Investigating the influence of Information Systems on Quality Systems: Case of Moroccan Companies, BARAKAT, O.¹ & BOUHSAIN, I.²

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**Summary:**

This study is aimed at investigate the influence of adopting and implementing an Information Systems on Quality Systems and the performance of an organization.

We adopted a qualitative approach of an exploratory nature, we interviewed managers & IT senior consultant in eleven organizations in different activity sectors in private and public Moroccan companies.

Our findings show that the Information System is a main tool that a company uses to guide, manage, & measure its processes. Hence, the quality system steers the process through a structured approach to design, manage, and implement.

**Key words:** Information Systems ; Quality ; Performance ; Organization.
Analyser l’influence des systèmes d’information sur les systèmes qualité : 
Cas des organisations marocaines

Résumé :

L’objectif de cette étude est d’examiner l’influence de l’adoption et de la mise en œuvre des systèmes d'information sur les systèmes de qualité et la performance d'une organisation.

Nous avons adopté une approche qualitative, et interviewé des managers et des consultants seniors en informatique dans onze organisations de différents secteurs d'activité, dans des entreprises marocaines privées et publiques.

Nos résultats ont révélé que le système d'information est un outil principal qui permet à une organisation de guider, gérer et mesurer ses processus. Ainsi, le système qualité pilote le processus à travers une approche structurée pour concevoir, gérer, et implémenter.

Mots clés : Systèmes d’information ; Qualité ; Performance ; Organisation.
Introduction:

Modern economy development is inseparably concerned with the use of the most modern and advanced information technologies. The adoption of technologies has become essential to face the challenges and opportunities of today's business world (Joseph, 2023). Therefore, scientists’ attention in terms of the issues of digitalization and innovative development is constantly growing (Volodymyr et al., 2023).

The industrial area and its innovative potential is conditioned by new technologies, which are increasingly (directly and indirectly) influencing production processes and manufactured products, while implying their continuous evolution (Czerwińska et al., 2023). Hence, in today's world, the advancement of Information and Communication Technologies (ICT) is revolutionizing the ways we experience life in general. It has become unavoidable for countries to engage their administration processes and activities as a system, an information system, with the new capabilities of ICT (Yigzaw et al., 2021).

Companies make large investments in these scale systems in order to anticipate positive impacts on their organization. In this conjuncture that information systems are the backbone of any organization, and the performance of a company today is optimized by a coherent information system.

In addition compliance with regulations represents a permanent challenge because of the scope and complexity of regulatory requirements has grown significantly in recent years. The information system is a collection of interrelated components that gather, manipulate, store and disseminate information and provide a feedback mechanism for monitoring efficiency (Fadhil, 2020).

Quality systems can be defined as quality improvement efforts that are designed and organized, designed means that quality improvements are planned and carried out according to accepted methods. Organized means that efforts are managed and that employees work together towards shared goals (Kunkel et al., 2017). Information Systems & Quality Systems are closely related. Information systems provide the data & information needed to support quality management processes (Fitzsimmons, 2021).

In this way, our research is based on an empirical study with officials and managers in public and private organizations, certified or not, in Morocco. The objective of our study is to investigate the influence of Information Systems on Quality Systems. Therefore, our research question is: How does the adoption of information systems influence the quality systems and performance in an organization?

To answer this research question, the present article deals with four essential points: first, we focus on the theoretical part dedicated to the exploration of the main concepts that underlie the
present research. Then, we will present our research methodology. In the third step, we will present our results. Hence finally, we will give the main conclusions and possible perspectives.

1. Theoretical framework

1.1. Overview of Information Systems and their role in organizations

An information system can be defined technically as a set of interrelated components that collect, process, store, and distribute information to support decision making and control in an organization (Laudon et al., 2014).

So Information Systems are essential for organizations as they support various aspects of running a business, including communication, record-keeping, decision making, data analysis, and more. They contribute to improved efficiency, productivity, and competitive advantage, by providing accurate and up-to-date information, performing analytic functions, simplifying and speeding up information retrieval, enabling collaborative decision making, supporting strategic planning, providing insights into the potential effect of change, and tracking company results.

