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Do Change Management Influence ERP Implementation Success? Evidence from Morocco

Smail Mahjoubi*, Smail Kabbaj

Laboratory for Prospective Research in Finance and Management (LRPFG), University HASSAN II – Casablanca, Morocco.

*Email: s.mahjoubi33@gmail.com

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ABSTRACT

This study investigates the change management in the implementation of Enterprise Resource Planning (ERP) systems within Moroccan companies. Focusing on a range of technological, organizational, and environmental (TOE) elements, this research aims to identify key drivers and challenges that companies face in digital transformation. Through an analysis of various case studies and empirical data, the study evaluates the roles of managerial support, employee engagement, infrastructure alignment, and proactive risk management in ensuring ERP project success. Findings highlight the necessity of a robust change management framework, aligned strategic goals, and sufficient resource allocation for achieving sustainable ERP implementation success. This research contributes to the existing literature by offering a comprehensive model for ERP system adoption in Moroccan companies, providing practical insights for organizations seeking to enhance their competitive edge in a digitalized market.

Keywords: Enterprise Resource Planning, Implementation, Operational Efficiency, Change Management
JEL Classifications: M15, L80

1. INTRODUCTION

Over the past century, globalization, the Fourth Industrial Revolution, and rapid technological advancements have fueled the growth of dynamic firms. Consequently, 21st-century companies are increasingly embracing open innovation, which effectively transforms the world into a global village. In today's landscape, technological breakthroughs are essential for any firm's survival and adaptability. As companies face heightened demands for faster, better, and more cost-effective solutions, technology-driven open innovation—connecting both inbound and outbound partners—has become crucial for achieving competitive advantage and turning challenges into opportunities. Thus, the integration of open innovation through Enterprise Resource Planning (ERP) systems has become pivotal, enhancing dynamic capabilities that drive a firm's sustainable competitive advantage.

In addition to technical, operational, and strategic benefits, previous research highlights a broad range of collaborative advantages such as improved performance, productivity, streamlined business processes, enhanced efficiency, customer service, and overall effectiveness. ERP systems also help reduce costs, energy use, communication bottlenecks, material waste, and cycle times. However, ERP adoption and implementation depend on various factors, including a firm's financial resources, available expertise, and infrastructure. Globally, ERP systems operate as integrated, module-based software that supports a comprehensive flow of knowledge and materials across a firm's collaborative processes, connecting both upstream and downstream stakeholders. By automating collaborative networking and eliminating duplicate activities across functional areas, ERP systems deliver a significant competitive advantage.

ERP implementation demands a strong commitment from all resources involved, leading to significant improvements across various aspects of business operations (Peterson et al., 2001; Amid et al., 2012). According to Al-Mashari, ERP adoption is complex, highly resource-intensive, and often disruptive, necessitating deep organizational change. Despite these challenges, organizations pursue ERP systems to achieve competitive advantages and enhance global integration through better information flow. ERP has become the most widely adopted solution in developed countries and is increasingly appearing in developing nations (Al-Mashari, 2002).

Since most cloud ERP clients are small firms, SMEs are drawn to cloud ERP for its flexibility, ease of management, and especially its low costs for licensing, maintenance, and overall investment these benefits, cloud ERP has limitations, including concerns around security, privacy, trust, a lack of industry-specific standards, and potential data loss. Never widely adopted across various sectors and countries to boost competitive advantages and enhance performance. However, the expected beneficence and competitiveness from cloud ERP depend on successful integration. Studies reveal mixed outcomes; sensitive effects of cloud ERP on firm performance, while others find a minimal impact. Many of these st direct link between cloud ERP and p suggest this relationship is not strictly linear. These conflicting results highlight the need to examine factors influencing cloud ERP's impact on performance. Additionally, top management support (TMS) is widely regarded as a critical success factor in organizational processes. For cloud ERP, literature confirms TMS as a key predictor of successful implementation.

This study will focus on the role of change management in ERP implementation, examining both theoretical and empirical perspectives. The paper will begin by reviewing relevant literature to provide a foundational understanding, followed by an outline of the research methodology used. The final sections will present the study's findings, leading to a comprehensive discussion in the conclusion.

2. LITERATURE REVIEW

2.1. Theoretical Literature Review

2.1.1. The Technology-Organization-Environment (TOE) Framework

The TOE framework identifies three organizational contexts that impact technological innovation: technological, organizational, and environmental. The technological context encompasses available and emerging technologies. The organizational context includes firm characteristics such as size and resource availability. The environmental context covers external factors like competitors and industry relations. Due to its strong empirical validation, TOE effectively examines adoption factors and innovation utilization (Wang et al., 2010; Zhu and Kraemer, 2005). Its comprehensive inclusion of these contexts gives TOE an advantage over other models in exploring technology adoption and value creation (Hossain and Quaddus, 2011; Oliveira and Martins, 2010; Zhu and Kraemer, 2005).

2.1.2. The Task-Technology Fit (TTF) Theory

The TTF theory, proposed by Goodhue and Thompson (1995), asserts that technology acceptance depends on how well technology features align with job requirements. TTF clarifies how IT can enhance task performance: greater alignment between technology and tasks leads to improved employee performance. TTF emphasizes the relationships between individuals, tasks, and technology. Tasks involve actions taken to transform inputs into outputs, while technology comprises the systems and support used to accomplish these tasks. Individual characteristics like training and skills influence how effectively technology is utilized. A significant gap between task needs and technology applicability results in lower TTF (Goodhue and Thompson, 1995).

