforming through continuous renewal, reconfiguring and recombining assets and organisational structures (Teece, 2007). Dynamic capabilities theory provides an interesting explanation in the framework of smart enterprises. Artificial intelligence, big data analytics, and Internet of Things technology directly increases the sensing abilities of organisations by offering real-time scanning of the environment, predictive analytics, and market intelligence (Mikalef & Gupta, 2021). In the same manner, smart automation and algorithmic decision support reinforce seizing capabilities by being a resource allotment, opportunity exploitation, and higher and more precise resource allotment. Cloud computing, modular architecture, and digital platforms support the capabilities of transformation by promoting reconfiguration and scalability in the short term (Warner and Wäger, 2019).

Nevertheless, the use of dynamic capabilities theory on smart enterprise environments is limited. The theory focuses on managerial thinking and organisational habits but lacks in focusing on technological support and algorithmic operation, which becomes more and more active in sensing, seizing and transforming activities (Mikalef & Gupta, 2021). Also, although the theory recognizes the dynamism of the environment, it is not very specific as to how technology-enabled feedback loops, machine learning, and autonomous systems form self-reinforcing cycles of capability development peculiar to smart enterprises.

Resource-based view (RBV) which was developed by Barney (1991) states that sustainable competitive advantage is based on valuable, rare, inimitable, and non-substitutable (VRIN) resources and capabilities owned by organisations. RBV alters the strategy of positioning on the external market towards internal resource settings that imply the heterogeneous allocation of resources across firms is a cause of performance variation. The resources include physical infrastructure, financial capital (tangible), and knowledge, reputation, organisational culture, technological capabilities (intangible). To create sustained competitive advantage, resources need to be valuable at the same time (enabling ability to exploit opportunities or neutralise threats), rare (not held by many rivals), inimitable (not easily replicated by rivals), and non-substitutable (strategically equivalent alternative does not exist) (Barney, 1991). Within the smart enterprise framework, RBV is used to shed light in understanding that data resources, algorithmic capabilities, technological infrastructure, and digital competencies are strategic resources. VRIN can be observed with big data repositories, proprietary algorithms, artificial intelligence models, and combined digital platforms embedded in organisational-specific contexts, complementary assets, and causal ambiguity that prevents imitation of competition (Mikalef and Gupta, 2021). In addition, RBV describes the reasons why comparable technological investments produce different performance results in different organisations: they are only as successful as they complement other organisational resources, absorbent capacity and integration mechanisms not as a result of technology.

However, RBV has theoretical drawbacks of not functioning as a comprehensive description of smart enterprise dynamics. The theory with its traditional

orientation of focusing on stocks of resources instead of flows does not provide an ideal solution to the never-ending evolution, recombination, and obsolescence of digital resources in the fast-changing technological settings. Moreover, the firm-centric view of RBV does not provide sufficient specifications of network effects, platform ecosystems, and inter-organisational data exchange that define the smart enterprise value creation (Nambisan et al., 2017). The theory also has some difficulties in fitting algorithmic resources that enhance themselves in a more autonomous manner via machine learning, with value appreciation dynamics that are different compared to the more traditional resource depreciation dynamics.

Although the dynamic capabilities theory and resource-based view can be useful, both of them do not entirely explain the smart enterprise phenomena. Dynamic capabilities focus on how to adapt but give less focus on technological infrastructures and algorithmic mechanisms, whereas RBV focuses on strategic resources, but does not focus on dynamic approach of continuous change and ecosystem interdependencies. Combination of resources focus of RBV and dynamic capabilities evolutionary lens containing technological agency, algorithmic learning, network effects and ecosystem dynamic would be a key of an all-inclusive smart enterprise system.

Existing Model and Framework Review.

