



Open-Source Enterprise Resource Planning Systems for Small and Medium Enterprises: A Conceptual Framework

Kazeem Sulaimon^{1*}, Ehsan Fansuree Surin², Muhammad Iskandar Hamzah¹

¹*Faculty of Business and Management, Universiti Teknologi MARA, Shah Alam Campus, Selangor, Malaysia*

²*Faculty of Business and Management, Universiti Teknologi MARA, Puncak Alam Campus, Selangor, Malaysia*

* Corresponding author e-mail: sulaimonkazeem.a@gmail.com

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ABSTRACT

The growing importance of information management in the digital economy has exerted considerable pressure on small and medium enterprises (SMEs) to implement advanced innovations in technology. Nonetheless, the high costs and intricacy of conventional Enterprise Resource Planning (ERP) systems have constrained their uptake among SMEs. This conceptual study examines the feasibility of Open-Source ERP (OS-ERP) systems as a practical option for Malaysian SMEs, offering a conceptual framework that connects information management capabilities, entrepreneurial orientation (EO), and enterprise success. The article contends that OS-ERP systems can augment entrepreneurial performance by enhancing information integration, strategic decision-making, and enterprise agility. This approach seeks to guide future research and offer practical insights for SMEs and policymakers to encourage digital transformation.

1. Introduction

In today's rapidly evolving business landscape, information management has become a critical determinant of organisational success (Pereira et al., 2022). SMEs, which comprise the backbone of the Malaysian economy, face unique challenges in effective information management due to resource constraints and the complexity of their business environments (Pertheban et al., 2023). Meanwhile, traditional ERP systems offer a solution by integrating various business processes, but their high costs and

complexity have made them inaccessible to many SMEs (Vuković et al., 2023). However, Open-Source ERP (OS-ERP) systems, which provide similar functionalities without the financial burden, present an attractive alternative (Puig-Denia et al., 2023).

This article aims to develop a conceptual framework that explores how OS-ERP systems can be leveraged to improve entrepreneurial success in Malaysian SMEs through improved information management. Thus, this argument could be seen in the case of a Malaysian SME that implemented an OS-ERP system but found it difficult to customise and integrate it with their existing processes due to a lack of technical expertise. This resulted in significant downtime and inefficiencies that ultimately hindered rather than improved their entrepreneurial success (Aremu et al., 2021).

On the other hand, there are also success stories of Malaysian SMEs that have successfully implemented OS-ERP systems and have received the benefits of improved information management (Stewart, 2019). Furthermore, by conducting a thorough analysis of both the successes and failures of OS-ERP implementation in Malaysian SMEs, we can gain valuable insight into the factors that contribute to entrepreneurial success in this context (Supramaniam et al., 2014). This research will contribute to the existing literature on the role of technology in enhancing SME's performance and provide practical recommendations for SMEs looking to leverage OS-ERP systems for improved information management.

Researchers proposed a framework that integrates theories of entrepreneurial orientation and dynamic capabilities to understand the conditions under which OS-ERP systems can contribute to entrepreneurial success (Heaton et al., 2020; Surin et al., 2023). It seeks to provide a theoretical basis for future empirical research and practical guidance for SMEs looking to harness the benefits of digital technologies. By exploring the relationship between EO, dynamic capabilities, and the adoption of OS-ERP systems, this research aims to shed light on how SMEs can effectively use technology to drive growth and innovation (C. I. Fernandes et al., 2024). By bridging the gap between theory and practice, this framework will offer valuable insights for SME owners and managers seeking to stay competitive in today's digital economy. Ultimately, this study seeks to empower SMEs to make informed decisions about their technology investments and strategic direction, ultimately leading to improved performance and long-term success (Haki et al., 2024). According to Wales et al., (2023) EO has become increasingly associated with the installation of technological systems, in a variety of ways. While EO's major focus is on innovation and strategic initiatives, ERP systems, including open-source solutions, provide the framework that enables these entrepreneurial endeavours by improving corporate processes and decision-making skills. Innovation through technological adoption, risk-taking in OS-ERP investment, and proactive process optimization (Abreu et al., 2019).

Firms with a high EO are more inclined to adopt new technology, such as OS-ERP, to drive innovation and efficiency (Irawan et al., 2023). ERP systems allow for the integration of corporate processes, enabling innovation by offering real-time data insights that improve decision-making and encourage experimentation. While implementing ERP systems, particularly open-source alternatives, poses risks such as system integration, data migration, and operational disruption (Aremu et al., 2021). Firms with a strong EO are more likely to take such risks because they understand the possible long-term rewards of enhanced procedures and competitive advantage (Lola & Bakeev, 2024). whereas Proactive businesses foresee future issues and opportunities, leveraging ERP technologies to streamline operations and prepare for market changes. OS-ERP systems provide customisable solutions that enable businesses to adapt processes in response to changing needs, hence supporting proactive initiatives (Yulianto et al., 2020).

EO philosophy promotes innovation, strategic flexibility, and process optimisation, which is strongly related to ERP implementation goals. OS-ERP systems, in particular, provide SMEs with the tools they need to pursue entrepreneurial opportunities despite limited resources (Reuben et al., 2019). EO-driven businesses are more likely to adopt these tools and use their capabilities to gain a sustained competitive advantage, ensuring that technological investments and strategic goals are in sync (Wales et al., 2023).

2. Background of Study

2.1 The Role of SMEs in the Malaysian Economy

According to Adam et al., (2021) & San et al., (2023) SMEs play a crucial role in the Malaysian economy, contributing significantly to employment, innovation, and GDP growth. According to SME Corp Malaysia, SMEs make up 98.5% of the total number of business establishments in the country and represent almost 40% of Malaysia's GDP. With such a significant presence, SMEs must effectively leverage open-source technology to remain competitive and drive sustainable growth (Khai et al., 2020). This study aims to provide a roadmap for SMEs to navigate the digital landscape and harness the power of community-based technology to achieve their business goals (Olson et al., 2018). However, they often face challenges such as limited access to finance, skilled labour, and advanced technology (Weerasekara & Gooneratne, 2023). A study by Zain et al., (2020) ascertains that effective information management is vital to overcome these challenges and ensure sustainable growth. The Malaysian Digital Economy Blueprint is one example of a government initiative that supports digital transformation, which aims to improve SMEs' digital capabilities (Du et al., 2023). However, the adoption of advanced technologies, such as ERP systems, remains low due to perceived complexity and cost barriers (Razzaq et al., 2021).

2.2 Open-Source ERP Systems

OS-ERP systems, such as Odoo, ERPNext, Dolibarr, etc., offer a cost-effective and flexible solution for managing business processes. These systems provide functionalities similar to those of proprietary ERP systems, including modules for finance, human resources, supply chain management, and customer relationship management (Terminanto et al., 2019). Their open-source nature allows customisation to meet the specific needs of SMEs. Despite its potential, the adoption of OS-ERP systems in Malaysia has been limited, requiring further investigation of their role in improving information management and business performance (Razzaq et al., 2021). For instance, a small manufacturing company looking to streamline its operations could implement open-source information system software to automate inventory management, track production processes and manage its finances seamlessly (Puig-Denia et al., 2023). With its customisable features, the company can customise the system to integrate with its existing processes and scale as they grow, ultimately improving efficiency and profitability (Jassim & Mahmoud, 2022).

