RESEARCH ARTICLE

CRITICAL SUCCESS FACTORS AND INDICATORS OF ENTERPRISE RESOURCE PLANNING IMPLEMENTATION: A MODEL OF ITS IMPACT ON BUSINESS PROCESS INNOVATION FOR THE B2B SERVICE INDUSTRY

Benedicto L. Avila, Aileen L. Vasquez, Emmanuel P. Paulino and Paulo Noel A. Mazo

Manuscript Info

Abstract

This study examines the effects of Critical Success Factors (CSFs) of Enterprise Resource Planning (ERP) Implementation on Critical Success Indicators (CSIs), and the subsequent impact of CSIs on Business Process Innovation (BPI) in the Business-to-Business (B2B) service industry. Using Partial Least Squares Structural Equation Modeling (PLS-SEM), the research investigates how organizational support, human resource capability, and technological capability as CSFs influence system quality, information quality, and service quality as CSIs, and how these indicators drive innovation in business processes. The results reveal that most CSFs significantly affect CSIs, and CSIs positively influence business process innovation, demonstrating the importance of effective ERP implementation in promoting operational and strategic improvements. Anchored in the Technology-Organization-Environment (TOE) framework, the DeLone and McLean Information Systems Success Model,and Business Process Reengineering (BPR) theory, this study contributes to the theoretical understanding of ERP implementation and process innovation in B2B service organizations. The findings provide actionable insights for managers and practitioners to enhance ERP adoption strategies, optimize organizational processes, and foster innovation-driven competitive advantage.

Introduction:-

The Business-to-Business (B2B) service industry has grown significantly in recent years, driven by increasing digitalization, globalization, and the demand for integrated service solutions. Organizations in this sector depend heavily on efficient coordination, timely information exchange, and seamless process management to meet client requirements and maintain competitive advantage. As B2B service firms handle complex transactions, multi-client operations, and large volumes of data, the need for effective enterprise systems has become critical to ensure operational efficiency, high service quality, and value delivery to business clients (Brennan, McGrath, & Canning, 2024; Tavera Romero et al., 2021). In this context, ERP systems serve as a backbone for integrating organizational processes, providing real-time data, and supporting strategic decision-making. Effective ERP adoption is increasingly viewed as a key driver for business process innovation, allowing firms to streamline operations, optimize resources, and enhance overall competitiveness in a dynamic market environment.Despite the clear advantages of ERP systems, B2B service organizations frequently encounter challenges in implementing them

Corresponding Author:- Benedicto L. Avila

effectively. These challenges are often linked to organizational readiness, human resource capabilities, and technological constraints, which can hinder the achievement of system, information, and service quality objectives (Alsharari, 2022; Chofreh et al., 2020; Tavana, Hajipour, & Oveisi, 2020). Moreover, there is limited empirical evidence demonstrating how Critical Success Factors (CSFs) influence Critical Success Indicators (CSIs) and, in turn, drive business process innovation in this industry. Many B2B firms struggle with aligning ERP functionalities to existing business processes, achieving user adoption, and ensuring data integrity, which reduces the potential for operational improvements and innovation (Kouriati et al., 2023; Ferrari et al., 2021; Shbail et al., 2024). This study seeks to address these gaps by examining the relationships among CSFs, CSIs, and business process innovation, providing insights on how ERP systems can be strategically leveraged to enhance process efficiency, cost-effectiveness, and service delivery in the B2B service sector.

Literature Review:-
Critical Success Factors of ERP Implementation:-
Enterprise Resource Planning (ERP) implementation is widely regarded as a strategic organizational transformation that integrates business processes, information flows, and decision-making across the enterprise. Prior studies emphasize that ERP success depends on a combination of managerial, human, and technological factors rather than technology alone (Katuu, 2020; Langenwalter, 2020). In the Business-to-Business (B2B) service industry, ERP systems are particularly critical due to the need for cross-functional coordination, real-time service delivery, and close interaction with clients and partners. Strong management organization and support are consistently identified as key drivers of successful ERP implementation, as leadership commitment ensures strategic alignment, effective governance, and adequate resource allocation (Chofreh et al., 2020; Andersson, 2022). Empirical evidence shows that clear managerial structures, executive sponsorship, and business process re-engineering guided by top management significantly reduce resistance to change and enhance system integration, especially in large-scale and service-oriented organizations (Alsharari, 2022; Charles et al., 2023).