DeLone & McLean (1992) performed a review of the research published during the period 1981–1987, and created a taxonomy of IS success based upon this review. In their 1992 paper, they identified six variables or components of IS success: system quality, information quality, use, user satisfaction, individual impact, and organizational impact (Petter, et al., 2008).

The management of Information System used in organization has now increased when seen from its efficiency and effectiveness. Hence, the initial stage of developing management information systems aims to improve the efficiency of activities in the organization (Priantinah et al., 2019). The purpose of information systems is to synthesize, strengthen and accelerate knowledge management, within the entity and between entities (Bennani et al., 2023).

Researchers have studied the impacts of IS on organizations and individuals, considering factors such as strategies, structures, productivity, work design, and individual tasks. However, previous efforts have focused mainly on the determinants of acceptance and user satisfaction, lacking an examination of the consequences (Boujelbene, 2013). Then, Different information systems are developed to support strategic decisions, such as dealing with competitive advantage or disadvantage (Drake et al., 2020)
In the scientific literature, several theories and models have been developed to understand and explain various aspects of information systems. These theories provide frameworks for studying the role, impact, and adoption of information systems in organizations.

### Table 1: Theories of the influence of Information Systems on organization

<table>
<thead>
<tr>
<th>Theories mobilized</th>
<th>Characteristics of the theories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resource-Based View (RBV),</td>
<td>A theory in strategic management, argues that a firm's competitive advantage stems from its unique resources and capabilities. In the context of information systems, RBV emphasizes how information and technology resources can be a source of competitive advantage in an organization.</td>
</tr>
<tr>
<td>Agency Theory</td>
<td>Explores the principal-agent relationship, where one party (the principal) delegates decision-making authority to another party (the agent). In the context of information systems, it examines how organizations can align the interests of users (agents) with the organization's objectives (principals).</td>
</tr>
</tbody>
</table>

These theories offer invaluable insights into the complexities of information systems, providing researchers and practitioners with frameworks to understand, analyze, and optimize the role of technology within organizations.

Information systems can manage information from both the internal and external environment of the business and can help to increase its efficiency and competitiveness (Serafeim et al., 2022). Thus, implementing IS into a company's core is a complex process requiring human capital, financial resources, and project management essentials (Prajova et al., 2022). We may have even realized that one of the roles of information systems is to take data and turn it into information, and then transform that information into organizational knowledge.
1.2. Overview of Quality Systems and their role in organizations

A quality system is a specific implementation of quality philosophies/concepts, standards, methodologies and tools, for the purpose of achieving quality-related goals. When implemented, a quality system will be unique to an organization. Its structure, however, may be similar to quality systems in other organizations (Radziwill, 2008). Quality Systems provides a dominant influence on user satisfaction, the use of systems and organizational structures (Puspita et al., 2020). In doing so the SQ literature is evolving across overlapping phases of conceptualization, expansion, re-conceptualization and integration (Prakash, 2019).

Moreover, culture is an integrated pattern of human behavior consisting of thoughts, language, actions, and other products. Organizational culture influences how things work in the organization (Ibrahim et al., 2018). The quality culture of the organization will also change the attitudes and behavior of all members of the organization. An influential culture in an organization can provide coercion or encouragement to its members to act or behave as expected by the organization (T. Kim & Chang, 2019).

In the scientific literature, several theories and models have been developed to understand and improve quality systems within organizations. These theories provide valuable frameworks for
studying the principles, methods, and practices that lead to effective quality management. Some of the prominent theories of quality systems in the literature include:

<table>
<thead>
<tr>
<th>Theories to understanding Quality Systems</th>
<th>Characteristics of the theories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Quality Management (TQM)</td>
<td>It’s a comprehensive approach to quality management that involves all members of an organization in continuous improvement efforts. It focuses on <strong>customer satisfaction</strong>, employee involvement, and process optimization to achieve high-quality products and services.</td>
</tr>
<tr>
<td>Kaizen</td>
<td>It’s a Japanese term for &quot;continuous improvement.&quot; It involves making small, incremental improvements in processes and operations to achieve significant overall improvements in <strong>quality</strong> and <strong>efficiency</strong>.</td>
</tr>
<tr>
<td>Deming's 14 Points for Management, Proposed by W. Edwards Deming,</td>
<td>These points provide guiding principles for managers to transform their <strong>organizations</strong> through continuous improvement and a focus on <strong>quality</strong>.</td>
</tr>
<tr>
<td>Theory of Constraints (TOC)</td>
<td>TOC is a management philosophy that identifies the most critical limiting factor (constraint) in a system and focuses on improving it to enhance overall system <strong>performance</strong>.</td>
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</tbody>
</table>

These theories and models offer valuable insights and methodologies for organizations seeking to enhance their quality systems and achieve higher levels of performance and customer satisfaction. Researchers and practitioners can draw upon these theories to guide their quality management practices and continuous improvement efforts.