2.1.3. Combining TOE and TTF

Wang et al. (2010) and Gangwar et al. (2015) note that the TOE framework lacks clarity in its major constructs and is overly generic. They suggest strengthening it by integrating more explicit theories. Awa et al. (2015) and others recommend incorporating theories that address task and individual contexts to enhance the predictive power of the model. The TOE framework does not sufficiently address how technological functionality aligns with user task needs, making TTF a fitting complementary theory. Therefore, the feature-task match (FTM) concept from TTF serves as the technology factor within the TOE framework.

2.2. Success Factors for ERP Implementation

2.2.1. Organizational factors

The first grouping, Organizational, emphasizes the significance of a clear business plan and vision. Top management support is consistently identified as the most critical success factor in ERP system implementation projects (Somers and Nelson, 2001). A well-defined business plan is essential for guiding the project throughout its life cycle (Loh and Koh, 2004). Project management must navigate three interrelated constraints: scope, time, and cost (Schwalbe, 2000).

Successful projects begin with clear goal conceptualization, which should be specific and operational to guide overall direction (Somers and Nelson, 2004). Expectations from board members and stakeholders can pose challenges for ERP project leaders (Nah et al., 2001). Many ERP implementations fail due to unclear planning (Somers and Nelson, 2004). Top Management Support on Change Management (TMSCM) refers to a deliberate set of activities undertaken by top management to facilitate, support, direct, authorize, and allocate resources for organizational change during the adoption of IT systems, including ERP systems (Ifinedo, 2008; Wipfli LLP, 2014). A qualitative study by Abdollahzadehgan et al. (2013) identified top management support as one of the most critical success factors for cloud computing adoption within the Technology-Organization-Environment (TOE) framework, particularly in small and medium-sized enterprises (SMEs) in Malaysia. Kim et al. (2017) also highlighted top management support as a key driver for Software as a Service (SaaS) adoption.

While cloud computing can drive organizational change, resistance to change has been identified as a significant barrier to its adoption and effective usage (Gangwar et al., 2015; Hsu and Lin, 2016; Yeboah-Boateng and Essandoh, 2014). Top management support has been confirmed as an effective strategy to address this resistance and ensure successful IT implementation (Elbanna, 2013). In a case study of Canadian universities, Dong et al. (2009) identified TMSCM as a critical factor in the successful implementation of enterprise systems.

Business Process Re-Engineering (BPR) plays a vital role in establishing best practices, involving a fundamental redesign of business processes to enhance performance metrics like cost, quality, service, and speed (Hammer and Champy, 1993; Koch, 2001). Selecting suitable ERP software is critical for success, with a focus on user-friendliness, scalability, and business process coverage (Kraemmergaard and Rose, 2002; Yusuf et al., 2004; Al-Mashari et al., 2003; Somers and Nelson, 2001; 2004).

Vendor selection is another crucial aspect, where factors like knowledge of the system, understanding organizational needs, and the vendor's ability to provide support are important (Verville and Halingten, 2003). The partnership between implementers and vendors significantly influences ERP success (Nah et al., 2001; Zhang et al., 2005; Somers and Nelson, 2001). Effective communication throughout the organization is essential, with middle managers playing a key role in conveying project details (Falkowski et al., 1998; Wee, 2000).

2.2.2. Technological factors

The second grouping, Technological, addresses distinct ERP implementation strategies: phased and Big Bang (O'Leary, 2004). The appropriate strategy depends on organizational complexity, economic considerations, and geographical factors (Markus and Tanis, 2000). The Big Bang approach involves simultaneous implementation of multiple ERP modules, while phased implementation entails a step-by-step approach.

A robust IT infrastructure, including hardware and networking, is vital for successful ERP implementation. Transitioning from legacy systems to an integrated IT infrastructure is complex and requires careful hardware selection based on the chosen ERP software (Al-Mashari, 2002). The Vanilla implementation approach focuses on minimal customization (Holland et al., 1999) and has been commonly adopted.

The highlight that major motivations for implementing ERP systems include replacing legacy systems and standardizing processes. Al-Mashari et al. (2006) studied a company that treated ERP implementation as a re-engineering initiative, emphasizing the need for standardized information systems. The interconnectedness of ERP modules means that inaccurate data input into one module can negatively impact others (Markus and Tanis, 2000).

2.2.3. People factors

The third grouping, People, focuses on the importance of education and training (Ehie and Madsen, 2005). Training helps management and employees understand the logic and concepts behind ERP systems. Ongoing training during implementation, as well as for new employees, is essential for reducing frustration and saving organizational resources (Jha et al., 2008).

ERP projects should be viewed as change management initiatives rather than merely IT projects, requiring organizations to emphasize change management strategies for effective implementation (Ngai et al., 2008). Effective change management balances forces in favor of change against resistance . To minimize resistance, training is crucial. A culture that embraces shared values and goals increases the likelihood of success (Bingi et al., 1999; Somers and Nelson, 2001; Sumner, 1999; Zhang et al., 2005).

Innovative employee behavior can significantly influence ERP success (Lee and Lee, 2000). Evidence suggests that benefits from ERP implementation arise from organizational change, with the ERP system acting as an enabler. Literature indicates that user involvement is a critical success factor, enhancing perceived control and satisfaction through participation in the project (Zhang et al., 2005; Esteves and Casanovas, 2003).

2.2.4. Project management factors

The fourth grouping, Project Management, highlights the importance of teamwork and composition throughout the ERP life cycle. The ERP team should consist of top talent from the organization, blending consultants and internal staff to build necessary technical skills (Buckhout et al., 1999; Bingi et al., 1999; Rosario, 2000; Wee, 2000; Loh and Koh, 2004). The success of the project correlates with the project manager's skills and the selection of the right team members.