The modern digital enterprise models emphasize the usage of technologies and creation of digital capabilities as the way to competitive advantage. Digital Business Strategy framework practices conceptualize the role of digital resources as a strategic resource that needs to be integrated across organisational borders, and highlights modularity, platforms and network effects (Bharadwaj et al., 2013). Although useful in describing value creating and business model innovation, it pays attention to strategic positioning and it pays less attention to operational transformation and governance systems and human-technology interface. Equally, technical alignment guidance is offered by enterprise architecture frameworks such as TOGAF, but they do not provide sufficient leadership transformation, organisational culture, and dynamic capability development essential to a long-term digital advantage (Shanks et al., 2018). Industry 4.0 systems focus on use of cyber-physical systems, intelligent manufacturing, and autonomous production systems. RAMI 4.0 identifies hierarchical levels, and life cycles and functional layers, providing interoperability and connectivity advice (Liao et al., 2017). Nevertheless, it is not applicable outside the manufacturing field, and does not give much information on services, knowledge-based industries, or non-manufacturing roles. The frameworks are also indicative of technological determinism, which puts efficiency of automation ahead of human creativity, ethics and sustainability, which increasingly feature in Industry 5.0 discussions (Xu et al., 2021). They do not pay much attention to strategic leadership, business model innovation, and stakeholder ecosystem management needed to develop enterprises holistically.

Smart governance models are concerned with technology-based decision-making, accountability and regulatory compliance. IT Governance framework identifies decision rights and the accountability frameworks in realizing IT to business priorities (Weill and Ross, 2004). Although they offer clarity in how to govern, traditional models focus on control instead of being agile or innovative, which is insufficient in dealing with AI ethics, algorithmic decisions, data sovereignty, and platform governance (Héroux and Fortin, 2018). Their hierarchical, centralised strategy does not go well with the distributed governance that is common in digital ecosystems. The models therefore describe the concept of control, but they do not reflect a participatory form of governance, co-creation of stakeholder and adaptive regulation, which is essential in modern technology-oriented firms. Digital maturity models determine the organisational capabilities and advancement across digital transformation paths. Kane et al. (2015) and Berghaus and Back (2016) also assess such dimensions as strategy, culture, talent, technology, customer experience, innovation, and collaboration. They offer assessment apparatus to determine the development between novices and digitally mature organisations. But their stage-based, linear structure is an incomplete representation of the non-linear, iterative quality of transformation (Warner and Wäger, 2019). Although they are useful in assessment, they provide less prescriptive information on implementation pathways, the development of capabilities, and the orchestration of resources, and they are lacking in terms of connecting maturity to the result of performance.

Identification of Thematic Pillars

Intelligent, interconnected and adaptive enterprise operations are based on Smart Technology Infrastructure. It also includes cloud computing of scalable resources, IoT devices producing real-time data, AI and machine learning that make independent decisions, big data analytics of processing sophisticated information, blockchain of transparency and security, and robots to automate process operations. The infrastructure must be effective, which means interoperability, scalability, security, and flexibility, which are constantly found in the literature on digital transformation as the key to smart enterprise capabilities (Mikalef & Gupta, 2021; Bharadwaj et al., 2013). Digital Leadership and Governance facilitates change with the help of technology by providing executive vision, strategic direction, accountability structures, and decision-making frameworks. It encompasses the development of strategies, governance and balancing innovation and control, leadership and competencies in technological and change management, ethical management in response to data privacy and algorithmic bias, and stakeholder engagement that encourages inclusive decision making. Transformational leaders develop organisational culture, deal with ambiguity, and have the ability to coordinate ecosystems (Héroux and Fortin, 2018; Weill and Ross, 2004).

Data Analytics and Intelligence allows gathering, processing, and interpreting data of organisations in order to make evidence-based decisions. It combines data management, predictive and prescriptive analytics, business intelligence dashboards, and operational and customer analytics and transforms the management of business administration through intuitive management to data management (Kane et al., 2015; Mikalef and Gupta, 2021). Human Capital and Digital Skills guarantee that the workforce has been digitalized, the culture of continuous learning, collaborative and innovative thinking, and specific talent management. The human potential enhanced by technology is maximised in case of investment in training, reskilling, and knowledge sharing (Xu et al., 2021; Berghaus and Back, 2016). Organisational Agility helps in fast adaptation by using modular structures, agile methodologies, decentralised decision-making, cross-functional teamwork, adaptive strategic planning, and cultures of experimentation that promote innovation, resilience, and continuous improvement to all operational and strategic business processes (Warner & Wäger, 2019; Teece, 2007).

