



# A REVIEW OF THE INFORMATION SYSTEMS USED BY PUBLIC SECTOR ORGANIZATIONS IN SAUDI ARABIA

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## ABSTRACT

*This is a qualitative review of the information systems used by public sector organisations in Saudi Arabia. The Google Scholar database was searched to select the papers dealing with IS in other countries and then specifically in Saudi Arabia. The selected papers were discussed under the sections of IS, IT, e-government, and information security in the case of other countries and under the sections of IS, IT, Knowledge management, and e-government in the case of Saudi Arabia. The difference between other countries and Saudi Arabia in the number of papers on each topic was considered to suggest future research topics. Some limitations of this review were also mentioned at the end.*

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## 1. INTRODUCTION

“An information system (IS) is a formal, sociotechnical, organisational system designed to collect, process, store, and distribute information” (Piccoli, 2019) (p 28). From a sociotechnical perspective, information systems consist of four components: task, people, structure (or roles), and technology (O'Hara, Watson, & Kavan, 1999) (p 64). Information systems can also be defined as an integration of components for collection, storage, and processing of data of which the data is used to provide information and contribute to knowledge as well as digital products that facilitate decision making. (Encyclopedia Britannica). Thus, information distribution and decision-making are two functions of IS.

Now public sector organisations are pressurised to perform. Emulating the private sector, public sector organisations use information systems for this purpose. However, the differences between the public and private sectors could affect the success of using information systems for performance improvement. A critical study is required to understand the unique characteristics of public sector organizations (Nandi & Nayak, 2008).

There are 149 public organisations in Saudi Arabia according to DNB (2023). Of these, 102 are in Riyadh and Jeddah has 15 and the remaining towns have five or fewer. These organisations may be using different information systems in different ways. Hence, it is necessary to evaluate these differences. This qualitative review aims to evaluate the differences in the use of IS by different Saudi public organisations.

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## **2. METHODOLOGY & RESULTS**

Google Scholar was searched to identify the papers related to the topic and the selected papers are discussed in the following sections. In selecting the papers, books, book sections, dissertations and abstracts without any relevant information were avoided. Only papers in English were selected. However, based on this model, creativity and continuous innovation are necessary to stay ahead of the competition to satisfy customers.

### **General**

#### ***Information systems***

Institutional tensions between low entrepreneurial culture and the efficiency principle of IT affected the information systems in public organisations. Institutional adjustments of bureaucracy were suggested as a solution to this problem by Wiredu (2012).

From a case study, Saxena and McDonagh (2020) observed that procurement of enterprise information systems (EIS) was determined by a multi-level process. This process was influenced by factors of the work system and the macrosocial level at the organisational level. The technological imperative at the work-system level and business case at the organisational level also played crucial roles. Macro-social factors like the EIS market, EIS vendor, and institutional context had greater roles in EIS procurement by public organizations.

Cavicchi and Vagnoni (2023) investigated how NGOs used digital information to respond to the external pressure for accountability. A shared meaning of accountability was constructed based on the NGO's accountability conversations with partners. IS facilitated this conversation. Even the change to IS by the NGO was prompted by the accountability pressures. This action research on a single NGO revealed a mutual cycle between accountability pressures and IS adoption by the NGO.

Magboul, Chew, and Raman (2016) proposed a conceptual model of IS usage by public organisations. In the model, IS usage was an intervening variable playing the dual role of an antecedent and a consequence. For any contextual application of the model, the key factors were top management support, availability of training, business-IT alignment, information service support and IS investment. In the model, strategic variables considered were product differentiation, product innovation, process innovation, organisational performance, competitive advantage, and strategy formulation to improve the performance of organisations.

Although IS is widely used, it fails during the development or implementation and use stages. Merely solving the technical issues will not contribute to their success. It is necessary to consider the cognitive and organisational aspects of their "real-world" application. If organisations learn from past mistakes, there will be a better chance of success next time (Shoniregun, 2004). Strategic Information Systems (SIS) have not been adequately developed among Indian public sector organisations. A survey by Rishi and Goyal (2009) identified corporate planning; regular upkeep of the machinery; fire and safety audits; quality control; and quality assurance as the critical factors for proper SIS development among Indian PSUs.