Effective communication between business and IT personnel is crucial (Holland et al., 1999; Akkermans and Helden, 2002). Both business acumen and technical knowledge are essential for success (Bingi et al., 1999; Sumner, 1999). Formal project schedules define milestones and project boundaries, facilitating planning, coordination, and monitoring of activities (Akkermans and Helden, 2002; Somers and Nelson, 2001).

Responsibilities for driving project success should be clearly assigned, with a defined project scope to ensure focus on results (Rosario, 2000; Holland et al., 1999; Wee, 2000). Communication about project expectations at all levels is vital (Wee, 2000). Effective communication promotes project progress awareness throughout the organization (Holland et al., 1999). Addressing errors promptly and working collaboratively with vendors and consultants is essential for resolving software issues. The ability to respond quickly, coupled with patience and problem-solving skills, is critical during implementation (Rosario, 2000).

Based on the previous literature, we've formulated the following hypotheses for our study:

- H_1: Active management support has a positive and significant impact on the success of ERP implementation.
- H_2: Employee engagement in the ERP project has a positive and significant impact on the success of ERP implementation.
- H_3: The quality of training programs and the development of end-user skills have a positive and significant impact on the success of ERP implementation.

- H_4: Effective communication throughout the ERP project has a positive and significant impact on the success of ERP implementation.
- H_5: Proactive risk management has a positive and significant impact on the success of ERP implementation.
- H_6: Alignment of the ERP project with the company's strategy has a positive and significant impact on the success of ERP implementation.
- H_7: An organizational culture supportive of innovation and flexibility has a positive and significant impact on the success of ERP implementation.
- H_8: Proper allocation of resources (financial, human, and technical) has a positive and significant impact on the success of ERP implementation.
- H_9: Compatibility and updating of existing technological infrastructures have a positive and significant impact on the success of ERP implementation.

3. METHODOLOGY

3.1. Sample and Target Population

The target population for this study comprises companies in Morocco from different sectors including companies specialized in digital solutions, large industrial companies, and tourism sector. The unit of analysis includes top-level managers such as senior IT managers, information technology officers (ITO), project managers, chief information officers (CIO). These individuals are considered the most suitable respondents as they possess greater knowledge of issues related to ERP adoption and its strategic business benefits compared to lower-level operational employees.

The sample size is determined using Krejcie and Morgan's (1970) formula, resulting in a target of 382 respondents. Stratified random sampling will be utilized to ensure representation across different regions. According to the Moroccan Ministry of Industry and Trade, regions comprising Casablanca-Settat, Rabat-Salé-Kénitra, and Tangier-Tétouan-Al Hoceima host the highest concentrations of these companies. Each of these regions will serve as a stratum from which the sample will be drawn.

To reach a broader audience, both online and paper-based questionnaires will be employed. The questionnaire will include sections on demographic profiles and the key constructs, comprising a total of 50 questions. The second part will utilize a 5-point Likert scale, ranging from "strongly disagree" to "strongly agree." The English version of the questionnaire is translated into Arabic and French by language experts, followed by a back-translation process to ensure accuracy. Pre-testing will involve two senior faculty members from information systems and one industry expert to assess clarity and relevance. For data analysis, descriptive statistics and Structural Equation Modeling (SEM) techniques will be employed, utilizing SPSS 25.0 and SMART-PLS 4.0 software.

3.2. Principal Component Analysis (PCA)

Principal Component Analysis (PCA) is a statistical technique used to reduce the dimensionality of data while preserving as much variance as possible. A key metric in determining the appropriateness of PCA is the Kaiser-Meyer-Olkin (KMO) measure, which assesses the adequacy of sample size for factor analysis; a KMO value above 0.6 is generally considered acceptable, indicating that the data is suitable for PCA. Additionally, Bartlett's Test of Sphericity is employed to examine the null hypothesis that the correlation matrix is an identity matrix; a significant result ($P < 0.05$) suggests that the variables are correlated enough to proceed with PCA. Variance extracted, often guided by the Kaiser rule, indicates the proportion of total variance accounted for by each principal component, with components having eigenvalues greater than 1 being retained for analysis. Lastly, communality reflects the proportion of each variable's variance that can be explained by the extracted components; higher communality values suggest that the PCA effectively captures the essential information contained within the original variables.

3.3. Analysis of Measurement Model

Validity measures how well an instrument evaluates a particular concept, ensuring the concepts and measurements used by researchers are appropriate. Valid data show no discrepancies between the data reported by the researcher and the data gathered as the object of research. In PLS-SEM, two types of validity are used: convergent and discriminant validity.

Convergent validity assesses the extent to which a measurement correlates positively with alternative measures of the same construct. It is evaluated using two metrics: outer loadings and average variance extracted (AVE). Outer loadings, with a standard of 0.70, indicate how much variation within the item is explained by the construct. If an indicator's outer loadings value is greater than 0.70, it meets convergent validity and is considered reliable. AVE, with a standard of 0.50, implies that the construct explains more than half of the variance of its indicators. Specifically, an AVE greater than 0.50 means that the construct accounts for at least 50% of the variance in its manifest variables.

The formula is as follows:

$$AVE = \frac{\sum \lambda_i^2}{\sum \lambda_i^2 + \sum \theta_i}$$

Where:

λ_i: Are the factor loadings of the indicators for a construct.

θ_i: Are the error variances of the indicators.

Reliability indicates the stability and consistency of instruments measuring concepts, assessing measurement correctness and error. Cronbach's alpha, a conservative measure of reliability, provides estimates based on the intercorrelation of observed indicator variables. Due to its limitations, composite reliability is also used to measure consistency. For this study, the acceptable range for reliability is a minimum of 0.70 and a maximum of 0.90, with the desired range being between 0.80 and 0.90.