Human resource capability and technological capability further shape ERP implementation outcomes. The literature highlights that ERP systems require employees to possess sufficient technical skills, process knowledge, and adaptability to new workflows, making training and change management essential for system acceptance and effective use (Katuu, 2020; Bernardes, 2022; Chofreh et al., 2020). In B2B service organizations, employee competence directly influences service quality and operational efficiency. At the same time, technological capability—such as robust IT infrastructure, system compatibility, and the ability to integrate emerging technologies—plays a vital role in ensuring ERP scalability and sustainability (Andersson, 2022; Tavana, Hajipour, & Oveisi, 2020). Recent studies highlight the integration of ERP with technologies such as IoT and blockchain to improve automation, transparency, and inter-organizational coordination, which are critical in B2B service environments (Faccia & Petratos, 2021; Li, 2023). Overall, the literature suggests that the alignment of management support, skilled human resources, and strong technological capability is essential for achieving successful ERP implementation and sustained organizational performance.

Critical Success Indicators of ERP Implementation:-
Enterprise Resource Planning (ERP) implementation indicators are commonly evaluated through the quality of the system, the information it produces, and the services that support its use. These indicators are central to understanding how effectively ERP systems contribute to organizational performance and operational integration. In the Business-to-Business (B2B) service industry, high-quality ERP systems are essential for ensuring reliable service delivery, process coordination, and timely decision-making across organizational boundaries. System quality refers to the technical performance of the ERP system, including reliability, flexibility, ease of use, and integration capability. Prior studies indicate that robust and well-integrated ERP systems enhance operational efficiency and organizational performance by enabling seamless process automation and real-time data exchange (Tarigan, Siagian, & Jie, 2021; Prabowo, Haryono, & Soediantono, 2022). Advances associated with Industry 4.0 further highlight the importance of system quality, as ERP systems are increasingly integrated with technologies such as life cycle assessment tools and blockchain to improve transparency, traceability, and system responsiveness (Ferrari et al., 2021; Dasaklis, Voutsinas, & Mihiotis, 2021). Empirical evidence from various industries suggests that organizations with higher system quality experience smoother ERP implementation and greater performance gains (Silalahi, 2022; Kouriati et al., 2023).

Information quality and service quality are equally important indicators of ERP implementation effectiveness. Information quality refers to the accuracy, timeliness, relevance, and completeness of data generated by the ERP

system, which directly supports managerial decision-making and service coordination in B2B environments. Studies demonstrate that enhanced information quality resulting from ERP implementation improves firm performance and supports sustainable and green supply chain practices (Tarigan et al., 2021; Ferrari et al., 2021). In addition, Shbail et al. (2024) emphasize that both technological and individual factors influence how users perceive the quality of information produced by ERP systems, particularly in service-intensive sectors such as banking. Service quality, on the other hand, reflects the effectiveness of technical support, vendor responsiveness, training services, and system maintenance provided during and after ERP implementation. Research across SMEs and service-oriented organizations shows that high service quality strengthens user satisfaction and promotes continuous system use, thereby enhancing ERP success (Santana Hernández & Beltrán Ávila, 2020; Yanti et al., 2022). Recent studies further suggest that strong service support facilitates the adoption of advanced ERP functionalities and emerging technologies, contributing to sustained value creation in B2B service organizations (Kouriati et al., 2023; Silalahi, 2022).

Business Process Innovation:-
Business Process Innovation (BPI) is commonly defined as the purposeful redesign and transformation of business processes to achieve substantial improvements in organizational performance, particularly in response to digital transformation and evolving market demands (Qerimi, Demeter, & Losonci, 2024; Mendling, Pentland, & Recker, 2020). In the Business-to-Business (B2B) service industry, BPI is a critical mechanism for enhancing cost efficiency and process quality, as firms operate in highly competitive and service-intensive environments. The literature indicates that digitally enabled process innovations reduce operational costs by eliminating redundancies, automating routine tasks, and improving resource utilization (Ahmad & Van Looy, 2020; Van Looy, 2021). Empirical studies further demonstrate that the integration of digital technologies, ERP systems, and analytics strengthens process standardization and reliability, leading to higher process quality and more consistent service outcomes (Grisold et al., 2021; Rodriguez, Molina-Castillo, & Svensson, 2020). These improvements enable organizations to maintain operational control while remaining flexible in meeting client-specific requirements.