Overall, a good quality system can provide the following benefits: greater efficiency, reduced costs, problems show up earlier, better quality, improved customer confidence.... etc.

**1.3. The influence of Information Systems on Quality Systems**

Unfortunately, few studies had considered focusing on these causal relationships. Yet some literature reviews show indirectly the influence of information systems on quality systems.

User satisfaction has been considered as the measure of information system effectiveness success. Then, to achieve quality outcomes we must practice excellence and maintain systems that are fit for purpose (Kennedy, 2019). The efficiency of Information Systems can be a significant factor of user satisfaction and increase organizational performance, so that a good quality system (Kalankesh et al., 2020).
Information Systems can be used to provide benefits such as: improved customer satisfaction, lower risks, & long term sustainable growth. Then, it aids businesses in streamlining procedures, & promoting a quality culture throughout the business (Al-Mamary et al., 2014).

**Figure 4: The influence of Information Systems on Quality Systems and Performance**

![Diagram showing the influence of Information Systems on Quality Systems and Performance]

Source: Al-Mamary et al. (2014), Kennedy (2019) & Kalankesh et al. (2020)

The success of an organization is determinant through its performance in this competitive business era. Organizational performance plays an important role for the success of the organizations (Widjaja et al., 2020). The literature supports that information systems improve the effective performance of any organization and gain a competitive advantage for their success in the business environment (Tashtoush, 2021).

Hence, information systems have a significant impact on an organization's performance by enabling data-driven decision-making, improving efficiency, fostering innovation, enhancing customer relationships, and providing a competitive advantage. Firms have made major investments in such systems as enterprise resource planning (ERP), supply chain management (SCM) and customer relationship management (CRM), to achieve organizational performance (Torkestani et al., 2014).

System quality includes the ease of system interaction and use, features and analysis capabilities, reliability or uptime/data consistency, architecture, and accessibility from various areas on-demand, and system factors are seen to promote learning and usage. Ease of use includes the system design and interface; the goal is that if the relative ease of use is high, users will be more inclined to learn the systems. Analysis capabilities include the features and technical characteristics, and have the ability to improve performance of the end-users (Torkestani et al., 2014).

According to (Karim, 2011) the information system is an inseparable part of the management system to provide appropriate information query resources for both system managers and the organization's management. Then (Fadhil, 2020) described management information systems as a method or process that gives detailed data necessary to manage organization efficiently. Moreover, Information systems have a profound influence on quality systems as management systems within organizations. Quality systems refer to the structured processes and procedures put in place to ensure that products, services, and processes meet or exceed defined quality standards.
1.4. Areas of investigating in the Moroccan context

The adoption and integration of Information Systems (IS) in the Moroccan context have been evolving in recent years, driven by advancements in technology and the need for businesses to stay competitive and efficient (Slimani H, 2021). For instance: ERP systems (Enterprise resource planning), CRM systems (Customer Relationship Management), Cloud computing, E-Commerce platforms, Digital Marketing tools ...etc. Several research studies have dealt with the question of the contribution of IS investments to the performance of companies.

The best conclusions lead to the fact that it is not the importance of IS investments themselves that have a real effect on performance, but rather their relevance to the company’s strategy, this means that companies with consistent IS strategies are more organizational performers when investing in IS (Regragui et al., 2018).