The formula is as follows:

$$\alpha = \frac{N}{N-1}\left(1 - \frac{\sum_{i=1}^{N}\sigma_i^2}{\sigma_{total}^2}\right)$$

Discriminant validity compares the value of loadings of a parameter with those of other latent variable constructs. It is measured using the Heterotrait-Monotrait ratio (HTMT) and the Fornell-Larcker criterion. HTMT assesses discriminant validity by evaluating whether correlations between constructs within a measurement model differ significantly from correlations across different constructs. If HTMT is significantly less than 0.9, discriminant validity is suggested; if it approaches or exceeds 1, there may be issues. The Fornell-Larcker criterion compares the square root of the AVE value with the correlation between latent variables.

3.4. Structural Model Analysis

Inner model testing, also known as structural model testing, aims to describe the relationships between latent variables. This study considers several factors including collinearity, the coefficient of determination (R^2), effect size (f^2), predictive relevance (Q^2), and path coefficients.

The coefficient of determination (R^2) is a widely used metric for evaluating structural models. It predicts the model and is calculated as the squared correlation between the actual value and the predicted endogenous construct based on the number of connected exogenous constructs. The R^2 value ranges from 0 to 1 and is categorized into three levels: 0.75 (substantial), 0.50 (medium), and 0.25 (weak). Higher R2 values indicate greater predictive accuracy.

Effect size (f2) measures the change in R^2 value before and after removing exogenous constructs from the model, indicating the substantive impact of exogenous constructs on endogenous constructs. The f^2 values are categorized as 0.02 (small), 0.15 (medium), and 0.35 (large). Values smaller than 0.02 suggest no significant effect of the latent exogenous variable.

Predictive relevance (Q^2) assesses the accuracy of an unsampled research model. A Q^2 value greater than 0 indicates that the model has satisfied the predictive relevance test for a given dependent construct.

Path coefficients test the relationships between constructs as part of the research hypothesis. Standard path coefficients range from −1 to +1. Values close to +1 indicate a strong positive relationship, while values close to −1 indicate a strong negative relationship. Values near zero suggest a weakening relationship.

Model fit analysis evaluates how well the proposed model structure aligns with empirical data, helping to identify specification errors. The normalized impact factor (NIF) index is commonly used in fit model analysis to evaluate the quality of previous research journals.

After running the PLS-SEM algorithm, researchers use path coefficients to test hypothetical estimates for structural model relationships. The significance of these coefficients depends on the standard error obtained through bootstrapping, which assesses the contribution of indicators to the corresponding construct. The standard error allows for calculations using t-values and P-values for all structural path coefficients. When the t-value exceeds the critical value, the coefficient is considered statistically significant at a certain probability level.

Hypothesis testing reveals whether the estimated hypothesis is accepted or rejected. Critical t-values are used to determine the significance of the coefficient. If the empirical t-value exceeds the critical t-value (typically >1.65 for a significance level of 5% with one-tailed tests), the hypothesis is rejected.

4. RESULTS AND DISCUSSIONS

4.1. Principal Component Analysis (PCA) Results

The Principal Component Analysis (PCA) yielded strong indicators of sampling adequacy and component reliability (Table 1). The Kaiser-Meyer-Olkin (KMO) measure was above 0.6, suggesting that the sample size was suitable for PCA, and that there were sufficient correlations among variables to justify factor analysis. Additionally, Bartlett's test of sphericity was significant ($P < 0.05$), indicating that the correlation matrix was not an identity matrix, which confirms the presence of underlying relationships suitable for PCA.

The analysis extracted a single principal component with an eigenvalue >1, while all other components had eigenvalues below 1. This supports the Kaiser criterion, which suggests retaining only the first component as it explains the majority of the variance in the data. Furthermore, communalities were all above 0.5, indicating that each variable shared a significant amount of variance with the principal component, making this solution highly interpretable and well-suited for representing the data in a single component.

4.2. Measurement Model Analysis

To assess convergent validity, we examined both the factor loadings of the items and the Average Variance Extracted (AVE). Convergent validity is confirmed when AVE values exceed 0.50, indicating that the variance shared between a construct and its items is greater than the measurement error variance. In this study, the AVE values for all constructs ranged from 0.57 to 0.708, meeting this criterion. Additionally, items were retained in the measurement model if their outer loadings were 0.6 or higher. As presented in Table 2, the outer loadings for all items ranged from 0.825 to 0.951, demonstrating valid measurements.

For discriminant validity, both the Heterotrait-Monotrait (HTMT) criterion and the Fornell-Larcker criterion were employed (Table 3).

To confirm the validity of the model, the HTMT can be evaluated in two ways, as highlighted by Benitez: (1) by comparing it with a threshold value and (2) by constructing a confidence interval to determine whether the HTMT is significantly lower than a certain threshold value. Simulation studies suggest a threshold value of 0.90 if the constructs are conceptually very similar, or 0.85 if the constructs are more distinct. For the second approach, methodological research recommends examining whether HTMT