Furthermore, by centralising data and providing real-time insights, information systems can enable the company to make informed decisions and respond quickly to market changes. This level of visibility and control over various aspects of the business can lead to better resource allocation, reduced operational costs, and increased customer satisfaction (Steininger et al., 2022). Additionally, the system's ability to generate reports and analytics can help the company identify trends, opportunities, and areas for improvement, allowing it to stay competitive in the ever-evolving market. In general, the implementation of OS-ERP systems such as ERPNext and others can play a crucial role in driving business growth and success (Pereira et al., 2022). The below diagram illustrates the ecosystem of enterprise resource planning.

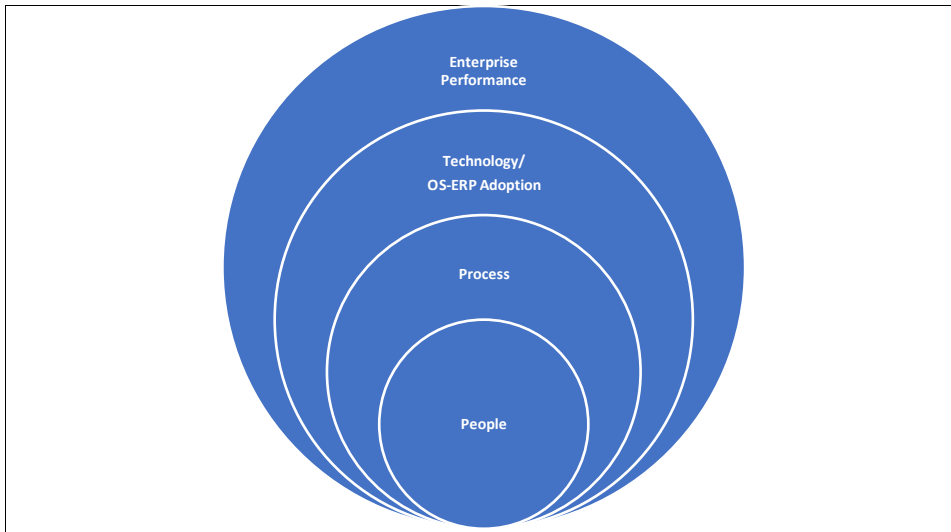


Figure 1: Stacked Venn Diagram illustrating the Anatomy of Study. By Authors

3. Review of the literature

3.1 Information Management in SMEs

Information management involves the systematic collection, storage, processing, and dissemination of data to support organisational and decision-making processes. For SMEs, effective information management is crucial for agility, responsiveness, and competitiveness (Olakunle et al., 2022). However, research indicates that many SMEs lack the systems and processes necessary to manage information effectively, leading to operational inefficiencies and strategic disadvantages (Liu et al., 2024). From one perspective, a small manufacturing company may struggle to keep track of inventory levels and customer orders due to manual record-keeping processes. Without a centralised information management system, employees may waste time searching for information and making errors in order fulfilment, leading to delays and dissatisfied customers (Weerasekara & Gooneratne, 2023). By implementing an integrated software solution for inventory management and order processing, the company can streamline operations, reduce errors, and improve overall performance (Olson et al., 2018).

Although the implementation of an integrated software solution can streamline operations and reduce errors, it also requires a significant upfront investment and ongoing maintenance costs that may not be feasible for a small manufacturing company with limited resources (Al-Hakimi et al., 2022). In addition, transitioning to a new system can cause disruptions in workflow and require extensive training for employees, potentially leading to further inefficiencies in the short-term (Yenugula et al., 2023). In one instance, a small manufacturing company may decide to invest in an integrated software solution for inventory management and order processing only to realise that they do not have the budget to cover the upfront costs. As a result, the company may struggle to pay for the necessary maintenance and updates to the software, leading to system malfunctions and errors (Wang et al., 2021). This can ultimately hinder operations and negate any potential benefits of streamlined processes with the new system. Furthermore, without adequate training and support for employees on how to use the new software effectively, the company may face resistance to change and low adoption rates. This could result in employees switching to old and inefficient methods of managing inventory and processing orders. In the long run, the company may end up wasting more time and resources trying to fix the issues caused by the new system, further exacerbating the initial inefficiencies (Casidy et al., 2020). Overall, without careful planning and

consideration of all factors involved, investing in new technologies such as integrated software solutions can end up doing more harm than good for a business (Rawashdeh & Rawashdeh, 2023).

3.2 ERP Systems and Organisational Performance

ERP systems integrate various business functions into a unified platform, facilitating access to real-time data and process standardisation. They have been linked to improved efficiency, better resource management, and enhanced strategic decision-making. However, the cost and complexity of these systems often discourage SMEs from adopting them. OS-ERP systems, with their lower cost and customisation options, provide a feasible alternative but require further exploration in terms of their impact on SME performance (Ruivo et al., 2016). Research by Ismail et al., (2021) shown that SMEs often face unique challenges regarding implementing ERP systems, such as limited financial resources and technical expertise. Despite these obstacles, there is growing interest in exploring the potential benefits of OS-ERP systems for SMEs. By offering a more affordable and flexible solution, these systems have the potential to level the playing field and help SMEs compete more effectively in the market (Stewart, 2019).

However, another study indicated that it is important to thoroughly examine the implications of adopting OS-ERP systems on organizational performance before deciding (Mohamed & Noorliza, 2021). This includes evaluating factors such as compatibility with existing systems, ease of integration, and ongoing support and maintenance. Furthermore the cost savings and customization options of OS-ERP systems are appealing, it is crucial to ensure that these benefits do not come at the expense of functionality or security (Stewart, 2019). By conducting a comprehensive analysis and weighing the pros and cons, SMEs can make an informed decision that aligns with their business goals and sets them up for success in the long run (Abadía & Avila, 2023).

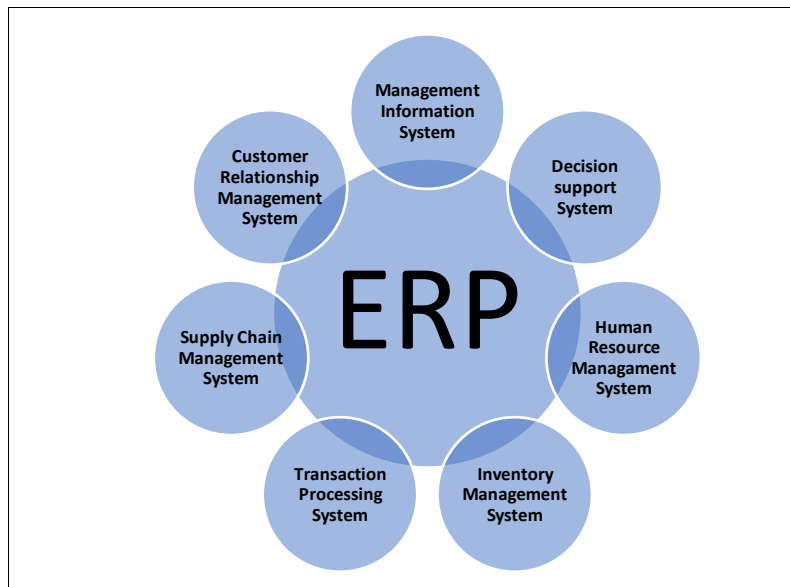


Figure 1: Information System Modules consolidated into ERP. By authors

3.3 Entrepreneurial Orientation and Technology Adoption

EO, characterised by innovation, proactiveness, and risk-taking, influences the willingness of an organisation to adopt new technologies. SMEs with a high degree of EO are more likely to experiment with

and adopt technologies such as OS-ERP systems to gain a competitive advantage (Pingali et al., 2023). This strategic approach allows SMEs to stay ahead of the curve in terms of technology adoption and innovation, ultimately propelling them to success in the ever-evolving business landscape (Singh et al., 2023). By leveraging their EO to embrace new technologies, SMEs can improve their operational efficiency, improve customer satisfaction, and increase their market competitiveness (Hamzah et al., 2020).

