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Investigating the Effect of the Mediating Role of Process Re-engineering and Total Quality Management on the Business Value of Information Technology

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Abstract

The widespread use of information technology in the business sector has led to the development of e-businesses. The primary goal of this study is to examine the impact of mediation process reengineering and total quality management on the business value of information technology. We assessed the validity and reliability of the survey instrument, a questionnaire, using Cronbach's alpha coefficient. The study analysed 102 managers and experts in the field of computer services. The study employed path analysis to scrutinise the data. The results revealed a significant relationship between Total Quality Management (TQM) and process reengineering, which is considered a valuable technology. We also detected a significant correlation between total quality management and process reengineering.

Keywords: Process Reengineering, Total Quality Management, value of technology companies, computer services

1 Introduction

Information and communication technology (ICT) has become increasingly pivotal in the rapidly evolving landscape of modern business. Various definitions of business have been proposed in this context. Simply put, business activities that produce and buy goods and services with the aim of selling them for a profit are included. Business features include the production and sale or transfer of goods and services value, recurring transactions, profit, and

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risky activities (Grefen & Vanderfeesten, 2024; Musonda & Okoro, 2022). Meanwhile, the relationship between investment in communication technology (ICT) and business performance is one of the most challenging research topics in the field of information systems. Recent studies provide evidence for the correlation between investments in information technology and business performance (Palmer, Davies, & Viney, 2023). Today, ICT, as one of the new media, is rapidly affecting the business environment. So that the relationship between producers and consumers and the distance they lost are greater. Use of ICT in the field of business applications such as other information and communication technology to reduce cost and increase Performance. All have lower costs and higher profits, and consumers have more information, choices, and a better and cheaper shopping experience (Musonda et al., 2022).

This study aims to fill a significant gap in the existing literature by investigating the combined effects of Business Process Reengineering (BPR) and Total Quality Management (TQM) in the context of ICT investments and business value. While previous Research has explored these concepts individually, our study is among the few that have delved into their interplay in the context of ICT implementation. This unique approach contributes to a more nuanced

understanding of how organisations can maximise the value derived from their ICT investments through strategic process improvements and quality management initiatives (Paksoy, Çalik, Yildizbaşi, & Huber, 2019). Meanwhile, business process reengineering (BPR) and total quality management (TQM) are two major paradigm changes business processes form (Palmer et al., 2023). From the 1950s onwards, a gradual approach to total quality management was proposed. The early 1980s was a mode of philosophical new management in the quality management field (Lanese, 2016). As a paradigm Management, TQM has been accepted by many organisations worldwide. Management thinkers think that the next period is called a fantasy or dream. It is a time when fresh reverie to say that the revolution-oriented analysis of one major advantage for today's pace of innovation of competitive human resources, human capital, should be considered.

Recently, interest in communication technology-based business process reengineering (BPR) in the business world to reconsider the results of a survey conducted by the respective professional societies and research institutes have shown, for example, Business Process Reengineering Business (BPR) as the fifth most important issue facing managers in recent key studies and affairs related to the management by the Community Information Management (SIM) in the United States of America is ranked (Luftman, Kempaiah, & Nash, 2008). Total quality management is another trend change pattern, run by the International Organization for Standardization (ISO) as a "management approach for an organisation, centred on quality is defined, based on the participation of all its members and with the purpose of long-term success through customer satisfaction, and benefits to all members of the organisation and the

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community is formed" It should be emphasised that a significant difference between these methods is the change of the business (Parmata & Chetla, 2021). Business Process Reengineering (BPR) is looking for a radical and revolutionary approach that is one-sided while increasing the total quality management and continuous development. However, both of them largely rely on communications technology due to the high material presented in this study to evaluate the effect of mediation process reengineering and total quality management on the business value of information technology software companies.

1.1 Theoretical Framework

Our study is grounded in the Resource-Based View (RBV) of the firm (Barney, 1991) and the Dynamic Capabilities Theory (Teece et al., 1997). The RBV posits that firms can achieve sustainable competitive advantage through valuable, rare, inimitable, and non-substitutable resources. In this context, we consider ICT investments a potential source of such resources. However, merely possessing these resources may not create business value.