Table 1: Principal component analysis results

Variables	Items	KMO	Variance extracted by 1st factor (%)	Eigenvalue of first factor	Communality
Support	SUPPORT1	0.79	63.57	3.18	0.87
	SUPPORT2				0.81
	SUPPORT3				0.78
	SUPPORT4				0.60
	SUPPORT5				0.89
Engagement	ENGAGEMENT1	0.74	50.93	2.55	0.72
	ENGAGEMENT2				0.82
	ENGAGEMENT3				0.49
	ENGAGEMENT4				0.78
	ENGAGEMENT5				0.71
Formation	FORMATION1	0.79	65.34	3.27	0.87
	FORMATION2				0.75
	FORMATION3				0.82
	FORMATION4				0.82
	FORMATION5				0.78
Communication	COMMUNICATION1	0.84	64.55	3.23	0.69
	COMMUNICATION2				0.83
	COMMUNICATION3				0.86
	COMMUNICATION4				0.82
	COMMUNICATION5				0.81
Risks	RISKS1	0.80	63.37	3.17	0.71
	RISKS2				0.75
	RISKS3				0.81
	RISKS4				0.87
	RISKS5				0.83
Strategy	STRA1	0.78	67.68	3.38	0.89
	STRA2				0.80
	STRA3				0.80
	STRA4				0.81
	STRA5				0.81
Culture	CUL1	0.83	71.30	3.57	0.92
	CUL2				0.78
	CUL3				0.92
	CUL4				0.69
	CUL5				0.88
Resources	RESOURCES1	0.77	58.44	2.92	0.67
	RESOURCES2				0.84
	RESOURCES3				0.80
	RESOURCES4				0.74
	RESOURCES5				0.76
Compatibility of Technology	TECH1	0.80	67.45	3.37	0.71
	TECH2				0.87
	TECH3				0.75
	TECH4				0.89
	TECH5				0.88
Implementation	IMPLE1	0.83	70.41	3.52	0.86
	IMPLE2				0.87
	IMPLE3				0.85
	IMPLE4				0.66
	IMPLE5				0.93

is significantly less than 1 or less than smaller values such as 0.85 or 0.90. The HTMT is a reliable tool for assessing discriminant validity. As shown in Table 3, using the second approach, all HTMT values are below 0.85, indicating good discriminant validity.

The Fornell-Larcker criterion is met when the square root of the AVE for each construct is greater than its highest correlation with any other construct in the model (Table 4). The matrix shows that each construct shares more variance with its own items (bold diagonal values) than with any other constructs in the model. This confirms that the Fornell-Larcker criterion requirements are satisfied.

Regarding collinearity, all hypothesized paths are valid as the Variance Inflation Factor (VIF) values fall within the acceptable range of 0.20 to 5.0, with recorded values between 1.0 and 1.884.

4.3. Structural Model Analysis

After validating the measurement model's convergent and discriminant criteria, the structural model was assessed. The primary focus was on the model's ability to explain and predict the effect of exogenous latent variables on the endogenous dependent latent variables. Several metrics were examined to evaluate the model's goodness of fit (GoF).

The minimum acceptable R^2 score for a proper model fit was 0.10. Accordingly, the endogenous latent variable is Implementation of ERP success. The variable had R^2 values of 0.766, indicating that the study model has adequate predictive power. So, in this study 76% of the variance occurred in ERP implementation success is explained by the exogenous variables (Table 5 and Figure 1).

Hypothesis testing can be conducted by evaluating the structural (inner) model. This process determines whether a hypothesis should be accepted or rejected by analyzing the significance values and the coefficients of relationships between variables in the research model. The structural model and its values can be assessed using software calculations, specifically the SmartPLS 4.1 module in the bootstrapping section. A 5000-sample bootstrapping approach was conducted to assess the path coefficient effects and t-values for significance in the direct and mediating relationships. The criteria for testing this structural model include t-statistics values greater than 1.645, significance values (P-values) less than 0.05, and positive coefficients between variables. The results of the structural model testing in this study are presented in the following Table 6.

H_1: Active management support—The results indicate that active management support has a positive and significant

Table 2: Convergent validity analysis

Variables	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
COMMUNICATION	0.861	0.877	0.9	0.644
CUL	0.896	0.923	0.923	0.708
ENGAGEMENT	0.75	0.726	0.827	0.592
FORMATION	0.866	0.871	0.903	0.652
IMPLE	0.891	0.892	0.921	0.703
RESOURCES	0.82	0.947	0.867	0.57
RISKS	0.854	0.866	0.895	0.633
STRA	0.88	0.896	0.912	0.675
SUPPORT	0.852	0.9	0.893	0.63
TECH	0.877	0.893	0.911	0.674

Table 3: Discriminant analysis - HTMT values

Variables	COMMUNICATION	CUL	ENGAGEMENT	FORMATION	IMPLE	RESOURCES	RISKS	STRA	SUPPORT
COMMUNICATION									
CUL	0.787								
ENGAGEMENT	0.4	0.529							
FORMATION	0.741	0.616	0.404						
IMPLE	0.779	0.644	0.413	0.781					
RESOURCES	0.58	0.496	0.299	0.4	0.588				
RISKS	0.767	0.748	0.589	0.801	0.832	0.578			
STRA	0.453	0.539	0.577	0.506	0.719	0.506	0.512		
SUPPORT	0.372	0.341	0.752	0.571	0.472	0.499	0.518	0.653	
TECH	0.606	0.551	0.363	0.557	0.804	0.876	0.656	0.761	0.597