Additionally, EO plays a crucial role in shaping the mindset and approach of SMEs toward technology adoption. The willingness to take risks and explore new opportunities can drive organisations to embrace innovative solutions such as OS-ERP systems (Surin et al., 2023). However, the successful implementation and utilisation of these systems also depend on the organisation's information management capabilities (Hamzah et al., 2020). By effectively leveraging data and information, SMEs can maximise the benefits of OS-ERP systems and enhance their overall performance in the competitive market landscape. Although EO is important to drive innovation, the successful implementation of OS-ERP systems also requires significant financial investment and technical expertise, which may pose challenges for SMEs with limited resources (Al-Harasi et al., 2021). Furthermore, organisational culture and resistance to change can hinder the adoption and use of new technology, regardless of the entrepreneurial mindset (Alshwayat et al., 2023).

3.4 *Dynamic Capabilities and Strategic Alignment*

Dynamic capabilities refer to an organisation's ability to integrate, build, and reconfigure internal and external resources to address rapidly changing environments. For SMEs, the adoption of OS-ERP systems can enhance dynamic capabilities by improving information integration and facilitating strategic alignment (Teece et al., 2009). This, in turn, enables SMEs to respond more effectively to market changes and seize new opportunities. However, it could be if an SME adopts an OS-ERP system without proper strategic alignment, leading to confusion and inefficiencies within the organization (Quitain et al., 2024). This lack of alignment could result in missed opportunities and hinder the organisation's ability to effectively respond to market changes (Al-Jaafreh et al., 2023).

On the other hand, when SMEs successfully align their OS-ERP systems with their strategic goals and objectives, the potential benefits can be significant. Using the enhanced information integration and streamlined processes that come with these systems, SMEs can improve their decision-making processes and gain a competitive edge in their industry (Audretsch & Belitski, 2023). Furthermore, the ability to quickly adapt to changing market conditions and seize new opportunities can help SMEs stay ahead of the curve and achieve sustainable growth in the long term. Therefore, it is crucial for SMEs to carefully consider their strategic alignment before implementing an OS-ERP system to ensure that they can fully capitalise on its potential benefits (Al-Jaafreh et al., 2023).

4. **Methodology**

The methodology of this conceptual paper comprises three primary stages: a comprehensive synthesis of the literature, the development of a conceptual framework, and validation through theoretical foundations. Synthesis of the literature involved a detailed evaluation of existing studies on OS-ERP adoption, information management capabilities, EO, and dynamic capabilities in SMEs. A thorough analysis involved querying academic databases, including Scopus, Web of Science, and Google Scholar, using relevant keywords: Open-Source ERP, Open-source Software, Malaysia's SMEs, Information Management, and EO (Cheong et al., 2023). The articles were selected based on criteria such as their focus on ERP adoption in SMEs and their theoretical contributions to entrepreneurial and dynamic capabilities. This review aims to highlight shortcomings in current research and create the theoretical foundations necessary for creating a comprehensive conceptual framework (Churchill & Sen, 2001).

Using insights from the literature review, a conceptual framework was developed to illustrate the expected connections among key constructs. The concept posits that OS-ERP adoption can improve information management capabilities, thus leading to increased business performance in SMEs (Ferreira et al., 2021). This relationship is believed to be influenced by an entrepreneurial attitude, characterised by innovation, proactiveness, and risk-taking, and is mediated by dynamic capabilities that enable businesses to reallocate resources in response to changing circumstances (Surin et al., 2023). The paradigm employs the Resource-Based View (RBV) and Dynamic Capabilities Theory, augmenting these theories by incorporating the unique challenges and opportunities encountered by SMEs throughout the digital transformation (Dejardin et al., 2023; C. I. Fernandes et al., 2024).

The third stage of the procedure involves validating the conceptual framework through a theoretical foundation. This was achieved by deductive approaches and theoretical triangulation, in which the proposed connections were examined within the context of other theoretical perspectives, including the Technology-Organisation-Environment (TOE) model (Marrucci et al., 2023). The technique was refined on the basis of input gathered from academic peer-reviewed journals and industry practitioners' white papers, ensuring its relevance and applicability to the SME context. The validation technique aimed to strengthen the theoretical foundations of the framework and demonstrate its potential to guide future empirical research (Lamm et al., 2020).

This study, despite the absence of real data collection, provides a solid foundation for future research to assess the conceptual framework using quantitative or qualitative methods. The methodology of this paper highlights the importance of integrating OS-ERP systems with entrepreneurial Orientation, and dynamic capabilities to enhance performance in SMEs (Crick et al., 2023). It underscores the imperative for empirical research to validate the proposed connections and offers pragmatic suggestions for SMEs seeking to leverage digital technologies for competitive advantage (Cheong et al., 2023).

5. Conceptual Framework

The proposed conceptual framework links the adoption of OS-ERP, the information management capabilities, EO, and the business performance of Malaysian SMEs. The framework consists of the following key constructs: OS-ERP adoption, information management capabilities, EO, dynamic capabilities, and business performance.

5.1 OS-ERP Adoption

This construct refers to the extent to which SMEs implement and use OS-ERP systems to manage their business processes effectively. This includes the integration of open-source software (OSS) with enterprise resource planning tools to streamline operations and increase efficiency (Puig-Denia et al., 2023). By adopting OS-ERP systems, Malaysian SMEs can access advanced technology at a lower cost, improving their competitive edge in the market. In addition, the use of OSS allows for customisation and flexibility to meet the unique needs of each business (Khai et al., 2020).

Another benefit of OS-ERP systems for Malaysian SMEs is the ability to scale and grow their business without incurring significant costs. Nonetheless, with the flexibility to customise the software to their specific needs, businesses can easily adapt to changes in the market and stay ahead of competitors (Razzaq et al., 2021). Furthermore, the integration of OSS with ERP tools enables seamless data management and analysis, providing valuable insights for decision-making and strategic planning. In general, the adoption of OS-ERP systems offers Malaysian SMEs a competitive advantage in today's fast-paced business environment (Supramaniam et al., 2014).

However, according to Khai et al., (2020) the key factors influencing adoption include perceived ease of use, compatibility with existing systems, and perceived usefulness. It is important for businesses to thoroughly evaluate these factors before implementing OS-ERP systems to ensure a smooth transition and maximum benefit. Furthermore, investing in training and support for employees can help minimise resistance to change and maximise the efficiency of the software. Using the power of OS-ERP, Malaysian SMEs can streamline their operations, improve productivity, and ultimately achieve long-term sustainable growth and success (Supramaniam et al., 2014).

5.2 Information Management Capabilities

These capabilities include the ability to collect, process, and disseminate relevant information to support decision-making. OS-ERP systems are believed to enhance these capabilities by providing a unified platform for data integration and real-time access. This can lead to more informed and strategic decision-making within Malaysian SMEs, as employees will have access to accurate and up-to-date information at their fingertips (Priporas & Vellore-Nagarajan, 2023). With improved information management capabilities, companies can react quickly to market changes, identify growth opportunities, and mitigate risks effectively (Wahab et al., 2021).