Using primary and secondary data on two public service organisations, Holohan and McDonagh (2017) examined the practices followed in these organisations to align business strategies with IS strategies. A practice-based mid-range theory was proposed in the form of a taxonomy. The taxonomy consisted of micro, meso and macro levels categorised to advocate, administer IS and Innovate. Thus, at the micro level, facilitate (advocate), support (administer IS) and counsel (innovate) were the taxonomic components. At the meso level, communication, implementation, and collaboration were the three components. At the macro level, venture, influence and share knowledge were the components. There were inter-level relationships also.

The strategy of mutual adaptation between the IS and the business process is facilitated by the iterative and incremental mechanisms of modern software engineering frameworks. The concept of mutual adaptation suggests that the real innovation of an IS project is not the software, but the working solution after implementation. Bygstad (2005) used a longitudinal case study from a large public auditing organisation. It developed a new audit process parallel to the construction of a new information system to support it. The authors described the project through seven iterations as it experiments with different organisational mechanisms to achieve mutual adaptation. The dynamics of mutual adaptation provided opportunities for both the information system and the business process to be flexible.

Timely data availability is essential for public health decisions. Health Information Systems generate, analyse, and disseminate the required data. However, health information systems are often not functioning systematically. These systems are products of historical, social, and economic complexities; hence fragmented and not responsive to needs. International donors prioritise their agenda, thus denying the data required to monitor the UN Millennium Development Goals. For effective solutions, these systems need to support the country's health information systems and there should be donor accountability and responsibility allocations (AbouZahr & Boerma, 2005).

Using a literature review, case analysis and testing of a model, Heeks (2006) showed that the design-reality gap model could be used to measure health information system (HIS) failure both as pre-hoc and post-hoc steps. The model also validated a set of methods, techniques, roles, and competencies required to support the dynamic improvements for the success of HIS. Ayyash, Ahmad, and Singh (2012) proposed a hybrid IS model for trusting e-government in public sector organisations based on the information system success model, technology acceptance model, and security and privacy from literature. These studies provided the IS factors affecting user trust in e-government adoption. These factors were information quality, system quality, and service quality from the IS model perceived usefulness and ease of use from the Technology Acceptance model, and perceived security and privacy, all leading to trust in e-government with the outcome of intention to use by the public.

Using interviews of managers from two organisations, Kelegai and Middleton (2004) identified many factors influencing the success of IS systems in Papua New Guinea (PNG). These were economic, political, cultural, and work culture factors. Each of these factors consisted of many sub-factors. To categorise the culture of the country, the authors used Hofstede's cultural dimensions (Hofstede, 2011). PNG is a least developed country. Most of these factors were negative or at low levels compared to developed countries.

The problems with stovepipe systems and departments have been mostly solved in the banking sector. However, interview results from public organisations by Sundberg and Sandberg (2012) revealed the existence of this problem affecting cross-functional collaboration, processes, customer focus and integration of services and channels, which also needed additional improvement or development.

#### ***e-Government***

The complexities involved in the choice and design of new technologies for e-government reforms were identified by Cordella and Iannacci (2010). Technologies are carriers of e-government reforms. A specific case of ICT in the mediation of the relationships between police forces and prosecutors in England and Wales was used in this study. In public organisations, information systems are usually regarded as one more resource with a powerful and protean one, in the armoury of politics as usual. IS can affect organisational politics. IS reinforces prevailing structures of control and biases within the organisation which can negatively impact public sector organisations and outcomes. Managerial and economic aspects are often ignored in such situations.

In an evaluation-led e-government design, Grimsley and Meehan (2007) focused on the concept of public value as concerning outcomes, services, satisfaction, and trust.

Transparency and client engagement are essential to build customer trust for positive outcomes on service deliveries. This model was validated by an empirical study. An Experience Management Matrix helps to decide on the e-government design to maximise trust and outcomes.

Besides e-services, public organisations are establishing new channels as contact centres, to interact more efficiently with the citizens. From the results of multiple case studies on Swedish municipalities, Kallberg (2013) noted that the establishment of contact centres has aims other than the traditional use of information as evidence for decision-making. They were internal business process development and cost savings. The information captured proactively serves different purposes. These purposes challenge the strong bond between processes, legislation, organisation, and accountability.

#### ***Information Technology***

The management of IT projects is a critical issue in public organisations due to the failure of several IT projects and budgetary limitations in them. It may not be ideal to copy the IT systems from the private sector. Many problems of IT project management in the public sector, including late start, overshooting the budget, poor project management skills of the bureaucracy and many other issues were noted by Cats-Baril and Thompson (1995) from a case study.