Sustainable Innovation is a combination of environmental accountability, social fairness, and economic feasibility based on the principles of a circular economy, responsible products, socially advantageous solutions, responsible AI, inclusion of stakeholders in activities, and creation of long-term value (Xu et al., 2021). Cybersecurity and Risk Governance deals with mitigation of threats, resilience, compliance, regulatory compliance, risk evaluation, and organisational vigilance, protection of critical assets, sensitive information, and operational continuity in the face of ever-complicated digital ecosystems (Héroux and Fortin, 2018). Customer-Centric Digital Systems focus on expected seamless omnichannel experiences, personalisation, co-creation, real-time responsiveness, interactive feedback mechanisms and management of relationships, using technology to increase customer satisfaction, customer loyalty and differentiate competitively over the long-term (Bharadwaj et al., 2013; Kane et al., 2015).

Theoretical Contributions

The given framework contributes substantively to the literature on digital transformation and smart enterprise because it is aimed at discussing fragmentation that dominates this field. One is that it generalizes the dynamic capabilities theory as it was initially proposed by the authors by explicitly using technological agency and algorithmic processes as independent capability-forming activities (Teece, 2007). Though the dynamic capabilities theory focuses on the managerial cognition and organisational practices, this theory proves the way artificial intelligence, machine learning, and autonomous systems are self-affirming sensing, seizing, and transforming processes that are not led by human-directed abilities. The identified technological extension fills in the theoretical gaps in the study by Mikalef and Gupta (2021) that found a lack of focus on the mechanisms of algorithms in the development of capabilities. Second, the theory brings together resource-based perspective and dynamic capabilities theory in the form of organisational agility as the mediating variable. This integration overcomes the RBV limitation of fixed resource orientation by showing how VRIN resources restructure dynamically via agility

processes, developing evolutionary, as opposed to fixed, competitive advantage (Barney, 1991; Warner and Wteger, 2019). The theories mentioned above were studied independently in the past, this framework combines resource identification (RBV) with capability evolution (dynamic capabilities) in a single conceptualisation.

Third, the framework addresses key gaps by offering holistic conceptualisation of basic business administration concepts that do not feature in other models. The Industry 4.0 models focus on manufacturability and neglect service settings, the digital maturity models provide evaluation, but no implementation recommendations; the governance models focus on control over innovation (Liao et al., 2017; Weill and Ross, 2004). It is a framework that cuts across disciplinary and functional lines and incorporates technological, strategic, organisational, governance, human capital, sustainability, security and customer dimensions at theoretically founded architecture. Fourth, it suggests paradigmatic change between the technology-oriented and capability-oriented smart enterprise conceptualisation. Instead of assuming technologies as deterministic drivers the framework puts organisational agility in the centre of mediating mechanism whereby organisational technological resources, leadership vision, human capital, and systemic capabilities interact to produce performance results (Nambisan et al., 2017). This is the socio-technical systems view where there is interdependence between technology and organisational factors.

IV. IMPLICATIONS OF THE STUDY

The framework develops the knowledge with the combination of the resource-based view and the dynamic capabilities theory, and organisational agility as the mediating construct. It identifies technological agency and algorithmic processes as self-directed ways of building capabilities to fill the voids in the explanations of how digital technologies bring about self-reinforcing capabilities. It challenges the views of technology determinism by advocating a capability based paradigm which underscores the socio technological interdependence. The framework provides a basis in which empirical research is done, and testable propositions are put forward to direct refinement of the theory.

To the practitioners, the framework offers a strategic map of a holistic smart enterprise development. The thematic pillars can be used to determine the organisational preparedness, pinpoint areas of weaknesses, and make investments priorities. The focus is on the organisational agility, which necessitates the balance between the technological capability, the organisational culture, the workforce capabilities, and the governance. The framework can be used by policymakers as a guideline in support programmes and regulations. Its environmental sustainability drive promotes responsible innovation, environmental custodianship, and the creation of social values and economic performance.