5.3 Entrepreneurial Orientation

EO is defined by the degree of innovation, proactiveness and risk-taking exhibited by an SME. For instance, a Malaysian SME implementing an OS-ERP system can use real-time data analytics to track customer preferences and market trends, allowing them to quickly develop and launch new products or services ahead of competitors. Furthermore, by using the proactive features of the system, SMEs could identify potential risks in their supply chain and take preemptive measures to mitigate them, showing a high level of EO in their decision-making processes. By staying ahead of the curve with the adoption of innovative technologies such as OS-ERP systems, the SME demonstrates a willingness to adapt and evolve in an ever-changing business environment (Sarya et al., 2023). This strategic approach to information management and decision-making differentiates the SME as a forward-thinking and agile organisation ready to take advantage of opportunities and overcome challenges (Wales et al., 2023).

5.4 Business Performance

Business performance is conceptualised as the achievement of organisational goals, including financial performance, market share, and operational efficiency (Franco-Santos et al., 2007). The framework posits that enhanced information management capabilities, supported by OS-ERP systems, will lead to improved business performance (Susanti et al., 2023). Although adaptability and evolution are important in a business environment, focusing solely on information management and decision-making may not address other factors that contribute to overall business performance, such as leadership, employee skills, and market conditions. Furthermore, the effectiveness of OS-ERP systems in improving business performance may vary according to the specific needs and capabilities of the SME (Jean et al., 2008).

Therefore, it is crucial for SMEs to carefully assess their own unique requirements and capabilities before implementing OS-ERP systems. In addition, SMEs should also consider the potential challenges and limitations associated with these systems, such as high implementation costs, technical complexity, and resistance to change among employees (Tayyab & Ahmad, 2023). By taking a holistic approach to business performance improvement and considering all relevant factors, SMEs can maximize the benefits of OS-ERP systems and achieve sustainable growth in the long run (Vuković et al., 2023).

Thus, some suitable dimensions of business performance that SMEs can focus on when implementing OS-ERP systems include financial performance, operational efficiency, customer satisfaction, and

employee productivity. By measuring and improving these key areas, SMEs can ensure that their investment in OS-ERP systems is providing a positive impact on their overall business performance. Additionally, SMEs should regularly review and adjust their performance metrics to align with their evolving business goals and objectives (Ngelyaratan & Soediantono, 2022).

5.5 *Dynamic Capabilities*

People think that dynamic capabilities are what make it possible for small businesses to use OS-ERP systems to align their strategies and adapt to changes in the market. They include the ability to sense and seize opportunities and reconfigure resources effectively (Ferreira et al., 2021). Ultimately, the success of implementing OS-ERP systems in small businesses depends on these dynamic capabilities, as they enable organisations to respond quickly to changes in the market and take advantage of emerging opportunities (C. I. Fernandes et al., 2024). Without the ability to sense changes in the market and quickly adapt their strategies and resources, SMEs may struggle to fully leverage the benefits of these systems. Therefore, developing and nurturing dynamic capabilities is essential for small businesses looking to enhance their overall performance with the help of OS-ERP systems (Mikalef et al., 2021).

5.6 *Resource-Based View (RBV)*

The RBV posits that companies achieve competitive advantage by utilising internal resources that are valuable, rare, inimitable, and non-substitutable (VRIN). This methodology provides valuable insights; nevertheless, certain objections restrict its use in examining OS-ERP adoption for SMEs (Shah, 2022). The RBV emphasises resource possession, although it neglects the necessity for resource reconfiguration or adaptation in response to evolving market conditions. Because SMEs work in extremely unpredictable contexts, RBV's static character might not fully explain how businesses maintain a competitive edge when using developing technology like open-source ERP (Cuthbertson & Furseth, 2022).

Furthermore, the omission of external factors. The RBV minimally addresses the influence of external technical advancements, including open-source software advances, on resource utilisation. This constraint complicates the examination of the interplay between internal competencies and external trends, which is essential for SMEs implementing OS-ERP systems (Fernandes et al., 2022). Additionally, underappreciation of resource availability for SMEs. The theory presupposes that enterprises either possess or can get VRIN resources; nevertheless, SMEs frequently encounter resource limitations (e.g., constrained budgets and talent) that are insufficiently addressed by the RBV (Shah, 2022). Open-source ERP could serve as a viable option; however, the RBV framework provides little guidance on how resource-constrained enterprises can utilise these tools effectively (Cuthbertson & Furseth, 2022).

Thus, the DCT enhances the RBV by emphasising an organization's capacity to develop, integrate, and reconfigure resources in reaction to environmental shifts. DCT introduces a dynamic aspect to the RBV, although it encounters specific limitations such as: Conceptual ambiguity. A primary critique of DCT is the ambiguity surrounding the definition of a dynamic capacity (Heubeck & Meckl, 2022). This complicates the operationalisation or measurement of these competencies, particularly for SMEs that may lack formalised systems for recognising, exploiting, and transforming opportunities (Rohit & Saurabh, 2023).

Another one is excessive focus on major corporations. A significant portion of empirical research on DCT concentrates on major corporations with intricate structures and sophisticated capabilities. SMEs frequently lack formal mechanisms, hindering the efficient application of DCT in the context of OS-ERP adoption (Rohit & Saurabh, 2023). Additionally, The restricted emphasis on technological transformation. DCT emphasises the significance of adaptability; yet it fails to directly address technology-induced disruptions, such as the use of open-source solutions, which provide flexibility yet necessitate swift reconfiguration of business processes (Karttunen et al., 2024).

Moving on to TOE Framework. The TOE framework elucidates the impact of technological, organisational, and environmental elements on the adoption of innovations. Although beneficial for comprehending the external and internal factors affecting ERP adoption, it possesses some significant limitations (Rahman et al., 2023). The TOE framework offers a comprehensive classification of elements but provides less insight into the interaction of specific technologies, such as OS-ERP, with these factors in the context of SMEs. The approach inadequately addresses the distinct issues encountered by SMEs, including resource limitations and insufficient technical skills (Awa et al., 2016).

Furthermore, TOE is predominantly a static framework that emphasises the pre-adoption phase, neglecting the continual evolution and adaptation of enterprises post-adoption. In the context of OS-ERP, organisations may require periodic updates and maintenance of the system (Rahman et al., 2023). nevertheless, the TOE framework provides minimal guidance about these continuous activities. The TOE framework recognises the impact of environmental factors (e.g., competition, legislation), but it may disproportionately highlight these pressures, neglecting internal capabilities and firm-level tactics (Zhu et al., 2004). SMEs implementing OS-ERP systems frequently encounter the necessity to reconcile external pressures with internal constraints, a nuance not comprehensively addressed by the TOE paradigm (Tekeh, 2015).

6. Limitation

Considering aforementioned constraints, Although the RBV, DCT, and the TOE framework are well-established theories that offer valuable insights into organizational strategy and technology adoption, each has its limitations. These weaknesses warrant further investigation, particularly in the context of OS-ERP systems for SMEs. Further investigation is needed to fully understand how these theories apply to the unique challenges faced SMEs implementing OS- ERP systems. additional research is necessary to enhance the theoretical framework for examining OS-ERP adoption by SMEs (Razzaq et al., 2021). An in-depth examination of how RBV, DCT, and TOE can synergistically enhance one another will yield a more comprehensive understanding. For instance, whilst RBV emphasises internal resources, DCT can tackle the dynamic adaptation of these resources, and TOE can integrate the influence of external factors (Rahman et al., 2023).