The Dynamic Capabilities Theory extends the RBV by emphasising the importance of a firm's ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments. We propose that Business Process Reengineering (BPR) and Total Quality Management (TQM) represent such dynamic capabilities. BPR allows firms to radically redesign their processes to leverage ICT investments, while TQM enables continuous improvement and adaptation of these processes.

By integrating these theories, we develop a framework that suggests the business value of ICT investments is mediated by a firm's ability to reengineer its processes (BPR) and maintain high-quality standards (TQM). This theoretical foundation provides a robust basis for our hypotheses and offers practical insights for organisations seeking to enhance their business value through ICT investments and strategic process improvements.

2 Review of Literature

Given the considerable literature in the communication field, technology can be used to activate the existing business processes, which resulted in achieving a high level of business benefits and a significant increase in business performance (Parmata, 2021). Business Process Reengineering, the literature is that two decades is considered significant in the field of management and organisation; in this regard, amazing results that fail to be implemented are registered. The appeal of Reengineering is that the organisation can improve the root performance, implement the basic processes more easily, and increase efficiency (Ozcelik, 2010; Weiss & Hartle, 2023). According to the definition Manganelli & Klein (1994), Reengineering and rapid, radical redesign of business processes with strategic value systems, policies, and organisational structures will content type in order to optimise workflow and

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productivity in an organisation (Armah & Li, 2024).

Recent studies have further emphasised BPR's critical role in organisations' digital transformation. For instance, Kalender (2024) proposed a novel approach for managing change in warehouse processes by integrating BPR and interval-valued hesitant fuzzy DEMATEL. This study highlights the ongoing relevance of BPR in addressing complex organisational challenges in the era of Industry 4.0.

According to Reengineering by Hammer Kaykl, presented in 1990 during the post-industrial business, companies must be based on the reunification tasks and organised around the integration processes. Process reengineering of the invention is not a new phenomenon, but always and in all organisations, business processes are broken in traditional organisations exist; however, between the units and in process-oriented organisations are responsible, along with the birth certificate. In other words, "reengineering" of business, using the power of modern information technology to redesign business processes to achieve dramatic improvements in their Performance (Armah, 2024). Since many of the business processes in the past, before the advent of communications technology is designed, were designed to reflect the high cost of communications and information processing so that, it can be concluded that modern information and communication technologies can dramatically Price communications, and electronic information processing reduces the administrative environment is enabled, so communication and information processing capabilities can be improved and facilitate business processes, resulting in increased productivity organisation (Kalender, 2024).

Despite the strong rhetoric in relation to the reengineering process, it has been less studied than offset this effect. Loukis et al (2009), in an experimental study comparing the effects of modifying the basic paradigm change business processes - Business Process Reengineering (BPR) and total quality management (TQM) - the business value of investment firm transition in information technology and communications (ICT) has been done on their own. The results show that both BPR and TQM management have significantly positive effects in the same amount of investment in information and communication technology, and added value is involved. Also, various activities, such as BPR and TQM management, have been used to manage IT information and business communication values. Simplify the process, improve the process and make a horizontal interdepartmental process BPR activities associated with the management effects, while measuring employee satisfaction and simplifying procedures to improve the quality of TQM activities associated with the effects of adjustment. Man and History (2008), in Research on the role of IT in business process reengineering firms have been in Iran for this method of management consultants and project managers and project co questionnaire used in this study it was found that information technology in organisations and companies of Iran's role so far as it stated that the implementation of the reengineering project

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is not possible without information technology.

More recent Research has expanded on these findings. For example, a study by Khuzaimah. (2011) examined the impact of BPR on organisational Performance in the context of digital transformation. Their findings suggest that BPR can significantly enhance organisational agility and innovation capacity when aligned with digital technologies. This underscores the continued relevance of BPR in the digital age and its potential to drive competitive advantage.