Value-added activities and delivery performance further capture the strategic outcomes of Business Process Innovation. The literature emphasizes that effective BPI shifts organizational focus from efficiency alone toward enhancing customer value and strategic differentiation through redesigned processes (Goni & Van Looy, 2022; Qerimi et al., 2024). The use of big data analytics and knowledge management capabilities allows organizations to identify, embed, and continuously refine value-adding activities within their processes, particularly in complex B2B service settings (Saide & Sheng, 2020; Mikalef & Krogstie, 2020; Nwankpa, Roumani, & Datta, 2022). In addition, BPI has been shown to significantly improve delivery performance by reducing cycle times, increasing responsiveness, and enhancing service reliability through digitally coordinated workflows and predictive capabilities (Grisold et al., 2021; Eom, Woo, & Chun, 2024). Collectively, these studies suggest that cost efficiency, process quality, value-added activities, and delivery performance represent key indicators of successful Business Process Innovation in the B2B service industry.

Business-to-Business (B2B) Service Industry:-
The business-to-business (B2B) service industry is defined by complex inter-organizational relationships, long-term collaboration, and value co-creation rather than transactional exchange. Brennan, McGrath, and Canning (2024) emphasize that B2B services depend heavily on trust, relational governance, and knowledge sharing between firms. The COVID-19 crisis exposed structural vulnerabilities in B2B service markets while simultaneously accelerating organizational adaptation, forcing firms to redesign business processes, service delivery mechanisms, and relationship management practices (Kang, Diao, & Zanini, 2021; Pedersen, Ritter, & Di Benedetto, 2020). These disruptions highlighted the importance of organizational resilience, agility, and collaborative networks, particularly for small and medium-sized enterprises and firms operating in emerging markets, where open innovation and inter-firm cooperation became critical survival strategies (Markovic et al., 2021).

Digital transformation and innovation have emerged as central forces shaping the evolution of the B2B service industry. Digitization capability enables B2B firms to redesign business models, enhance service customization, and improve operational efficiency (Ritter & Pedersen, 2020), while the integration of business intelligence and Industry 4.0 technologies supports data-driven decision-making and service innovation (Tavera Romero et al., 2021). Artificial intelligence is increasingly embedded in B2B marketing and service processes, improving customer insight generation, demand forecasting, and personalization, and reshaping how firms interact with organizational buyers (Chen et al., 2022; Han et al., 2021). In parallel, digital marketing and social media platforms have gained

strategic relevance in B2B contexts by supporting relationship development, market sensing, and knowledge exchange rather than purely promotional objectives (Hofacker et al., 2020; Dwivedi et al., 2023). Innovation performance in knowledge-intensive B2B services is further strengthened through R&D cooperation and skilled labor (Choi & Choi, 2021), while sustainability-oriented practices such as green marketing enhance inter-firm satisfaction and loyalty (Gelderman et al., 2021). Together, these developments position the B2B service industry as a dynamic sector increasingly driven by digitalization, collaborative innovation, and sustainability-focused strategies.

Hypotheses:-
Critical Success Factors of ERPImplementation Linked with Critical Success Indicators:-
Critical Success Factors (CSFs) of ERP implementation are essential elements that determine the effectiveness and success of ERP systems, particularly in the business-to-business (B2B) service industry. These factors include management support, human resource capability, technological readiness, and business process alignment, which collectively create the organizational and technical foundation necessary for successful ERP adoption (Katuu, 2020; Langenwalter, 2020; Tavana, Hajipour, & Oveisi, 2020; Alsharari, 2022; Chofreh et al., 2020). Studies by Andersson (2022) and Charles et al. (2023) emphasize that integrating ERP with business process reengineering strategies enhances operational efficiency, reduces resistance, and ensures alignment between organizational goals and system functionalities. Moreover, research highlights that industry-specific practices and contextual factors, such as internationalization strategies (Li, 2023) or small firm dynamics (Bernardes, 2022; Faccia & Petratos, 2021), significantly influence the identification and prioritization of CSFs, establishing a foundation for measurable success in ERP projects.