Subsequent study ought to enhance these frameworks to more effectively accommodate the distinct requirements and limitations of SMEs. This entails examining how SMEs can utilise OS-ERP as a strategic asset and competency, notwithstanding their constrained financial and technical resources (Audretsch & Belitski, 2023). Integrating a dynamic perspective into the TOE framework will provide fresh insights into the evolution of organisations following adoption. This may involve examining continual learning, adaption, and system enhancements in SMEs utilising OS-ERP. A technology-centric approach is essential to examine how open-source solutions challenge traditional resource-based perspectives and dynamic capabilities, especially in budget-constrained organisations (Estensoro et al., 2022).

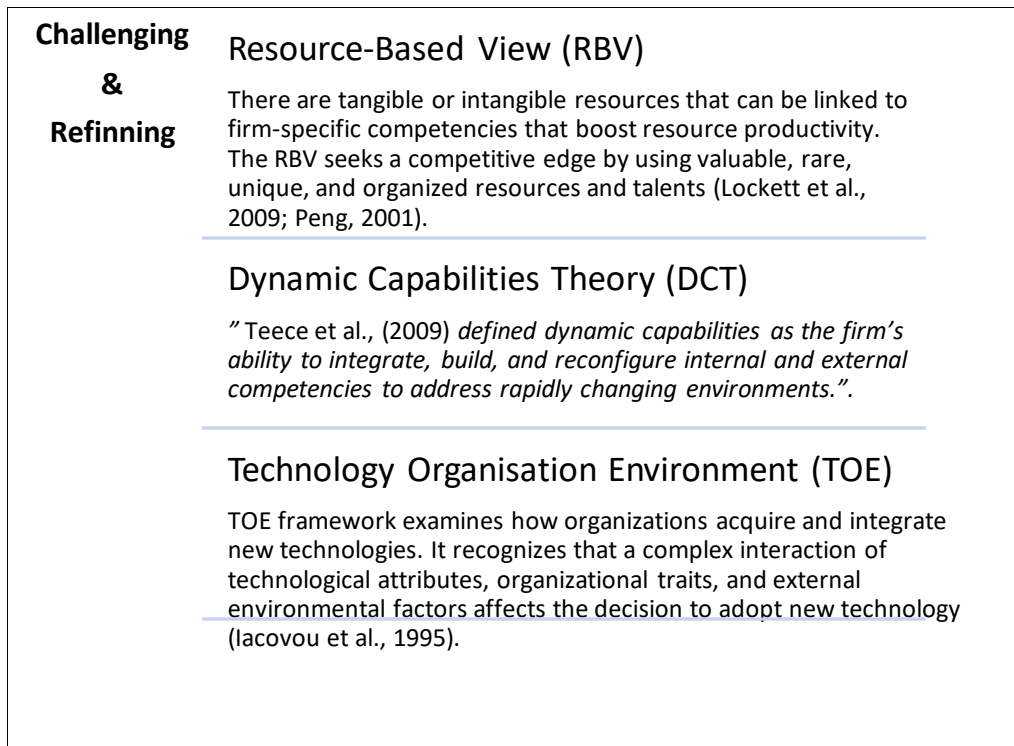


Figure 3: Underpinning Framework

7. Discussion and Implications

The proposed framework suggests that OS-ERP systems can play a transformative role in enhancing the information management capabilities of Malaysian SMEs, thus contributing to entrepreneurial success. By integrating business processes and providing real-time access to information, these systems can support strategic decision-making and operational efficiency (Cuthbertson & Furseth, 2022; Fernandes et al., 2024; Horani et al., 2023). However, the effectiveness of OS-ERP systems depends on several factors, including the level of EO of the SME and its dynamic capabilities. Furthermore, the successful implementation of OS-ERP systems in Malaysian SMEs can also depend on factors such as organisational culture, leadership support, and employee training (Tayyab & Ahmad, 2023). SMEs should invest in training programmes and change management strategies to ensure that employees can use the system effectively. Furthermore, ongoing monitoring and evaluation of the system's performance is crucial to identify any issues and make necessary adjustments to maximise its benefits. In general, the adoption of OS-ERP systems has the potential to revolutionise the way Malaysian SMEs operate and compete in the global market (Adam et al., 2021).

The framework has several implications for practice and policy. For SMEs, it highlights the importance of aligning IT investments with strategic objectives and fostering an entrepreneurial mindset to fully leverage the benefits of OS-ERP systems (Pesce, 2023). For policymakers, the findings underscore the need for initiatives that support the digital transformation of small businesses, including training programs and incentives for the adoption of technology. Adopting OS-ERP systems can improve efficiency, increase productivity, and improve decision-making for Malaysian SMEs. By aligning IT investments with strategic goals, SMEs can stay competitive in the global market and adapt to changing business landscapes (Sharma & Behl, 2023). Policymakers should prioritise creating a supportive environment for SMEs to embrace

digital technologies, as this will ultimately drive economic growth and innovation in Malaysia (Adam et al., 2021).

Future research should empirically test the proposed framework using longitudinal data to explore the dynamic interactions between these constructs and their impact on business performance. Furthermore, comparative studies in different contexts could provide a deeper understanding of the generalisability of the framework (Małkowska et al., 2021; Pfajfar et al., 2024).

8. Conclusions

This conceptual paper has developed a framework to understand the role of OS-ERP systems in enhancing the information management capabilities and business performance of Malaysian SMEs. By integrating theories of EO and dynamic capabilities, the framework offers a comprehensive perspective on the conditions under which OS-ERP adoption can contribute to entrepreneurial success. Provides a foundation for future research and practical guidance for SMEs and policymakers seeking to promote digital transformation and enhance the competitiveness of the SME sector.

The framework also highlights the importance of organisational readiness, leadership support, and strategic alignment in a successful implementation of OS-ERP. By aligning EO with dynamic capabilities, Malaysian SMEs can leverage their resources and capabilities to fully realise the potential benefits of OS-ERP systems. This research contributes to the growing body of literature on the role of technology in driving business innovation and growth, particularly in the context of small and medium enterprises.

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Conflict of Interest Statement

No conflict of interest

References

- Abadía, S., & Avila, O. (2023). Adoption of Intelligent Information Systems: An Approach to the Colombian Context. *International Conference on Enterprise Information Systems, ICEIS - Proceedings, 1*(Iceis), 21–31. <https://doi.org/10.5220/0011750300003467>
- Abreu, M., Aparicio, M., & Costa, C. J. (2019). *Association for Information Systems Association for Information Systems AIS Electronic Library (AISeL) AIS Electronic Library (AISeL) ERP adoption in Cloud Environment ERP adoption in Cloud Environment*. <https://aisel.aisnet.org/capsi2019>
- Adam, A., Hassan, R., & Abdullah, H. (2021). Maintaining The Survival of Malaysian SMEs During Covid-19 Outbreak: Challenges and Suggestion for Management. *ASEAN Entrepreneurship Journal* |, 7(1), 27–33. <https://www.smeinfo.com.my>
- Al-Hakimi, M. A., Saleh, M. H., Borade, D. B., Hasan, M. B., & Sharma, D. (2022). Competitor orientation and SME performance in competitive environments: the moderating effect of marketing ethics. *Journal of Entrepreneurship in Emerging Economies*. <https://doi.org/10.1108/JEEE-12-2021-0486>
- Al-Harasi, A. H., Surin, E. F., Rahim, H. L., Al-Shammari, S. A., Abdulrab, M., Al-Mamary, Y. H., Alshebami, A. S., & Grada, M. (2021). *The Impact Of Social Entrepreneurial Personality On Social Entrepreneurial Intention Among University Graduates In Yemen: A Conceptual Framework*. 1–17. <https://doi.org/10.15628/Holos.2021.11420>