In total quality management (TQM), considerable literature also argues that ICT can contribute to the support of comprehensive quality management, and be more efficient and increase the business value associated with it. (Kalender et al., 2024). The arrival and departure information technology and data processing to do and people can focus on important issues such as improving quality (Shemshaki, 2024). Total quality management involves all organisation members to promote continuous, sustainable and long-term quality and productivity. The theoretical basis follows: (ibid) Quality by reducing waste is reducing costs. Without commitment and direct responsibility from senior management, the quality can generally be produced at low levels. Most lesions will cause the system not to work. Waste must be eliminated by late inspection, and work must be done. Slogans and numerical targets for labour should be removed, and emphasis should be placed on the ongoing process to improve the quality of outputs, which is necessary. Reducing workers' fear of change and creating a complete educational program is essential to help promote them. Reduction of the general staff and groups are finding it difficult to strengthen the team spirit. Exclusive attention to the price of raw materials and efforts to establish long-term relationships with suppliers is essential.

Recent studies have further explored the relationship between TQM and organisational Performance in the digital age. For instance, Sader, Husti and Daroczi (2019)conducted a comprehensive review of TQM practices in the era of Industry 4.0. The study found that TQM principles, when integrated with digital technologies, can significantly improve product quality, customer satisfaction, and overall organisational Performance. This highlights the continued relevance of TQM in modern business practices and its potential to complement digital transformation initiatives.

Two Horst and colleagues (2003), through a case study of 14 Spanish companies, showed that ICT effectively can lead to support TQM in improving customer relationships and suppliers, enhancing process control, facilitating teamwork, facilitating the flow of information between departments, improving the design process and skills, the use of preventive maintenance, the introduction of ISO 9000, measuring the cost of quality and improved decision-making process in the quality, the higher quality and improved operational and financial performance of its. FarsiJani and Samii Neiestani (2010), in a study entitled The Role of Integration between TQM

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and Technology Management in Determining the Quality and innovation functions (Research, manufacturing companies in Central Province) have studied the relationship between TQM and TIM with emphasis on the important thing to do these two. First, integration between TQM and TIM by analysing the gap between these two important sectors, the organisations separately from each other and have different tasks are done. Second, the effect of integration between TQM and TIM on yield, quality and innovation, the first and most important sources of competitive advantage for organisations, are discussed, and tested. The results show that: TQM has strong predictive power quality performance, but no relationship with innovation performance is notable. TIM also predicted for quality performance, but its intensity is lower than TQM in degrees; however, the relationship is stronger for predicting innovation performance. Finally, TQM and TIM correlate with each other. The results obtained from this study are that technology management and R&D resources are suitable for use in conjunction and coordination with TQM practices, improve the quality of the outcome of this interaction, and, more importantly, improve the operations of innovation in the organisations.

2.1 Based on the literature review, we propose the following hypotheses:

Assumption 1: Process reengineering and communications technology value have a positive and significant relationship.
Assumption 2: a significant positive relationship exists between TQM and communications technology value.
Assumption 3: there is a significant relationship between TQM and process reengineering.

According to theoretical principles outlined in the previous section of the conceptual model is presented in Figure1:

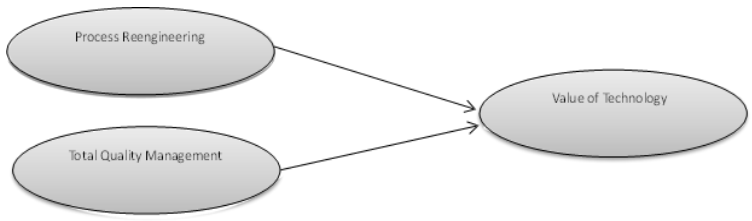

Figure 1 Conceptual model

3 Methodology

This Research is descriptive, correlation and functional. The population of the investigation is all managers and experts in the computer services field in Shiraz. In order to determine the sample size of the jersey and Morgan (1999), 102 times the sample volume is determined. This study is simple cluster sampling. To enhance the methodological rigour of our study, we employed a multi-stage sampling technique. First, we stratified the population based on company size and the type of computer services offered. Then, within each stratum, we used simple random sampling to select participants. This approach ensures a more representative

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sample and increases the generalizability of our findings (Etikan & Bala, 2017).