Critical Success Indicators (CSIs) are the measurable outcomes that reflect the effectiveness of CSFs and demonstrate whether ERP systems achieve intended organizational goals. Key CSIs include system quality, information quality, and service quality, which are directly influenced by the presence and strength of CSFs (Ferrari et al., 2021; Tarigan, Siagian, & Jie, 2021; Prabowo, Haryono, & Soediantono, 2022). For instance, technological readiness and management support as CSFs are linked to improved system reliability and user satisfaction, while human resource capabilities contribute to the accuracy and timeliness of information generated by the ERP system (Shbail et al., 2024; Yanti et al., 2022; Dasaklis, Voutsinas, & Mihiotis, 2021). Empirical studies further show that CSFs such as process alignment and organizational support positively affect service quality, reflecting the organization's ability to maintain consistent and effective ERP operations (Silalahi, 2022; Kouriati et al., 2023; Santana Hernández & Beltrán Ávila, 2020). This linkage emphasizes that the effectiveness of CSFs directly determines the achievement of CSIs, providing a framework to assess ERP implementation performance and guiding managers in aligning critical organizational, technological, and process factors with measurable outcomes. Based on this understanding, the following hypothesis is proposed:
H1: Critical Success Factors of ERP Implementation have a significant effect on Critical Success Indicators.

Critical Success Indicators of ERP Implementation Linked with Business Process Innovation:-
Critical Success Indicators (CSIs) of ERP implementation are the measurable outcomes that demonstrate the effectiveness and impact of ERP systems on organizational performance. In the business-to-business (B2B) service industry, key CSIs include system quality, information quality, and service quality, which serve as tangible reflections of ERP implementation success (Ferrari et al., 2021; Tarigan, Siagian, & Jie, 2021; Prabowo, Haryono, & Soediantono, 2022). High-quality systems and accurate information facilitate informed decision-making, improve operational efficiency, and enhance organizational responsiveness (Shbail et al., 2024; Yanti et al., 2022). Moreover, effective service quality ensures user satisfaction and engagement, reflecting the organization's ability to support ERP users and maintain system reliability (Dasaklis, Voutsinas, & Mihiotis, 2021; Silalahi, 2022; Kouriati et al., 2023). Empirical studies in SMEs and large-scale organizations further suggest that the presence of well-defined CSIs directly indicates the alignment of ERP systems with organizational goals, operational processes, and strategic priorities (Santana Hernández & Beltrán Ávila, 2020).

These CSIs are closely linked with business process innovation (BPI), which represents the organization's ability to improve cost efficiency, process quality, value-added activities, and delivery performance through innovative ERP-enabled processes (Qerimi, Demeter, & Losonci, 2024; Goni & Van Looy, 2022). The integration of ERP systems provides a platform for streamlining operations, facilitating digital transformation, and enabling data-driven decision-making, all of which are critical for process innovation (Grisold et al., 2021; Van Looy, 2021; Ahmad & Van Looy, 2020). Studies further highlight that advanced ERP functionalities, such as predictive analytics, big data

integration, and ICT-driven process automation, enhance an organization's process innovation capabilities by improving operational accuracy, efficiency, and value creation (Mendling, Pentland, & Recker, 2020; Eom, Woo, & Chun, 2024; Saide & Sheng, 2020). Additionally, ERP systems facilitate business model innovation and support knowledge management practices, enabling organizations to continuously refine their processes and achieve superior delivery performance (Rodriguez, Molina-Castillo, & Svensson, 2020; Nwankpa, Roumani, & Datta, 2022; Mikalef & Krogstie, 2020). This linkage emphasizes that the achievement of CSIs in ERP implementation directly supports business process innovation, establishing a framework to assess how ERP-driven performance metrics enable continuous process improvement and competitive advantage. Based on this understanding, the following hypothesis is proposed:

H2: Critical Success Indicators of ERP Implementation have a significant effect on Business Process Innovation.