- Al-Jaafreh, H. H., Al-Adaileh, R., & Aljaafreh, A. O. (2023). The level of IT-business strategic alignment and its impact on achieving a sustainable competitive advantage as mediated by the net benefits of information systems. *International Journal of Business Information Systems*, 42(2), 187–209. <https://doi.org/10.1504/IJBIS.2020.10031825>
- Alshwayat, D., Elrehail, H., Shehadeh, E., Alsalthi, N., Shamout, M. D., & Rehman, S. U. (2023). An exploratory examination of the barriers to innovation and change as perceived by senior management. *International Journal of Innovation Studies*, 7(2), 159–170. <https://doi.org/10.1016/j.ijis.2022.12.005>
- Aremu, A. Y., Shahzad, A., & Hassan, S. (2021). The Empirical Evidence of Enterprise Resource Planning System Adoption and Implementation on Firm's Performance Among Medium-Sized Enterprises. In *Global Business Review* (Vol. 22, Issue 6). <https://doi.org/10.1177/0972150919849751>
- Audretsch, B. D., & Belitski, M. (2023). The limits to open innovation and its impact on innovation performance. *Technovation*, 119(February 2022), 102519. <https://doi.org/10.1016/j.technovation.2022.102519>
- Awa, H. O., Ukoha, O., & Emecheta, B. C. (2016). Using T-O-E theoretical framework to study the adoption of ERP solution. *Cogent Business and Management*, 3(1). <https://doi.org/10.1080/23311975.2016.1196571>
- Casidy, R., Nyadzayo, M., & Mohan, M. (2020). Service innovation and adoption in industrial markets: An SME perspective. *Industrial Marketing Management*, 89(January 2019), 157–170. <https://doi.org/10.1016/j.indmarman.2019.06.008>
- Cheong, H. I., Lyons, A., Houghton, R., & Majumdar, A. (2023). Secondary Qualitative Research Methodology Using Online Data within the Context of Social Sciences. *International Journal of Qualitative Methods*, 22, 1–19. <https://doi.org/10.1177/16094069231180160>
- Churchill, G. A., & Sen, S. (2001). A Statistical Framework for Quantitative Trait Mapping. *Genetics*, 159, 371–387.
- Crick, J. M., Crick, D., & Chaudhry, S. (2023). Staying alive: Coopetition and competitor oriented behaviour from a pre- to post COVID-19 pandemic era. *Industrial Marketing Management*, 113(April), 58–73. <https://doi.org/10.1016/j.indmarman.2023.05.017>
- Cuthbertson, R. W., & Furseth, P. I. (2022). Digital services and competitive advantage: Strengthening the links between RBV, KBV, and innovation. *Journal of Business Research*, 152(July), 168–176. <https://doi.org/10.1016/j.jbusres.2022.07.030>
- Dejardin, M., Raposo, M. L., Ferreira, J. J., Fernandes, C. I., Veiga, P. M., & Farinha, L. (2023). The impact of dynamic capabilities on SME performance during COVID-19. *Review of Managerial Science*, 17(5), 1703–1729. <https://doi.org/10.1007/s11846-022-00569-x>
- Du, M., Abdurahman, A. Z. A., Voon, B. H., Hamzah, M. I., Wahab, S. N., Hamzah, M. I., Rajendran, S. D., Othman, A. K., Hamzah, M. I., Abdullah, Z., Abdul Rahim, N., Muhammad, N. S., Fikry, A., Hussein, Z., Hamzah, M. I., Sudarwanto, T., Marlina, N., Othman, A. K., Hassan, F., ... Hassan, F. (2023). The influence of entrepreneurship education and experience on students' entrepreneurship spirit: The moderating effects of internal locus of control. *Advances in Business Research International Journal*, 1(1), 11–29. <https://doi.org/10.1108/IJBM-10-2019-0388>
- Estensoro, M., Larrea, M., Müller, J. M., & Sisti, E. (2022). A resource-based view on SMEs regarding the transition to more sophisticated stages of industry 4.0. *European Management Journal*, 40(5), 778–792. <https://doi.org/10.1016/j.emj.2021.10.001>
- Fernandes, C. I., Ferreira, J. J. M., Veiga, P. M., Hu, Q., & Hughes, M. (2024). Dynamic capabilities as a moderator: enhancing the international performance of SMEs with international entrepreneurial orientation. *Review of Managerial Science*. <https://doi.org/10.1007/s11846-024-00784-8>
- Fernandes, K. J., Milewski, S., Chaudhuri, A., & Xiong, Y. (2022). Contextualising the role of external partnerships to innovate the core and enabling processes of an organisation: A resource and knowledge-based view. *Journal of Business Research*, 144(January), 146–162. <https://doi.org/10.1016/j.jbusres.2022.01.091>
- Ferreira, J., Cardim, S., & Coelho, A. (2021). Dynamic Capabilities and Mediating Effects of Innovation

- on the Competitive Advantage and Firm's Performance: the Moderating Role of Organizational Learning Capability. *Journal of the Knowledge Economy*, 12(2), 620–644. <https://doi.org/10.1007/s13132-020-00655-z>
- Franco-Santos, M., Kennerley, M., Micheli, P., Martinez, V., Mason, S., Marr, B., Gray, D., & Neely, A. (2007). Towards a definition of a business performance measurement system. *International Journal of Operations and Production Management*, 27(8), 784–801. <https://doi.org/10.1108/01443570710763778>
- Haki, K., Blaschke, M., Aier, S., Winter, R., & Tilson, D. (2024). Dynamic capabilities for transitioning from product platform ecosystem to innovation platform ecosystem. *European Journal of Information Systems*, 33(2), 181–199. <https://doi.org/10.1080/0960085X.2022.2136542>
- Hamzah, M. I., Othman, A. K., & Hassan, F. (2020a). Elucidating salespeople's market orientation, proactive service behavior and organizational culture in the B2B banking sector: a Malaysian perspective. In *International Journal of Bank Marketing* (Vol. 38, Issue 5). <https://doi.org/10.1108/IJBM-10-2019-0388>
- Hamzah, M. I., Othman, A. K., & Hassan, F. (2020b). Mediating effects of individual market orientation on the link between learning orientation and job performance. *Journal of Business and Industrial Marketing*, 35(4), 655–668. <https://doi.org/10.1108/JBIM-08-2018-0239>
- Heaton, S., Lewin, D., & Teece, D. J. (2020). Managing campus entrepreneurship: Dynamic capabilities and university leadership. *Managerial and Decision Economics*, 41(6), 1126–1140. <https://doi.org/10.1002/mde.3015>
- Heubeck, T., & Meckl, R. (2022). More capable, more innovative? An empirical inquiry into the effects of dynamic managerial capabilities on digital firms' innovativeness. *European Journal of Innovation Management*, 25(6), 892–915. <https://doi.org/10.1108/EJIM-02-2022-0099>
- Horani, O. M., Khatibi, A., AL-Soud, A. R., Tham, J., Al-Adwan, A. S., & Azam, S. M. F. (2023). Antecedents Of Business Analytics Adoption And Impacts On Banks' Performance: the perspective of the toe framework and resource-based view. *Interdisciplinary Journal of Information, Knowledge, and Management*, 18, 609–643. <https://doi.org/10.28945/5188>
- Irawan, T., Pakuan, U., & Ramlee, A. A. (2023). *Entrepreneurial Orientation and Firm Performance : A Systematic Review*. July. <https://doi.org/10.11648/j.ebm.20230903.12>
- Ismail, A., Harun, S., & Muda, F. L. (2021). The effect of enterprise resource planning (ERP) systems on organizational culture: A quantitative analysis. *International Conference on Economics, Entrepreneurship and Management 2021*, 1–12.
- Jassim, S. H., & Mahmoud, B. I. (2022). The Effect of Strategic Information System in Global Marketing Channel: A Case Study. *Webology*, 19(1), 3150–3168. <https://doi.org/10.14704/WEB/V19I1/WEB19208>
- Jean, R. J., Sinkovics, R. R., & Kim, D. (2008). Information technology and organizational performance within international business to business relationships: A review and an integrated conceptual framework. *International Marketing Review*, 25(5), 563–583. <https://doi.org/10.1108/02651330810904099>
- Karttunen, E., Jääskeläinen, A., Malacina, I., Lintukangas, K., Kähkönen, A. K., & Vos, F. G. S. (2024). Dynamic capabilities view on value creation in public procurement. *Journal of Public Procurement*, 24(1), 114–141. <https://doi.org/10.1108/JOPP-05-2023-0035>
- Khai, K. G., Onn, Y. W., Zulkifli, R. B., Kandasamy, S., & Ahmad, A. B. (2020). The necessity to digitalize SMEs business model during the COVID-19 pandemic period to remain sustainable in Malaysia. *Journal of Education and Social Sciences*, 16(1), 73–81. www.nst.com.my
- Lamm, K., Lamm, A., & Edgar, D. (2020). Scale Development and Validation: Methodology and Recommendations. *Journal of International Agricultural and Extension Education*, 27(2), 24–35. <https://doi.org/10.5191/jiaee.2020.27224>
- Liu, Y., Guo, M., Han, Z., Gavurova, B., Bresciani, S., & Wang, T. (2024). Effects of digital orientation on organizational resilience: a dynamic capabilities perspective. *Journal of Manufacturing*