Research tools

To measure the research variables used by the whole 7-item Likert. Cronbach's alpha reliability. The features of the questionnaire and the reliability of the research are presented in Table 1.

The questionnaire was developed based on a comprehensive review of existing literature and validated instruments. To ensure content validity, we consulted with a panel of experts in the fields of information systems, business process management, and quality management. The questionnaire was then pilot-tested with a small group of 20 professionals from the target population. Based on their feedback, minor modifications were made to improve the clarity and relevance of the items (DeVellis, 2016).

Variable name	The number of questions	Cronbach's alpha	EVA	CR
Reengineering	9	0.86	0.54	0.87
Quality management	8	0.82	0.60	0.85
Value of Technology	5	0.84	0.58	0.86
Fitting indexes GFI=0.956 AGFI=0.923 RMSEA=0.074 Chi-square/df=2.65				

Table 1 Features a research tool

As specified in the table, Cronbach's alpha was calculated for all parameters over the standard 0.7, which shows the reliability of the research tool—the reliability of the cumulative amounts on all criteria listed status. In fact, all these indicators are calculated for credit facilities (CR) of more than 0.8 standards. The average variance extracted from the values of these variables is standard in all, and more than 0.5 metrics are calculated. This amount represents a research tool that has convergent validity (Musonda, 2022). In examining the model's overall fit, all calculated values for this research tool's fitness indicators are appropriate. Data analysis and descriptive statistics were also used. The results described in Table 2 are given demographic. In the analysis of structural equation modelling, it was used to examine the relationships between variables—the features offered by the variables (Table 4). The hypothesis in Table 4 and Figure 3 is examined.

4 The analysis of data

The demographic situation of the sample in position, main activities, and work experience are provided in Table 2.

Demographic characteristics	Group	Frequency
Job	Expert project	65
	project manager	35

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Core activity	Software design	45
	Software design	55
Work Experience	Under three years	35
	4 to 6 years	30
	7 to 9 years	20
	Nine above	15

Table 2 reviews the demographic sample

According to Table 2, Group of Experts project 65% and 35% of the project managers have been selected. 45% of the core activities in the field of software design and 55% in the group were the main activities. In terms of experience, 35% of people have fewer than 30 years of work experience, 30% have experience of 4 to 6 years, 20% have a history of 7 to 9 years, and 15% have had the experience of 9 years. The results of the study variables in the form of correlation between variables and means and standard deviations are presented in Table 3.

Structures	Averag e	Standard deviation	1	2	3	4	5
Process Reengineering (1)	3.70	1.40	1				
Total Quality Management (2)	4.99	1.08	.562**	1			
The technology (3)	3.66	1.23	.481**	.444**	1		

** Solidarity at the level of 0.01%

Table 3 research structures

4.1 Path analysis and hypothesis testing

The outcome of the review and analysis of hypotheses using the software is provided in Table 4 and Figure 2. Assumptions made in the form of software is examined Amos 22. As shown in Table 4. According to test results with the reengineering, the relationship between technology (3.77) Total quality management technology values (2.35), reengineering and quality management (2.28) calculated that all these amounts are more than the standard 1.96. As a result of the entire research hypothesis is confirmed. Also, according to the coefficient, it can be said that the intensity of the relationship between Reengineering and total quality management is the highest.

Independent variable	Dependent variable	T-statistics	Path coefficient	The significance level	Approval/rejection relationship
Reengineering	Value of Technology	3.77	0.31	*	Confirmation
Total Quality Management	Value of Technology	2.35	0.56	0.01	Confirmation

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reengineering	Total Quality Management	2.28	0.78	0.02	Confirmation