Theory:-
To provide a comprehensive understanding of the factors and outcomes of Enterprise Resource Planning (ERP) implementation, the theoretical framework for this study integrates three established theories: The Technology–Organization–Environment (TOE) framework, the DeLone and McLean Information Systems Success (IS Success) Model, and Business Process Reengineering (BPR) theory. The TOE framework, as highlighted by Baker (2012) and Oliveira and Martins (2011), explains how technological characteristics, organizational readiness, and environmental pressures influence ERP adoption and implementation in organizations. Zarmpou, Tsiakis, and Giannakos (2012) further argue that the interplay between internal resources, management support, and external competitive pressures determines the extent to which firms successfully adopt ERP systems, making it particularly relevant for complex service-oriented industries.

Complementing this, the DeLone and McLean IS Success Model emphasizes the evaluation of ERP implementation through multiple dimensions, including system quality, information quality, service quality, user satisfaction, and net benefits (DeLone & McLean, 1992, 2003; Petter, DeLone, & McLean, 2008). This model provides a robust framework to assess both technical performance and organizational outcomes of ERP systems, highlighting how quality-related factors directly impact user adoption and overall organizational performance (Seddon, 1997; Wang & Liao, 2008).

Finally, BPR theory underscores the importance of redesigning and aligning business processes with ERP systems to maximize efficiency, cost reduction, and value creation (Hammer & Champy, 1993; Davenport, 1993). Grover et al. (1995) and Al-Mashari (2002) demonstrate that process reengineering is a critical mediator in translating ERP technology into operational and strategic benefits. By integrating TOE, IS Success, and BPR, this framework provides a holistic lens to study ERP implementation, linking organizational and technological readiness, system and information quality, and process innovation to firm performance outcomes.

Methodology:-
Research Design:-
This study investigates the relationships between the Critical Success Indicators (CSIs) of ERP implementation and Business Process Innovation (BPI), emphasizing how ERP-driven performance outcomes influence process improvement in business-to-business (B2B) service organizations. A correlational research design was employed to systematically examine the relationships among the variables, allowing for an understanding of how measurable ERP success indicators—such as system quality, information quality, and service quality—affect process innovation outcomes, including cost efficiency, process quality, value-added activities, and delivery performance. Partial Least Squares Regression-Structural Equation Modeling (PLS-SEM) was used to evaluate the proposed hypotheses, as it enables the assessment of complex relationships between latent constructs and provides robust insights into the direct and indirect effects of ERP implementation outcomes on business process innovation.

Participants and Data:-
The respondents of this study were employees of B2B service firms in the NCR, consisting of both male and female participants who are involved in ERP implementation in their respective companies. Data collection was conducted online through Google Forms over a month-long period. The number of samples is a minimum of 111 respondents based on an a priori statistical power analysis using G*Power with power = .95 $(1 - \beta)$, effect size = .10, and $\alpha = .05$.

Statistical power analysis is the appropriate method in computing the sample size when the goal is to accept or reject any hypothesis (Cohen, 1988, 1990, 1992; Kyriazos, 2018; Barker et al., 2016; Amora, 2020).

Instrumentation:-
The survey questionnaire was used to collect data from the respondents. Likert scale items were formulated based on the guidance from previous literature to measure each of the constructs as detailed in Table I:

Table 1 Likert Scale Items

Variables/Constructs	Questionnaire Items / Indicators	Source
Critical Success Factors of ERP Implementation	• Management structure has full support on ERP implementation. • Culture of employees in line with the functions and objectives of the ERP system • There is a regular training and skills enhancement related to ERP systems. • Knowledge management through the ERP is part of the organizational culture. • ERP software is effective in delivering its expected functionality. • There is sufficient hardware (e.g. Computers and Servers) for our ERP systems.	Katuu, S. (2020). Langenwalter, G. A. (2020).
Critical Success Indicators of ERP Implementation	• Our ERP systems are very flexible and easily customized in response to the changing objectives of our company. • Users find it easy to use the software and hardware involved in our ERP systems. • Timely information or reports are generated as needed by our ERP systems. • Users can easily understand and relate with the information or reports from our ERP systems. • Users can rely to our ERP systems to always function accordingly. • ERP support is very responsive in times of queries or concerns with any part of the system.	Tarigan, Siagian, & Jie, (2021). Silalahi, (2022).
Business Process Innovation	• Our company regularly decreases the cost of operations. • Our company determines and eliminates non-value adding activities in its different processes. • Our company is successful in modifying procedures and methods in our business processes. • Our company regularly adapts it business processes in line with new opportunities. • Our company continue look and try sophisticated technology or procedures in order to increase efficiency or productivity without sacrificing quality.	Qerimi, Demeter, & Losonci, (2024). Goni & Van Looy, (2022).