Figure 1: Study results

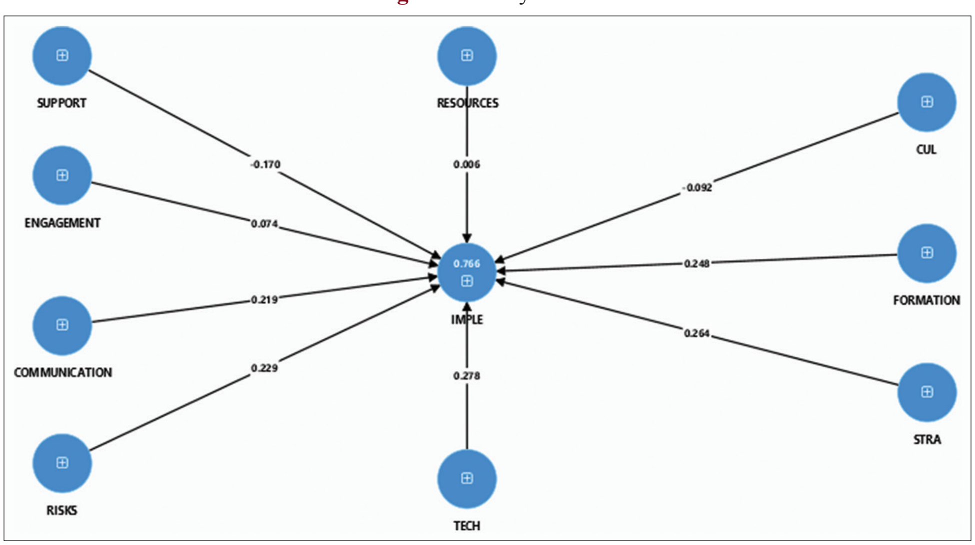

Table 4: Fornell-Larcker criterion results

Variables	COMMUNICATION	CUL	ENGAGEMENT	FORMATION	IMPLE	RESOURCES	RISKS	STRA	SUPPORT	TECH
COMMUNICATION	0.802									
CUL	0.687	0.841								
ENGAGEMENT	0.26	0.407	0.701							
FORMATION	0.641	0.561	0.307	0.808						
IMPLE	0.697	0.602	0.376	0.691	0.838					
RESOURCES	0.536	0.461	0.174	0.379	0.577	0.755				
RISKS	0.686	0.672	0.49	0.682	0.735	0.532	0.796			
STRA	0.412	0.498	0.45	0.455	0.653	0.478	0.461	0.821		
SUPPORT	0.322	0.304	0.621	0.496	0.432	0.441	0.429	0.556	0.794	
TECH	0.539	0.499	0.289	0.493	0.718	0.782	0.578	0.664	0.517	0.821

Table 5: R² results

Dependent variable	R-square	R-square adjusted
IMPLE	0.766	0.696

Table 6: Structural model results

Relations	Coefficient	Std. Dev	T-Statistic	P values
COMMUNICATION -> IMPLE	0.219	0.077	2.84	0.006
CUL -> IMPLE	0.092	0.155	0.59	0.555
ENGAGEMENT -> IMPLE	0.174	0.085	2.05	0.045
FORMATION -> IMPLE	0.348	0.182	1.91	0.061
RESOURCES -> IMPLE	0.206	0.1	2.06	0.044
RISKS -> IMPLE	0.229	0.18	1.27	0.208
STRA -> IMPLE	0.264	0.116	2.28	0.026
SUPPORT -> IMPLE	0.17	0.082	2.07	0.042
TECH -> IMPLE	0.278	0.108	2.57	0.013

effect on ERP implementation success, with a coefficient of 0.17, a T-statistic of 2.07, and a P-value of 0.042. This implies that strong support and involvement from management play a crucial role in facilitating successful ERP implementation, providing the needed direction, resources, and motivation for the project. Thus, H1 is supported.

H_2: Employee engagement—Employee engagement in the ERP project positively influences ERP implementation success. With a coefficient of 0.174, a T-statistic of 2.05, and a P-value of 0.045, this effect is statistically significant. These results suggest that employees' active participation and commitment to the ERP project are essential for achieving favorable implementation outcomes. Therefore, H2 is confirmed.

H_3: Quality of training programs and end-user skill development—The quality of training programs and the development of end-user skills show a positive but marginally significant impact on ERP success, with a coefficient of 0.348, a T-statistic of 1.91, and a P-value of 0.061. Although the impact is not as strong as expected, the near-significant result suggests that training quality and skill-building may still play a vital role. Hence, H3 is only partially supported.

H_4: Effective communication—Effective communication throughout the ERP project shows a significant positive impact, with a coefficient of 0.219, a T-statistic of 2.84, and a P-value of 0.006. These results confirm that clear, ongoing communication is essential to align project goals, manage expectations, and facilitate ERP success. Thus, H4 is supported.

H_5: Proactive risk management—Proactive risk management does not have a statistically significant impact on ERP success, with a coefficient of 0.229, a T-statistic of 1.27, and a P-value of 0.208. Although positive, the lack of significance suggests that while risk management may contribute to ERP outcomes, it may not be a key determinant on its own in this study's context. Therefore, H5 is not supported.

H_6: Alignment with company strategy—Aligning the ERP project with the company's overall strategy shows a significant positive impact, with a coefficient of 0.264, a T-statistic of 2.28, and a P-value of 0.026. This finding implies that an ERP initiative closely integrated with strategic goals enhances its likelihood of success, validating H6.

H_7: Organizational culture supportive of innovation and flexibility—The influence of a supportive organizational culture on ERP success is not statistically significant, with a coefficient of 0.092, a T-statistic of 0.59, and a P-value of 0.555. This suggests that cultural factors related to innovation and flexibility may not be primary drivers for ERP success in this study, and H7 is not supported.

H_8: Proper allocation of resources—The allocation of financial, human, and technical resources shows a significant positive impact on ERP success, with a coefficient of 0.206, a T-statistic of 2.06, and a P-value of 0.044. This supports the idea that resource availability is critical for ERP projects, lending support to H8.