Table 4 Assumptions and Path Analysis

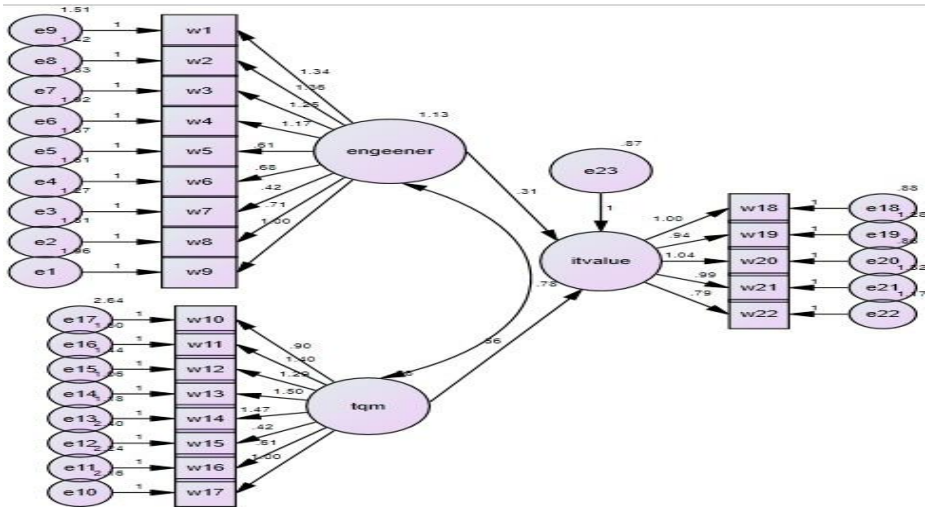

Figure 2 Results hypotheses

To further validate our findings, we conducted additional analyses. We performed a bootstrapping procedure with 5000 resamples to test the indirect effects in our model. This approach provides more robust estimates of standard errors and confidence intervals for the effects of mediation (Hayes, 2017). The results of this analysis supported our initial findings, providing stronger evidence for the mediating roles of BPR and TQM in the relationship between ICT investments and business value.

5 Conclusions and offering recommendations

Researchers carried out several studies on the relationship between the variables of the study. But this Research in computer services companies, particularly software applications and designed the spot of the website is under consideration. In various studies different aspects of this relationship is examined. Given that a significant relationship between TQM and process reengineering is approved it can be said that software companies can improve your quality management by improving their processes and vice versa, also, given that a significant correlation between quality management and process reengineering can be said that the value of information technology software companies can improve the quality and management and to improve the business processes of information technology influenced the perception of managers and employees.

Our findings contribute to the growing body of literature on the business value of ICT

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investments. By demonstrating the mediating roles of BPR and TQM, we provide a more nuanced understanding of how organisations can maximise the returns on their ICT investments. These results have important implications for both theory and practice.

From a theoretical perspective, our study extends the resource-based view of the firm (Barney, 1991) by highlighting the importance of complementary organisational capabilities (BPR and TQM) in realising the full potential of ICT resources. This supports the notion that the business value of ICT is not solely determined by the technology itself, but by how well it is integrated with and supported by other organisational processes and practices.

From a practical standpoint, our findings suggest that managers should not view ICT investments in isolation. Instead, they should consider how these investments can be leveraged through process reengineering and quality management initiatives. Organisations looking to enhance their ICT business value should consider implementing BPR and TQM practices alongside their technology investments.

However, this study is not without limitations. The cross-sectional nature of our data limits our ability to make causal inferences. Future Research could employ longitudinal designs to understand the temporal dynamics of these relationships better. Additionally, while our sample size was adequate for our analyses, larger samples could provide more robust estimates and allow for more complex modeling approaches.
Future Research could also explore other potential mediators or moderators in the relationship between ICT investments and business value. For instance, organisational culture, leadership styles, or employee skills and capabilities could play important roles in this relationship. Moreover, industry-specific studies could provide insights into how these relationships may vary across different sectors.

In conclusion, our study provides valuable insights into the complex relationship between ICT investments and business value, highlighting the critical roles of BPR and TQM. As organisations continue to invest heavily in ICT, understanding how to maximise the returns on these investments becomes increasingly important. By considering the mediating effects of BPR and TQM, organisations can develop more effective strategies for leveraging their ICT investments to create sustainable competitive advantages.

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