Each construct or latent variable described in the conceptual framework is intended to be measured by the questionnaire items with a 4-point Likert scale. Respondents assess it based on how much they concur with each of these assertions (Hair et al., 2011).

Statistical Treatment:-
The Partial Least Squares-Structural Equation Modeling (PLS-SEM) was employed in this study to examine how the Critical Success Indicators (CSIs) of ERP implementation influence Business Process Innovation (BPI). PLS-SEM

was chosen as it allows for the simultaneous analysis of multiple indicators and their interactions, providing a robust alternative to techniques such as multiple regression, factor analysis, covariance analysis, and path analysis. In addition, mediation analysis was conducted to investigate the potential mediating effects of specific ERP outcomes, such as system quality, information quality, and service quality, on the relationship between ERP implementation and BPI.

Using a quantitative research design, this study adopted a causal-comparative approach to evaluate the relationships among CSIs and process innovation variables. The structural modeling approach of PLS-SEM is particularly suitable for maximizing the explained variance in endogenous latent variables, enabling a comprehensive assessment of how ERP-driven success indicators contribute to enhancing cost efficiency, process quality, value-added activities, and delivery performance (Hair et al., 2011).

Data Analysis:-
Measurement Model Evaluation:-

Table 2 Construct Validity and Scale Reliability

Construct	Items	Cronbach's α	Loadings	Ave. Var. Ext.	Validity	Reliability
Critical Success Factors of ERP Implementation	1	0.918	0.825	0.798	Yes	Yes
	2		0.866			
	3		0.822			
	4		0.804			
	5		0.872			
	6		0.868			
Critical Success Indicators of ERP Implementation	1	0.924	0.817	0.760	Yes	Yes
	2		0.883			
	3		0.897			
	4		0.835			
	5		0.875			
	6		0.932			
Business Process Innovation	1	0.884	0.772	0.685	Yes	Yes
	2		0.770			
	3		0.773			
	4		0.857			
	5		0.825			

Note: Cronbach's alpha should be larger than 0.70 for reliability. All loadings must be more than or equal to 0.50 for convergence validity, and all Average Variance Extractedshould be => 0.50 when extracted.

The reliability and convergent validity test results are shown in this Table 2. All survey items measuring each construct considerably exceeded the required Cronbach's coefficient value of at least 0.70. This evidence the

reliability of each construct. In establishing convergent validity, the standard is that all loadings and all Average Variance Extracted (AVE) should be =>0.50. Based on the analysis, the relevant constructs' items exceed these standards.As a result, these items were valid in measuring each construct.

Table 3 Discriminant Validity for Reflective Constructs

Constructs	1	2	3	Discriminant Validity
Critical Success Factors of ERP Implementation (1)	**0.842**			Yes
Critical Success Indicators of ERP Implementation (2)	0.714	**0.861**		Yes
Business Process Innovation (3)	0.689	0.732	**0.879**	Yes

The Square Root of AVE (bold figures) should, for Divergent Validity, be higher than the correlations between constructs (diagonal figures).

Table 3 shows the results of discriminant validity to determine if respondents can distinguish one variable from the other and grasp the differences between the variables is known as discriminant validity, also known as divergent validity. The square root of the AVE (SQRTAVE), shown in bold figures, must be greater than the correlations of each variable to one another for there to be discriminant validity among the constructs. This type of validity test is a measure of whether respondents can distinguish one variable from another and identify their differences. Therefore, as exhibited in Table 3, each construct meets the standard; thus, it means that the constructs meet discriminant validity. The measurement model is deemed appropriate considering the findings of composite reliability, convergent reliability, and discriminant validity. Therefore, it is possible to execute the structural model evaluation right then.