In digitally transforming public organisations, governments face pressures from many sectors like the economy, national security, healthcare, and education. Even after spending large amounts, most digital transformation projects failed. Trade-offs and conflicts could be two reasons for this. IT enables public organisations to manage the trade-offs arising from conflicting value-based goals. Three mitigation strategies facilitated via IT-enabled organisational capabilities. These were bias, tunnelling and hybridisation (Goh & Arenas, 2020).

Although conversational technologies like discussion forums, chatrooms and web blogs have rapidly changed the way information is exchanged and spread, their uptake by companies is slow. According to Hasan and Pfaff (2007), this is because these conversational technologies democratise organisational information and knowledge leading to changes in the distribution of power, rights, and obligations.

Public sector organisations need to continuously transform to retain their legitimacy by meeting their obligations to citizens, central governments, and laws. The digital era brings new challenges for public sector organisations that historically are slow in the adoption of changes. A literature review and expert interviews by Faro, Abedin, and Kozanoglu (n.d.) highlighted the requirements of both current and novel capabilities for public organizations to utilise digital technologies and

respond to drivers of digital transformation. The drivers were cognitive, cultural, sociostructural and legal factors.

**Information security**

A systematic review by Khando, Gao, Islam, and Salman (2021) showed that to build information security awareness among employees, public organisations used theoretical models and gamification methods. Private organisations used a constructivist approach and violation detection.

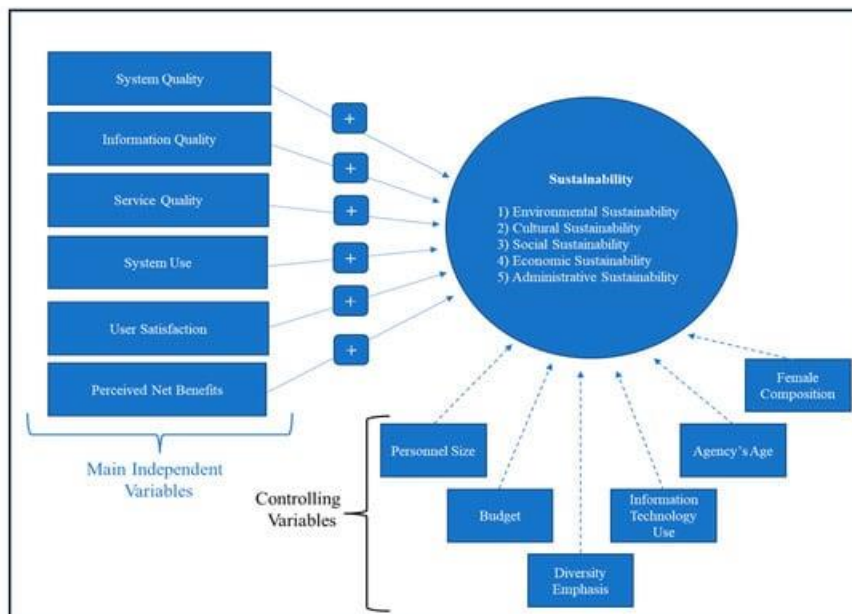
**Saudi Arabia**

**Information systems**

Factors influencing the successful adoption of human resources information systems (HRIS) in Saudi public organisations were studied by Al-Khowaiter, Dwivedi, and Williams (2013). A review on the topic found no work from Saudi Arabia. The authors describe the models and theories used by them. However, the results obtained for validation of the models have not been given.

Results of a survey of 160 participants from Saudi organisations showed that most Saudi organisations were partially or wholly outsourcing their IS. Most Saudi organisations were pricing the IS/IT outsourcing services either based on cost or a fixed lump sum price. Most Saudi enterprises own data centre facilities. A small number of organisations owned IT assets like equipment and programs. Saudi organisations preferred the best breed of multiple suppliers rather than only one supplier to reduce the outsourcing risk. A high percentage of Saudi organisations were regionally outsourcing the development and maintenance of the software, hardware, and integrated IS and staff training and education (Abu-Musa, 2011).