- Technology Management*, 35(2), 268–290. <https://doi.org/10.1108/JMTM-06-2023-0224>
- Lola, I., & Bakeev, M. (2024). Technology adoption expectations in the face of temporal uncertainty: an analysis of survey data from manufacturing firms. *Technology Analysis and Strategic Management*, 36(1), 45–58. <https://doi.org/10.1080/09537325.2021.2020751>
- Małkowska, A., Urbaniec, M., & Kosała, M. (2021). The impact of digital transformation on European countries: Insights from a comparative analysis. In *Equilibrium. Quarterly Journal of Economics and Economic Policy* (Vol. 16, Issue 2). <https://doi.org/10.24136/eq.2021.012>
- Marrucci, A., Rialti, R., & Balzano, M. (2023). Exploring paths underlying Industry 4.0 implementation in manufacturing SMEs: a fuzzy-set qualitative comparative analysis. *Management Decision*. <https://doi.org/10.1108/MD-05-2022-0644>
- Mikalef, P., Pateli, A., & van de Wetering, R. (2021). IT architecture flexibility and IT governance decentralisation as drivers of IT-enabled dynamic capabilities and competitive performance: The moderating effect of the external environment. *European Journal of Information Systems*, 30(5), 512–540. <https://doi.org/10.1080/0960085X.2020.1808541>
- Mohamed, S. M. S., & Noorliza, K. (2021). Explaining the Competitive Advantage of Enterprise Resource Planning Adoption: Insights Egyptian Higher Education Institutions. *Journal of Information Technology Management*, 12(4), 1–21. <https://doi.org/10.22059/jitm.2020.292788.2424>
- Ngelyaratan, D., & Soediantono, D. (2022). Customer Relationship Management (CRM) and Recommendation for Implementation in the Defense Industry : A Literature Review Customer Relationship Management (CRM) dan Usulan Penerapannya Pada Industri Pertahanan : A Literature Review. *Journal of Industrial Engineering and Management Research*, 3(3), 17–34.
- Olakunle Jayeola, S. S. S. M. M. H. A. P. S. S. I. H. (2022). The Nexus between Top Management Support on Change Management, Cloud ERP Implementation, and Performance of SMEs. *Academic Journal of Interdisciplinary Studies*, 11(3), 236–255. <https://doi.org/10.36941/AJIS-2022-0084>
- Olson, D. L., Johansson, B., & De Carvalho, R. A. (2018). Open source ERP business model framework. *Robotics and Computer-Integrated Manufacturing*, 50(October 2015), 30–36. <https://doi.org/10.1016/j.rcim.2015.09.007>
- Pereira, J., Varajão, J., & Takagi, N. (2022). Evaluation of Information Systems Project Success—Insights from Practitioners. *Information Systems Management*, 39(2), 138–155. <https://doi.org/10.1080/10580530.2021.1887982>
- Pertheban, T. R., Thurasamy, R., Marimuthu, A., Venkatachalam, K. R., Annamalah, S., Paraman, P., & Hoo, W. C. (2023). The Impact of Proactive Resilience Strategies on Organizational Performance: Role of Ambidextrous and Dynamic Capabilities of SMEs in Manufacturing Sector. *Sustainability (Switzerland)*, 15(16). <https://doi.org/10.3390/su151612665>
- Pesce, D. (2023). Unveiling the Determinants of IT Business Value: An Industry-Level Analysis on the Role of the Information-Based Nature of the Product. *IEEE Transactions on Engineering Management*. <https://doi.org/10.1109/TEM.2023.3279334>
- Pfajfar, G., Mitreğa, M., & Shoham, A. (2024). Systematic review of international marketing capabilities in dynamic capabilities view – calibrating research on international dynamic marketing capabilities. *International Marketing Review*, 41(1), 237–272. <https://doi.org/10.1108/IMR-12-2022-0276>
- Priporas, C.-V., & Vellore-Nagarajan, D. (2023). New-normal Market Entry Mode for Pharmaceuticals: an Internet of Things (IoT) market entry framework stemming from COVID-19. *International Marketing Review*, 40(5), 906–935. <https://doi.org/10.1108/IMR-12-2021-0363>
- Puig-Denia, A., Forés, B., Fernández-Yáñez, J. M., & Boronat-Navarro, M. (2023). Introducing an Open-Source Software for the Enterprise Resource Planning in the Business Management Degree. *Journal of Higher Education Theory and Practice*, 23(14), 186–194. <https://doi.org/10.33423/jhetp.v23i14.6393>
- Quitain, R. A., Santos, W. C. D., & Izon, M. V. (2024). *The Evolution and Impact of Management Information Systems in Modern Business Article Info Received : 24-07-2024 Accepted : 30-08-2024 Page No : 563-571. 2015, 563–571.*