**Figure 5: The influence of Information Systems on the performance**

Source: Mantouzi & Said (2021)
2. Analysis model

Information systems & Quality systems have become pervasive in both public and private organizations in Morocco. So, a qualitative methodological approach of an exploratory and comprehensive nature was borrowed by the use of conducting semi-structured interviews as a tool for data collection was chosen as the most suitable tool for our case. This qualitative approach can provide a comprehensive and nuanced understanding of the influence of information systems on quality systems by delving into the complexities and contexts. Then, all interviews were conducted in the period from December 2022 to January 2023. The choice of respondents is not arbitrary, both managers and consultants are generally viewed as credible sources of information. Their involvement in the research project can enhance the credibility of the study, making it more likely that participants will be open and forthcoming during interviews; our target was experienced managers and senior consultants who are experts in the fields of information systems. The objective is to obtain, through the multiple points of view of the interviewees, more objective information about the relationship between information systems and quality systems.

<table>
<thead>
<tr>
<th>Answers</th>
<th>Position held</th>
<th>Activity area</th>
<th>City</th>
<th>Quality standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>Manager</td>
<td>Information system security</td>
<td>Casablanca</td>
<td>International references</td>
</tr>
<tr>
<td>A2</td>
<td>manager</td>
<td>Public sector</td>
<td>Oujda</td>
<td>Security, Environment, Quality</td>
</tr>
<tr>
<td>A3</td>
<td>manager</td>
<td>Public sector</td>
<td>Oujda</td>
<td>Security, Environment, Quality</td>
</tr>
<tr>
<td>A4</td>
<td>manager</td>
<td>Public sector</td>
<td>Oujda</td>
<td>Security, Environment, Quality</td>
</tr>
<tr>
<td>A5</td>
<td>Consultant</td>
<td>Software editor</td>
<td>Casablanca</td>
<td>RSE label</td>
</tr>
<tr>
<td>A6</td>
<td>Consultant</td>
<td>Software editor</td>
<td>Casablanca</td>
<td>RSE label</td>
</tr>
<tr>
<td>A7</td>
<td>Consultant</td>
<td>Software editor</td>
<td>Casablanca</td>
<td>RSE label</td>
</tr>
<tr>
<td>A8</td>
<td>Consultant</td>
<td>Software editor</td>
<td>Casablanca</td>
<td>RSE label</td>
</tr>
<tr>
<td>A9</td>
<td>Consultant</td>
<td>Consulting in management of information systems</td>
<td>Casablanca</td>
<td>CMMI</td>
</tr>
<tr>
<td>A10</td>
<td>Consultant</td>
<td>Consulting in management of information systems</td>
<td>Casablanca</td>
<td>Organization without quality label</td>
</tr>
<tr>
<td>A11</td>
<td>Manager</td>
<td>Public sector</td>
<td>Casablanca</td>
<td>Organization without quality label</td>
</tr>
<tr>
<td>A12</td>
<td>Manager</td>
<td>Logistics</td>
<td>Rabat</td>
<td>Organization without quality label</td>
</tr>
<tr>
<td>A13</td>
<td>Manager</td>
<td>Public service-capital market regulation</td>
<td>Casablanca</td>
<td>SMAC (Anti-corruption management system), SMSI (Information security management systems)</td>
</tr>
</tbody>
</table>
3. Results and discussion

3.1. Textual analysis:

Technology adoption differs by contextual factors, such as activity sector, position held, and work experience. In general, studies showed that managers are generally motivated to support new technologies and see benefits such as enhanced productivity and the performance of the quality systems.

In our study we adopted as samples: the sector of activity of the interviewees, the position occupied and the seniority in the certification of quality standards. The graph shows that 46% of the answers represent state services, 31% represent consulting in management of information systems, 8% represent Logistics, 8% represent SSI, & 7% represent software editors.

![Figure 6: Distribution of the sample according to the activity sector](image)

Source: Self performed results

The surface and the word cloud represent the most used words in our interview guide according to their frequency which are: Activity, Quality, Processes, Organization, Knowledge.
3.2. Content analysis

The interview guide aims to explore the role of Information Systems as a strategic integration in an organization's performance. The guide covers a range of topics, including the benefits of an Information Systems, its impact on productivity, cost management, communication, and coordination within the organization, knowledge management, automation, and the 360-degree view of the organization's activities.
The guide also touches on the importance of Quality Systems in an organization, their impacts on internal and external performance, the normative frameworks in place, and the reasons for their implementation. The guide notes that the implementation of a Quality Systems is essential for meeting customer requirements, complying with regulatory requirements, improving the quality of services rendered, and ensuring that products, services, and processes meet the organization’s objectives. Overall, the interview guide provides a good foundation for understanding the importance of Information Systems and Quality Systems in organizational performance, as well as the various ways they impact the organization internally and externally.