V. RECOMMENDATIONS FOR THE STUDY

The proposed framework must be empirically supported by the future research to be conducted on the basis of quantitative surveys, case studies and mixed-methods designs in diverse organisational settings. Longitudinal research would help understand the change of smart enterprises in the course of time, and in what sequence capabilities were developed and at what pathways they have transformed. Moderating variables that must be considered by scholars include industry type, and size of the firms, geographical location and institutional environment, and comparative studies in developed and emerging economies should be taken to establish contextual contingencies. Proposition testing might be enhanced by using complex methods such as structural equation modelling and configurational analysis.

In practice, before transformation initiatives, organisations must conduct digital maturity measurements that are consistent with the pillars of the framework. The areas of leadership development should focus on digital literacy, change management and ethical governance. The investment plan must be able to balance both the technological infrastructure and human capital growth. Agile governance structures and cross-functional teams can make the coordination of the implementation, and both capability audits and monitoring of performance can be used continuously to be flexible in the changing technologic environment that develops rapidly.

VI. CONCLUSION

This paper formulated an intellectually sound concept of smart businesses in the next business administration by combining resource-based view and dynamic capabilities theory. Intelligent, technology-enabled operations are facilitated by eight pillars smart technology infrastructure, digital leadership and governance, data analytics and intelligence, human capital and digital skills, cybersecurity and risk governance, sustainable innovation, organisational agility, and customer-centric digital systems. Organisational agility facilitates aligning of technological resources, leadership and systemic capabilities to create innovation, competitive advantage and sustainable performance. The framework focuses on socio-technical interdependencies, a step beyond technology determinism and has twelve testable propositions that ensure the empirical validation and practical implementation of digital transformation.

REFERENCES

[1] Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, *17*(1), 99–120.

[2] Berghaus, S., & Back, A. (2016). Stages in digital business transformation: Results of an empirical maturity study. *Mediterranean Conference on Information Systems Proceedings*, Article 22.

[3] Bharadwaj, A., El Sawy, O. A., Pavlou, P. A., & Venkatraman, N. (2013). Digital business strategy: Toward a next generation of insights. *MIS Quarterly*, *37*(2), 471–482.

[4] Héroux, S., & Fortin, A. (2018). The moderating role of IT-business alignment in the relationship between IT governance, IT competence, and innovation. *Information Systems Management*, *35*(2), 98–123.

[5] Kane, G. C., Palmer, D., Phillips, A. N., Kiron, D., & Buckley, N. (2015). Strategy, not technology, drives digital transformation. *MIT Sloan Management Review*, *57*(1), 1–25.

[6] Liao, Y., Deschamps, F., Loures, E. D. F. R., & Ramos, L. F. P. (2017). Past, present and future of Industry 4.0 A systematic literature review and research agenda proposal. *International Journal of Production Research*, *55*(12), 3609–3629.

[7] Mikalef, P., & Gupta, M. (2021). Artificial intelligence capability: Conceptualization, measurement calibration, and empirical study on its impact on organizational creativity and firm performance. *Information & Management*, *58*(3), 103434.

[8] Nambisan, S., Lyytinen, K., Majchrzak, A., & Song, M. (2017). Digital innovation management: Reinventing innovation management research in a digital world. *MIS Quarterly*, *41*(1), 223–238.

[9] Shanks, G., Gloet, M., Asadi Someh, I., Frampton, K., & Tamm, T. (2018). Achieving benefits with enterprise architecture. *Journal of Strategic Information Systems*, *27*(2), 139–156.

[10] Teece, D. J. (2007). Explicating dynamic capabilities: The nature and microfoundations of (sustainable) enterprise performance. *Strategic Management Journal*, *28*(13), 1319–1350.

[11] Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, *18*(7), 509–533. https://doi.org/10.1002/(SICI)1097-0266(199708)18:7<509::AID-SMJ882>3.0.CO;2-Z

[12] Warner, K. S. R., & Wäger, M. (2019). Building dynamic capabilities for digital transformation: An ongoing process of strategic renewal. *Long Range Planning*, *52*(3), 326–349.

[13] Weill, P., & Ross, J. W. (2004). *IT governance: How top performers manage IT decision rights for superior results*. Harvard Business School Press.

[14] Xu, X., Lu, Y., Vogel-Heuser, B., & Wang, L. (2021). Industry 4.0 and Industry 5.0 Inception, conception and perception. *Journal of Manufacturing Systems*, *61*, 530–535.