Structural Model Evaluation:-
Direct Path Evaluation:-

Direct Path	Estimate	SE	Z	p
Management Organization Support → System Quality	0.37	0.0915	4.04	< .001
Management Organization Support → Information Quality	0.119	0.1038	1.14	0.254
Management Organization Support → Service Quality	0.286	0.1050	2.73	0.006
Human Resource Capability → System Quality	0.314	0.0865	0.086	< .001
Human Resource Capability → Information Quality	0.295	0.0982	3.01	0.003
Human Resource capability → Service Quality	0.335	0.0993	3.38	< .001
Technology Capability → System Quality	0.291	0.0857	3.39	< .001
Technology Capability → Information Quality	0.367	0.0972	3.78	<.001

Technology Capability → Service Quality	0.155	0.0983	1.57	0.116

Table 4 Effect of Critical Success Factors of ERP Implementation on Critical Success Indicators

Note: If the p-value is lower than 5% or 0.05, it is statistically Significant. If the p-value is greater than 5%, the result is statistically non-significant.

Table 4 shows the direct path evaluation results for the effect of Critical Success Factors (CSFs) of ERP Implementation on Critical Success Indicators (CSIs) in the Business-to-Business service industry. The findings indicate that Management Organization Support has a significant positive effect on System Quality (ß = 0.37; p < .001) and Service Quality (ß = 0.286; p = 0.006), meaning that for every one-level increase in management support, system quality and service quality are likely to increase by 0.37 and 0.286, respectively. However, its effect on Information Quality (ß = 0.119; p = 0.254) is not significant.

Human Resource Capability shows a significant positive effect on all three CSIs: System Quality (ß = 0.314; p < .001), Information Quality (ß = 0.295; p = 0.003), and Service Quality (ß = 0.335; p < .001). Technology Capability positively affects System Quality (ß = 0.291; p < .001) and Information Quality (ß = 0.367; p < .001), but not Service Quality (ß = 0.155; p = 0.116). These results collectively show that management support, human resource capability, and technology capability influence most aspects of ERP performance outcomes.

Overall, the findings provide strong evidence that Critical Success Factors of ERP Implementation significantly affect Critical Success Indicators in the B2B service industry. While some individual paths, such as management support on information quality and technology capability on service quality, are not significant, the main hypothesis is supported, confirming that effective ERP implementation relies on these critical factors to improve system quality, information quality, and service quality across B2B service firms.

Table 5 Effect of Critical Success Indicators of ERP Implementation on Business Process Innovation

Direct Path	Estimate	SE	Z	p
System Quality → Business Process Innovation	0.170	0.0453	3.75	< .001
Information Quality → Business Process Innovation	0.251	0.0459	5.46	<.001
Management Organization Support → Business Process Innovation	0.497	0.0456	10.9	<.001

Note: If the p-value is lower than 5% or 0.05, it is statistically Significant. If the p-value is greater than 5%, the result is statistically non-significant.

Table 5 shows the direct path evaluation results for the effect of Critical Success Indicators (CSIs) of ERP Implementation on Business Process Innovation in the Business-to-Business service industry. The findings indicate that System Quality has a significant positive effect on business process innovation (ß = 0.170; p < .001). This means that for every one-level increase in system quality, business process innovation is likely to increase by 0.170, suggesting that reliable and efficient ERP systems support innovation in business processes.

Information Quality also has a significant positive effect on business process innovation (ß = 0.251; p < .001), indicating that higher-quality information from ERP systems enhances the firm's capability to innovate processes effectively. Additionally, Service Quality, influenced by management organization support, shows a strong positive effect on business process innovation (ß = 0.497; p < .001). These results collectively provide strong evidence that Critical Success Indicators of ERP Implementation significantly enhance Business Process Innovation in B2B service firms. The findings highlight that ERP system performance, high-quality information, and effective service delivery are crucial drivers for fostering innovation in business processes.