The Information Systems is defined as the set of IT tools used to process information and processes to facilitate work and provide reliable data and instant statistics. Examples of Information Systems mentioned in the interview include general accounting and human resource management systems, planning systems, customer relationship management systems, payroll management systems... etc.

The role of the Information System in the performance of the organization is to enable better use of information to make informed decisions, improve efficiency and productivity, increase competitiveness, identify trends and opportunities, and manage performance and measure results. Information Systems can also help with communication and coordination within the organization, facilitate decision-making and the execution of tasks, enable better knowledge management by collecting, storing and sharing information across the organization, automate business processes, reduce errors and delays, and improve the quality of products and services offered. Regarding the question on the implementation of a Quality System, the normative references mentioned include safety, the environment, and quality, international standards, CMMI and the CSR label. It is also noted that the respondent is not informed whether or not Quality Systems are in place in the company.

Overall, the Information Systems are considered to be a central element in the proper functioning of a company, which makes it possible to increase productivity and promote innovation. The advantages of the Information Systems include the improvement of the quality of products and services, the reduction of costs, the traceability of flows and processes, the management of the company’s activity and dematerialization. The implementation of normative reference systems can also contribute to strengthening the quality and security of the entire Information systems.
Conclusion and prospects:

The theoretical framework discussed in the text highlights the critical roles of Information Systems (IS) and Quality Systems (QS) in organizations. Information Systems are defined as interconnected components that collect, process, store, and distribute information to support decision-making and control. They contribute to efficiency, productivity, and competitive advantage by providing accurate information, enabling collaboration, and supporting strategic planning. DeLone & McLean identified six components of IS success: system quality, information quality, use, user satisfaction, individual impact, and organizational impact. Various theories, such as Resource-Based View and Agency Theory, help understand how information systems can be a source of competitive advantage and align user interests with organizational objectives.

Quality Systems, on the other hand, are implementations of quality philosophies, standards, methodologies, and tools to achieve quality-related goals. Organizational culture plays a crucial role in shaping quality systems and influencing member behavior. Theories like Total Quality Management, Kaizen, Deming’s 14 Points, and Theory of Constraints provide frameworks for effective quality management. The paper also discusses the influence of IS on QS, highlighting that user satisfaction, IS efficiency, and data-driven decision-making can enhance QS. Information systems are seen as a means to improve organizational performance, foster innovation, and provide a competitive edge. In the Moroccan context, the adoption of IS has been growing, with a focus on ERP systems, CRM systems, cloud computing, e-commerce, and digital marketing tools. However, the relevance of IS investments to a company’s strategy is found to be more critical for organizational performance than the size of the investments themselves.

The text concludes by explaining the methodology used, which involves conducting semi-structured interviews with experienced managers and senior consultants in the field of information systems. These interviews aim to provide a comprehensive understanding of the relationship between IS and QS, taking into account the complexities and contexts of Moroccan organizations. The questions asked in the interview guide are relevant and cover different aspects of the information system and quality in a company.

The answers provided by candidates demonstrate a comprehensive understanding and practical experience in these areas. The benefits of implementing a quality system are many, including improving employee well-being, meeting European standards, organizing work procedures, improving service quality and procedures, ensuring proper functioning, and achieving performance objectives.

The quality system also helps standardize quality procedures, provides relevant information, ensures process conformity, and minimizes dysfunction. Then, the impacts of a quality system on the organization are both internal and external, including improving communication and coordination, increasing employee engagement, reducing errors and defects, improving customer satisfaction, and reducing costs. External impacts include improving reputation, increasing
customer trust, facilitating regulatory compliance, and improving competitiveness. An Information System, thanks to all its components, can help the organization achieve its quality objectives by collecting and processing data on products, services, and processes. It can help measure and evaluate quality, track adherence to defined requirements, and ensure efficient and effective performance.

Hence, the research is focused on the Moroccan context, which means that the findings may not be directly applicable to organizations in other countries or regions. The dynamics of information systems and quality systems can vary significantly across different cultural, economic, and regulatory environments.

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