- Rahman, N. A., Ahmad, A. H., Ani, N. S., Kadir, A. R., Reni, A., & Gjorevska, E. (2023). *Exploring the Impact of Entrepreneurial Orientation, Competitive Advantage, and Technological Factors on SMEs Digital Performance: A Comprehensive Analysis*. 01(March), 75–87. <https://doi.org/10.28934/jwee23.pp37-57>
- Rawashdeh, A., & Rawashdeh, B. S. (2023). The effect cloud accounting adoption on organizational performance in SMEs. *International Journal of Data and Network Science*, 7(1), 411–424. <https://doi.org/10.5267/j.ijdns.2022.9.005>
- Razzaq, A., Asmai, S. A., Abidin, Z. Z., Talib, M. S., Ali, M. F., & Mohammed, A. A. (2021). Propose a conceptual framework for the cloud ERP adoption among malaysian smes. *Journal of Engineering Science and Technology*, 16(4), 3387–3406.
- Reuben, J. M., Obura, J., & Oginda, M. (2019). Open Source ERP Adoption-Use and Organisational Performance of Deposit-Taking Saccos in Kenya. *International Journal of Information Technology*, 3(3), 1–9. www.globalscientificjournal.com
www.globalscientificjournal.com
- Rohit, B., & Saurabh, S. (2023). Dynamic Capabilities of Social Enterprises : A Qualitative Meta-Synthesis and Future Agenda. *Journal of Social Entrepreneurship*, 0(0), 1–29. <https://doi.org/10.1080/19420676.2021.1972030>
- Ruivo, P., Rodrigues, J., Johansson, B., Oliveira, T., & Rebelo, J. (2016). Using TOE and RBV Theories to Define a Theoretical Model to Assess ERP Value Across Iberian Manufacturing and Services SMEs. *Procedia Computer Science*, 100, 474–479. <https://doi.org/10.1016/j.procs.2016.09.184>
- San, A. N. C., Seng, W. T., Yee, C. J., Siong, O. H., Hussain, N. C., & Khen, T. M. (2023). *Preparing SMEs for E-Invoice Adoption: Assessing Technology Readiness and Its Segmentation* (Issue Bafe). Atlantis Press International BV. https://doi.org/10.2991/978-94-6463-342-9_22
- Sarya, I. N. N., Arief, M. T. S. T. S., Saroso, H., & Bandur, A. (2023). the Effect of Information Technology Adoption, Entrepreneurial Orientation on Dynamic Capabilities and Company Performance. *Journal of Theoretical and Applied Information Technology*, 101(1), 161–171.
- Shah, T. R. (2022). Can big data analytics help organisations achieve sustainable competitive advantage? A developmental enquiry. *Technology in Society*, 68(July 2021), 101801. <https://doi.org/10.1016/j.techsoc.2021.101801>
- Sharma, S., & Behl, R. (2023). Strategic Alignment of Information Technology in Public and Private Organizations in India: A Comparative Study. *Global Business Review*, 24(2), 335–352. <https://doi.org/10.1177/0972150919893839>
- Singh, S., Joshi, V., Tailor, Y., Sharma, Y., & Sharma, D. (2023). *ERP System College Management*.
- Steininger, D. M., Mikalef, P., Pateli, A., & Ortiz-De-guinea, A. (2022). Dynamic Capabilities in Information Systems Research: A Critical Review, Synthesis of Current Knowledge, and Recommendations for Future Research. *Journal of the Association for Information Systems*, 23(2), 447–490. <https://doi.org/10.17705/1jais.00736>
- Stewart, T. (2019). *Risk Mitigation for SMEs Implementing ERPs*. 1277(800). https://scholarsbank.uoregon.edu/xmlui/handle/1794/25130%0Ahttps://scholarsbank.uoregon.edu/xmlui/bitstream/handle/1794/25130/Stewart_2019.pdf?sequence=1&isAllowed=y
- Supramaniam, M., Abdullah, A., & Ponnar, R. (2014). Cost Analysis on ERP System Implementation amongst Malaysian SMEs. *International Journal of Trade, Economics and Finance*, January 2014, 72–76. <https://doi.org/10.7763/ijtef.2014.v5.343>
- Surin, E. F., Edward, O. T., Shaaran, S., & Ngah, R. (2023). Understanding Entrepreneurial Orientation based Research: A Proposed New Theoretical Framework. *Information Management and Business Review*, 15(3(SI)), 23–35. [https://doi.org/10.22610/imbr.v15i3\(si\).3454](https://doi.org/10.22610/imbr.v15i3(si).3454)
- Susanti, E., Mulyanti, R. Y., & Wati, L. N. (2023). MSMEs performance and competitive advantage : Evidence from women ' s MSMEs in Indonesia MSMEs performance and competitive advantage : Evidence from women ' s MSMEs in Indonesia. *Cogent Business & Management*, 10(2). <https://doi.org/10.1080/23311975.2023.2239423>
- Tayyab, A., & Ahmad, A. (2023). The Role Of Enterprise Resource Planning System's Assimilation

- Between Top Level Management Support And Organizational Performance: Evidence From Manufacturing Sector Of Lahore. *Journal of Positive School Psychology*, 7(2), 1028–1041.
- Teece, D. J., Pisano, G., & Shuen, A. (2009). Dynamic capabilities and strategic management. *Knowledge and Strategy*, 18(April 1991), 77–116. <https://doi.org/10.4337/9781035334995.00014>
- Tekeh, E. (2015). *The Adoption of Virtual Teams and Virtual Technology in Human Resources Management : A South African Perspective* . by Emmanuel Temban Tekeh Dissertation submitted in fulfilment of the requirements of the degree Master of Technology Business Information Sy. October.
- Terminanto, A., Hidayanto, A. N., & Maulana, B. (2019). Development, configuration and implementation open source ERP in manufacturing modul with accelerated Sap method. *International Journal of Management*, 10(3), 77–98. <https://doi.org/10.34218/IJM.10.3.2019.009>
- Vuković, V., Gagić, N., Raković, L., & Marić, S. (2023). *Erp Systems for Small and Medium Enterprises From the Sap and Microsoft Perspective*. January. https://doi.org/10.46541/978-86-7233-416-6_43
- Wahab, S. N., Hamzah, M. I., Sayuti, N. M., Lee, W. C., & Tan, S. Y. (2021). Big data analytics adoption: An empirical study in the Malaysian warehousing sector. *International Journal of Logistics Systems and Management*, 40(1), 121–144. <https://doi.org/10.1504/IJLSM.2021.117703>
- Wales, W. J., Covin, J. G., Schüller, J., & Baum, M. (2023). Entrepreneurial orientation as a theory of new value creation. *Journal of Technology Transfer*, 48(5), 1752–1772. <https://doi.org/10.1007/s10961-023-10021-1>
- Wang, H., Luo, X., & Yu, X. (2021). Exploring the role of IoT in project management based on Task-technology Fit model. *Procedia Computer Science*, 199, 1052–1059. <https://doi.org/10.1016/j.procs.2022.01.133>
- Weerasekara, U., & Gooneratne, T. (2023). Enterprise resource planning (ERP) system implementation in a manufacturing firm: Rationales, benefits, challenges and management accounting ramifications. *Journal of Accounting and Management Information Systems*, 22(1), 86–110. <https://doi.org/10.24818/jamis.2023.01005>
- Yenugula, M., Sahoo, S. K., & Goswami, S. S. (2023). Cloud computing in supply chain management: Exploring the relationship. *Management Science Letters*, 13(3), 193–210. <https://doi.org/10.5267/j.msl.2023.4.003>
- Yulianto, N., Anon, M., Prabowo, H., & Hidayanto, A. N. (2020). Erp System Selection for Small Medium Enterprises (Smes): a Systematic Literature Review. *International Journal of Mechanical Engineering and Technology (Ijmet)*, 11(12), 1–11. <https://doi.org/10.34218/ijmet.11.12.2020.001>
- Zain, Z. M., Jusoh, A. A., Intan, R., Munir, S., & Putit, L. (2020). Drivers of E-Commerce Adoption amongst Small & Medium Sized Enterprises (SMEs) in the Services Sector. *Journal of International Business, Economics and Entrepreneurship*, 5(June), 50–58. <https://doi.org/10.24191/jibe.v5i1.14292>
- Zhu, K., Kraemer, K. L., Xu, S., & Dedrick, J. (2004). Information technology payoff in E-Business environments: An international perspective on value creation of E-Business in the financial services industry. *Journal of Management Information Systems*, 21(1), 17–54. <https://doi.org/10.1080/07421222.2004.11045797>



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