A survey of 3738 employees of Saudi public service organisations by Almuqrin, Mutambik, Alomran, and Zhang (2023) showed that their perceptions of IS were only weakly associated with the sustainability practices of the organisations. The most important predictor of organisational sustainability was user satisfaction with IS. Job satisfaction leads to better use of systems. User satisfaction was a part of the overall employee satisfaction. High levels of technological infrastructure promote organisational sustainability. A conceptual model of the relationship between IS and organisational sustainability is given in Fig 1.



**Figure 1.** Conceptual model of the relationship between information system and organizational sustainability (Almuqrin et al., 2023.)

Alkrajji (2020) developed a conceptual framework for business information systems to identify and weight the challenges. The framework was based on four themes of business information capabilities, decision, technological and organisational contexts. To examine the framework, a Delphi method with business information experts from two Saudi government organisations was used. Business information experts weighted the identified challenges using AHP.

The top-ranked challenges were organisational compatibility and IT, BI system, and data collection capabilities. Decisional uncertainty and organisational culture were the lowest-ranked challenges.

The Saudi government has taken initiatives to promote the use of IS in the religious tourism industry, encouraging firms to adopt IS innovations like e-commerce and enforcing the use of the Makha'a

information system in Umrah for external pilgrims and the Yosr information system in Hajj for internal pilgrims. The results of interviews with five tourism firms showed that government initiatives and industry competitiveness were two positive factors promoting IS use. However, some major barriers prevented private firms from fully utilising the advantages of information systems. These included the internal factors of lack of commitment and need for professional help and external factors of lack of support from the IT industry and access to IT resources (Brdese, Corbitt, & Pittayachawan, 2013).

AlMindeel and Martins (2021) undertook a single case study consisting of document analysis and interviews with senior employees of a Saudi public organisation. Awareness, knowledge, and behaviour of individuals were important to develop an information security system in the organisation. The facilitating conditions identified were customisation to the needs of employees and the organisation, interactivity, innovation, frequency, integration of both electronic and physical learning resources, and rewarding the acquisition of in-depth security-related actionable knowledge.

A model was used by Alshardan, Goodwin, and Rampersad (2016) to evaluate the various impacts of IS on Saudi SMEs. The IS-Impact model consisted of four constructs: 'Individual impact', 'Organisational impact', 'System quality' and 'Information quality'. These represented four distinct but related dimensions of the multidimensional phenomenon of IS success. Use and satisfaction are antecedents of the consequences of IS impact. The impact had four levels: individual, organisational, system quality, information quality, and vendor quality. The results of a survey of 356 participants validated the model.

### **Information Technology**

Based on a survey of employees in Saudi public organisations by Basri and Sulaiman (2012) revealed that ICT usage was affected by TAM variables. Perceived usefulness (PU) was a better determinant than perceived ease of use (PEOU). Subjective norm moderated ICT acceptance. Training and current usage levels did not affect employees' readiness for change. The type of work did not influence the usage-attitude relationship. Acceptance by workers, their readiness for change, availability of the required skills, organizational readiness, language barrier, leadership support, and changes in job environment were listed as the issues related to ICT adoption and use by Saudi public organisations. Most users of e-services are women due to cultural issues in which women are expected by custom to stay at home. As they spend a long time at home, they will use the e-services at home frequently for convenience.

Alghazi, Li, Cui, Wamba, and Shen (2018) used a strategic alignment model to identify and analyse the factors contributing to business/IT strategy misalignment in Saudi Arabian public-sector organisations. The qualitative study consisted of semi-structured interviews in five public-sector organisations in Saudi Arabia. The results showed human, operational, and IT system factors lead to business-IT strategy misalignment. Some practical approaches for avoiding misalignment in Saudi public-sector organisations sometimes lack structure and consistency.

A GIS adoption model for Saudi public service organisations Alzahrani, Abdullah, Mohamed, and Mukred (2021) was validated by using the Technology Acceptance Model (TAM) in addition to DeLone and McLean's Success Model. Interviews with ten experts helped to rank the factors identified. These factors had significant effects on GIS adoption, which, in turn, was related to overall performance. The ranked factors by experts were system quality, pandemic pressure, information quality, change management, perceived ease of use, security, perceived usefulness, service quality, competitive pressure, intention to use, and performance. All these factors had rank values from 4 to 5.