H_9: Compatibility and updating of technological infrastructure—The compatibility and adequacy of technological infrastructure significantly affect ERP success, with a coefficient of 0.278, a T-statistic of 2.57, and a P-value of 0.013. This underscores the importance of having up-to-date and compatible technology to facilitate a smooth ERP implementation, thus confirming H9.

5. CONCLUSION

In conclusion, this study examined the critical factors influencing change management in ERP systems implementation in Moroccan companies, utilizing the Structural Equation Modeling (SEM) approach to analyze the relationships between key organizational factors and ERP success. The findings confirm the importance of active management support, effective communication, alignment with company strategy, and adequate resource allocation as significant drivers of ERP success, reinforcing their role as essential elements in ERP project planning and execution.

Employee engagement also emerged as a crucial factor, highlighting the need to foster a collaborative environment where employees feel committed to the ERP project's goals. While the impact of training programs and the development of end-user skills showed only marginal significance, the positive direction suggests that further focus on comprehensive training may be beneficial. Compatibility and updating of technological infrastructure were also shown to be essential for facilitating a smooth ERP transition, emphasizing the importance of investing in appropriate technological foundations.

On the other hand, factors such as proactive risk management and a culture supportive of innovation, though positively associated, did not show statistically significant impacts, suggesting that these elements may require different implementation contexts or conditions to exert measurable influence. The use of SEM has provided a robust framework for understanding the complex interactions among these variables, enabling a more nuanced view of ERP success factors within SMEs.

REFERENCES

Abdollahzadehgan, A., Hussin, C., Gohary, M.M., Amini, M. (2013), The organizational critical success factors for adopting cloud computing in SMEs. Journal of Information Systems Research and Innovation, 4(1), 67-74.

Akkermans, H., Van Helden, K. (2002), Vicious and virtuous cycles in ERP implementation: A case study of interrelations between critical success factors. European Journal of Information Systems, 11(1), 35-46.

Aladwani, A.M. (2001), Change management strategies for successful ERP implementation. Business Process Management Journal, 7(3), 266-275.

Al-Mashari, M. (2002), Enterprise resource planning (ERP) systems: A research agenda. Industrial Management and Data Systems, 102(3), 165-170.

Al-Mashari, M., Al-Mudimigh, A., Zairi, M. (2003), Enterprise resource planning: Taxonomy of critical factors. European Journal of Operational Research, 146(2), 352–364.

Awa, H.O., Baridam, D.M., Nwibere, B.M. (2015), Demographic determinants of e-commerce adoption by SMEs: Empirical evidence from Nigeria. European Journal of Business and Management, 7(9), 2222-2839.

Awa, H.O., Ukoha, O. (2017), Integrating TAM, TPB and TOE frameworks and expanding their characteristic constructs for e-commerce adoption by SMEs. Journal of Science and Technology Policy Management, 8(2), 134-160.

Bingi, P., Sharma, M.K., Godla, J.K. (1999), Critical issues affecting an ERP implementation. Information Systems Management, 16(3), 7-14.

Buckhout, S., Frey, E., Nemec, J. (1999), Making ERP succeed: Turning fear into promise. IEEE Engineering Management Review, 27(3), 116-123.

Cotteleer, M.J. (2002), ERP: PAYOFFS and Pitfalls. Harvard Business School Working Knowledge. Boston, MA: Harvard Business School.

Creswell, J.W., Klassen, A.C., Clark, V.L.P., Smith, K.C. (2011), Best Practices for Mixed Methods Research in the Health Sciences. 2nd ed. Bethesda, MD: National Institutes of Health.

Davenport, T.H. (1998), Putting the Enterprise into Enterprise System. Harvard Business Review, 76(4), 121-131.

Dong, L., Neufeld, D.J., Higgins, C. (2009), Top management support of enterprise systems implementations. Journal of Information Technology, 24(1), 55-80.

Ehie, I.C., Madsen, M. (2005), Identifying critical issues in enterprise resource planning (ERP) implementation. Computers in Industry, 56(6), 545-557.

Elbanna, A. (2013), Top management support in multiple-project environments: An in-practice view. Project Management Journal, 44(2), 76-93.

Esteves, J., Casanovas, J. (2003), An assessment of the understanding of critical success factors for ERP implementation projects. Information Systems and Technology Management, 1(2), 45-55.

Esteves, J., Pastor, J. (2001), Enterprise resource planning systems research: An annotated bibliography. Communications of the Association for Information Systems, 7(8), 1-51.

Falkowski, G., Pedigo, P., Smith, B., Swanson, D. (1998), A Recipe for ERP Success. In: Beyond Computing Conference Proceedings. p44-45.

Fornell, C., Larcker, D.F. (1981), Evaluating structural equation models with unobservable variables and measurement error. Journal of Marketing Research, 18(1), 39-50.

Gangwar, H., Date, H., Ramaswamy, R. (2015), Understanding determinants of cloud computing adoption using an integrated TAM-TOE model. Journal of Enterprise Information Management, 28(1), 107-130.