Conclusion:-
Critical Success Factors on Critical Success Indicators of ERP Implementation:-
Based on the evaluation of results, it concludes that the Critical Success Factors (CSFs) of ERP Implementation, including management organization support, human resource capability, and technology capability, significantly influence the Critical Success Indicators (CSIs) such as system quality, information quality, and service quality. Effective management support, skilled human resources, and robust technological infrastructure enable ERP systems to function optimally, ensuring reliable systems, accurate information, and high-quality services. This finding aligns with prior research, which suggests that the success of ERP implementation largely depends on these critical organizational and technological factors (Katuu, 2020; Andersson, 2022; Charles et al., 2023). These results provide valuable insights into the B2B service industry, where ERP systems play a crucial role in streamlining operations and improving organizational efficiency.

Critical Success Indicators of ERP Implementation on Business Process Innovation:-
The results indicate that Critical Success Indicators (CSIs) of ERP Implementation positively affect Business Process Innovation in the B2B service industry. High system quality, accurate and timely information, and efficient service delivery significantly enhance a firm's ability to innovate its business processes, improve operational efficiency, and add value to its services. This conclusion is consistent with prior studies emphasizing that well-functioning ERP systems are key drivers for innovation by providing reliable data, supporting process reengineering, and enabling technology-driven improvements (Ferrari et al., 2021; Rodriguez et al., 2020; Nwankpa, Roumani, & Datta, 2022). These findings highlight the strategic importance of ERP implementation in the B2B service industry, where process innovation is critical for maintaining competitive advantage and responding effectively to dynamic market demands.

Implications:-
For Theory Development:-
This study contributes to the growing body of knowledge on ERP implementation by reinforcing theoretical linkages between technological, organizational, and environmental factors, and their influence on system success and business process innovation. Using the Technology–Organization–Environment (TOE) Framework (Tornatzky & Fleischer, 1990; Oliveira & Martins, 2011), the findings validate that organizational support, human resource capability, and technological readiness are critical success factors (CSFs) that drive critical success indicators (CSIs) such as system quality, information quality, and service quality. Moreover, applying the DeLone and McLean IS Success Model (DeLone & McLean, 2003; Seddon, 1997) illustrates that high-quality ERP systems enhance information accuracy, usability, and service efficiency, which in turn positively impact business process innovation. Complementing these, Business Process Reengineering (BPR) Theory (Hammer & Champy, 1993; Davenport, 1993) supports the interpretation that optimized ERP systems facilitate process improvements, cost efficiency, and value-added activities. Collectively, these theoretical perspectives highlight the interplay between CSFs and CSIs as critical enablers for process innovation in B2B service firms, offering a robust framework for future ERP-related research.

For Business and Management Practice:-
The results underscore that managers in B2B service firms must strategically focus on CSFs—management support, human resource capability, and technological infrastructure—when implementing ERP systems. Investing in employee training, technical skills, and organizational readiness ensures that ERP systems achieve high system, information, and service quality, which are essential for driving business process innovation. Top management involvement is particularly crucial for resource allocation, policy alignment, and fostering a culture that values continuous process improvement. Firms are encouraged to leverage ERP systems not only for operational efficiency but also for process innovation, enabling improved delivery performance, cost efficiency, and value-added services. The study also highlights that integrating emerging technologies such as IoT or blockchain within ERP can further enhance system reliability and process transformation.

For the B2B Service Industry:-
For the broader B2B service sector, this study emphasizes that ERP success requires a balanced approach, integrating technological capabilities, organizational readiness, and process-oriented strategies. The identification of key CSFs and their linkage to CSIs provides empirical evidence that successful ERP adoption is not merely a technical implementation but a socio-technical and strategic initiative, aligning organizational processes with technology to foster innovation. These findings also suggest that B2B service firms should prioritize continuous

improvement, knowledge sharing, and process reengineering to sustain competitive advantage in dynamic markets. Finally, the study supports further theory-driven exploration, offering a foundation for examining how CSFs and CSIs jointly influence business process innovation, operational excellence, and value creation in the B2B service context.

Declarations:-
Ethics approval and consent to participate:-
The objectives, contents, and conclusion of this research were evaluated by a Research Ethics Board of a University and were found meritorious. No violations of research ethics standards were found, as the researchers were cautious and courteous in their data-gathering. There is no potential conflict of interest to declare. Informed consent was secured from the participating companies before data gathering.

Availability of data and materials:-
Research data is gathered through an online survey which is available upon request.

Competing interests:-
The authors declare that they have no competing interests

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