GIS helps to deliver services to the target people. Thus, it becomes a part of the IS in organisations. Survey responses from 221 participants from the Saudi Ministry of Water and Electricity (MOWE) indicated that managerial support, IT expertise and exposure to GIS, as the critical factors for employees to use it. Attitude was important for its usage. Training and incentives were not important. The use of GIS enhanced risk management. However, there was no effect of GIS on decision-making efficiency or saving costs (Alzighaibi, Mohammadian, & Talukder, 2016).

Almajed and Mayhew (2013) using a mixed approach identified the critical success factors of IT projects in Saudi public organisations. The factors were top management support and commitment, project management, project team competency, communication management, strategic planning, training and education, management of partners and suppliers, and stakeholder management.

Integrating the TOE (Technology–Organization–Environment) framework with the Information System Strategic Triangle (IS Triangle) and the HOT-fit (Human–Organization–Technology) models, Alharbi, Atkins, and Stanier (2016) investigated the determinants of cloud computing adoption in Saudi healthcare organisations. Out of the five perspectives, after the business perspective, technological, organisational, environmental and human perspectives were important in that order of decreasing importance. The authors have diagrammatically explained their theoretical framework, as given in Fig 2.

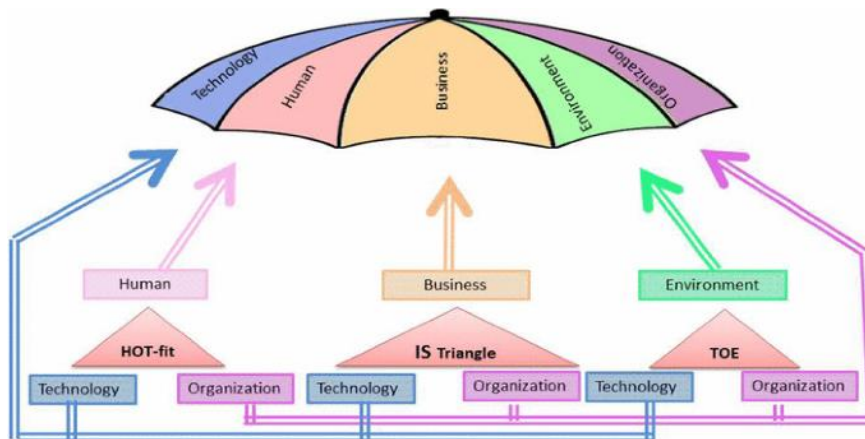


Figure 2. Theoretical framework linking TOE, IS TRIANGE and HOT-FIT (Alhrabi et al., 2016.)

The results of a qualitative study by Ghazi, Cui, Shen, Fosso, and Li (2020) showed that top management characteristics, IT governance mechanisms, business and IT strategy alignment and the implementation of IT project planning and quality can benefit organisational performance, services innovation, and operational excellence. Interviews with 15 senior employees from five case studies of Saudi public organisations were done in this study.

An analysis of four cases of Saudi organisations by Madkhali and Sithole (2023) revealed the implementation of various sustainable practices by them. These practices were facilitated by the Internet of Things (IoT), blockchain, and artificial intelligence (AI). These technologies helped to enhance energy efficiency and reduce waste. Policy interventions by the government and public-private partnerships supported the achievement of sustainable goals and economic growth. The role of the government should be to remove technological barriers and build digital capacities of companies.

Talukder, AlSheddi, Sharma, and Islam (2022) developed a conceptual model based on two theories: The unified Theory of Acceptance and Use of Technology and the Theory of Reasoned Action. The sample data comprised 340 responses to an online survey questionnaire from employees at the Ministry of Foreign Affairs, Saudi Arabia. The religious factors perfection (Itqan), cooperation (Ta'awun) and transparency (Shaffaf) had a significant effect on users' attitudes to the ERP system's usage. There was no significance for responsibility (Mas'uliyah).

Cloud computing is a main aspect of the digital transformation technology. There are some concerns about its adoption in many organisations in different countries. An online survey of 206 Saudi public organisations by Al-Ruithe, Benkhelifa, and Hameed (2018) revealed security, privacy, and loss of governance as the main barriers to adopting cloud computing in these organisations. Cloud computing facilitates service deliveries in any one of the forms of

platform as a service (PaaS), infrastructure as a service (IaaS) or software as a service (SaaS).