Gattiker, T.F., Goodhue, D.L. (2002), Software-driven changes to business processes: An empirical study of impacts of enterprise

resource planning systems at the local level. International Journal of Production Research, 40(18), 4799-4814.
Goodhue, D.L., Thompson, R.L. (1995), Task-technology fit and individual performance. MIS Quarterly, 19(2), 213-236.
Hair, J.F., Ringle, C.M., Sarstedt, M. (2013), Partial least squares structural equation modeling: Rigorous applications, better results, and higher acceptance. Long Range Planning, 46(1-2), 1-12.
Hammer, M., Champy, J. (1993), Reengineering the Corporation: A Manifesto for Business Revolution. New York, NY: Harper Business.
Hasibuan, Z.A., Dantes, G.R. (2012), Priority of key success factors (KSFs) on ERP system implementation life cycle. Journal of Enterprise Resource Planning Studies, 2012, 1-15.
Heber, F., Guerrini, M. (2017), Reference model for implementing ERP systems: An analytical innovation networks perspective. Production Planning and Control, 28(4), 281-294.
Holland, C.P., Light, B., Gibson, N. (1999), A critical success factors model for ERP implementation. IEEE Software, 16(3), 30-36.
Hossain, M.A., Quaddus, M. (2011), The adoption and continued usage intention of RFID: An integrated framework. Information Technology and People, 24(3), 236-256.
Hsu, P.F., Lin, H.F. (2016), Factors influencing the adoption of cloud services in enterprises. Information Systems and e-Business Management, 14(4), 791-822.
Huang, Z. (2010), A compilation research of ERP implementation critical success factors. Issues in Information Systems, 6(1), 507-512.
Ifinedo, P. (2008), Impacts of business vision, top management support, and external expertise on ERP success. Business Process Management Journal, 14(4), 551-568.
Jha, S., Panda, S., Mishra, P.K. (2008), ERP implementation issues: Role of end-users training. International Journal of Enterprise and Innovation Management Studies, 1(3), 89-95.
Kim, S., Jang, S., Yang, K.H. (2017), Investigating the determinants of SaaS adoption: A technology-organization-environment framework. Information and Management, 54(7), 888-901.
Koch, C. (2001), ERP-a moving target. Computerworld, 35(10), 54-56.
Kraemmergaard, P., Rose, J. (2002), Managerial competences for ERP journeys. Information Systems Frontiers, 4(2), 199-211.
Krejcie, R.V., Morgan, D.W. (1970), Sample size determination table. Educational and psychological Measurement, 30(3), 607-610.
Lee, D., Lee, S.M. (2000), An exploratory study of factors influencing the success of ERP implementation. Journal of Information Systems, 14(2), 99-114.
Loh, T.C., Koh, S.C.L. (2004), Critical elements for a successful enterprise resource planning implementation in small- and medium-sized enterprises. International Journal of Production Research, 42(17), 3433-3455.
Markus, M.L., Tanis, C. (2000), The enterprise systems experience-from adoption to success. In: Zmud, R.W., editor. Framing the Domains of IT Research: Glimpsing the Future through the Past. Cincinnati, OH: Pinnaflex Educational Resources. p. 173-207.
Nah, F.F.H., Lau, J.L.S., Kuang, J. (2001), Critical factors for successful implementation of enterprise systems. Business Process Management Journal, 7(3), 285-296.
O'Leary, D.E. (2004), Enterprise resource planning (ERP) systems: An empirical analysis of benefits. Journal of Emerging Technologies in Accounting, 1(1), 63-72.
Oliveira, T., Martins, M.F. (2010), Understanding e-business adoption across industries in European countries. Industrial Management and Data Systems, 110(9), 1337-1354.
Rosario, J.G. (2000), On the leading edge: Critical success factors in ERP implementation projects. Business World, 17(3), 15-29.
Schwalbe, K. (2000), Information Technology Project Management. Boston, MA: Course Technology.
Somers, T.M., Nelson, K. (2001), The Impact of Critical Success Factors Across the stages of Enterprise Resource Planning Implementations. In: Proceedings of the 34th Hawaii International Conference on System Sciences.
Somers, T.M., Nelson, K.G. (2004), A taxonomy of players and activities across the ERP project life cycle. Information & management, 41(3), 257-278.
Sumner, M. (1999), Critical Success Factors in Enterprise Wide Information Management Systems Projects. Proceedings of the 1999 ACM SIGCPR Conference. p297-303.
Teece, D.J. (2007), Explicating dynamic capabilities: The nature and microfoundations of (sustainable) enterprise performance. Strategic Management Journal, 28(13), 1319-1350.
Tornatzky, L.G., Fleischer, M. (1990), The Processes of Technological Innovation. Lexington, MA: Lexington Books.
Verville, J.C., Halingten, A. (2000), Acquiring enterprise software: Beating the vendors at their own game. Englewood Cliffs, New Jersey: Prentice Hall PTR.
Wang, Y.M., Wang, Y.S., Yang, Y.F. (2010), Understanding the determinants of RFID adoption in the manufacturing industry. Technological Forecasting and Social Change, 77(5), 803-815.
Wee, S. (2000), Juggling toward ERP success: Keep key success factors high. ERP News, 3(10), 1-5.
Wernerfelt, B. (1984), A resource-based view of the firm. Strategic Management Journal, 5(2), 171-180.
Wipfli, L.L.P. (2014), Best Practices in Change Management. Wipfli Consulting Report.
Yeboah-Boateng, E.O., Essandoh, K.A. (2014), Factors influencing the adoption of cloud computing by small and medium enterprises in developing economies. International Journal of Emerging Science and Engineering, 2(4), 13-20.
Yusuf, Y., Gunasekaran, A., Abthorpe, M.S. (2004), Enterprise information systems project implementation: A case study of ERP in Rolls-Royce. International Journal of Production Economics, 87(3), 251-266.
Zhang, Z., Lee, M.K.O., Huang, P., Zhang, L., Huang, X. (2005), A framework of ERP systems implementation success in China: An empirical study. International Journal of Production Economics, 98(1), 56-80.
Zhu, K., Kraemer, K.L. (2005), Post-adoption variations in usage and value of e-business by organizations: Cross-country evidence from the retail industry. Information Systems Research, 16(1), 61-84.