To evaluate the factors affecting the adoption of Cloud Computing in the government sector, Alsanea and Wainwright (2014) undertook a multiple case study of Saudi government organisations. In the conceptual model, the most significant issues related to organisation and technology were Service Quality, Usefulness, Security, Complexity, Cost, Organisation Size, IT Infrastructure Readiness, Senior Management Support, Feasibility, Trust, Organisation Culture, Organisation Structure, and Privacy Risk. The dependent variable was cloud computing. Environment and external pressure were from Culture, Industry Type, Government Support, and Regulatory Concerns. Perceived benefits were direct and indirect benefits. The initial results of the research showed the relative importance of these factors as service quality (100%), usefulness (100%), security (100%), complexity (88.9%), cost (77.8%), organisation size (77.8%), IT infrastructure readiness (77.8%), top management support (88.9%), feasibility (88.9%), trust (100%), organisation culture (66.7%), organisation structure (88.9%), privacy risk (100%), direct benefits (77.8%), indirect benefits (100%), culture (44%), external pressure (55.6%), industry type (100%), government support (88.9%), and regulatory concern (55.6%).

Saleh (2010) aimed to demonstrate the application of soft system methodology (SSM) to issues and obstacles facing Saudi Arabian government organizations using information and computer technology (ICT). Mixed methods were used. The results showed that most organisations suffered from people issues rather than technical issues. Based on the results obtained from various stages of SSM, many activities in the conceptual model were compared with the real-world situation to prepare an agenda for change.

To identify the most significant factors that influence the successful adoption of ERP and propose a conceptual model, Hammad, Yahaya, and Mohamed (2024) used the Technology Acceptance Model with the

DeLone and McLean Information Success Model. The model was validated with the help of consultation with 10 experts. In the validated conceptual model, the quality components were system quality, information quality and service quality. User engagement factors were participation, involvement, and resilience. Environment factors were change management, competitiveness pressure, and pandemic pressure. The three sets of factors led to perceived ease of use and perceived usefulness, both driving intention to use or implement and then actual use and its sustainability.

#### ***Knowledge management***

A knowledge management system is a type of information system used to maintain and develop KM processes associated with the formation, storage, recovery, dissemination, and application of knowledge within and outside an organization. After examining the current models, Alatawi, Dwivedi, Williams, and Rana (2012) proposed a conceptual model to study the factors responsible for the adoption and use of knowledge management systems. The authors used the TOE framework, UTAUT model, and institutional theory for their advantages. The proposed model contained technological, organizational, and environmental contexts and their components, accounting for 20 hypotheses. The model was not validated.

A survey of 352 employees from Saudi public sector organisations by Alatawi, Williams, and Dwivedi (2013) revealed that coercive pressure directly affects behavioural intention. It also indirectly affects behavioural intention through derived pressure. Coercive pressure, normative pressure and external IS support determine the strength of mimetic pressure. Mimetic pressure and coercive pressure influence behavioural intention to adopt knowledge management.

#### ***e-government***

e-government adoption is surrounded by political, cultural, organisational, technological, and social issues which must be considered and treated carefully to enable this transformation. Using case studies of Saudi public service organisations, their motivations for changing to e-government were identified by Abdullah, Rogerson, Fairweather, and Prior (2006). They were political, economic, social and cultural, geographical, managerial, technological, demographic and citizens' reasons and regional comparisons.

According to Shehry, Rogerson, Fairweather, and Prior (2009), to implement e-government, Saudi government organisations had to consider some technological, managerial, national and agency aspects of organisational issues both before and after going online. According to the findings obtained by Santa, Echeverry, Sánchez, and Patiño (2014), there was no predictive relationship between user satisfaction and operational effectiveness of e-government services of Saudi public organisations.

A predictive relationship was found for system quality and information on operational effectiveness. Qualities of system and information had no impact on user satisfaction. On the other hand, quality of service had a high impact on user satisfaction.

### **3. DISCUSSION**

Papers on public organisations in other countries focused more on IS. Papers on Saudi Arabian public organisations focused more on IT rather than IS. Knowledge management was an additional topic (with two papers) in the case of papers on Saudi public organisations. There was one paper on the information security of public organisations in other countries.

Both in the case of other countries and of Saudi Arabia, many models were tested and validated using empirical studies. One trend was to gather factors from the literature and get them verified or ranked by experts. Within information technology, cloud computing, GIS and ERP were some topics on which a few papers were published.

The quality of papers was generally good, although in some cases, mixed approaches rather than surveys alone would have been better.

### **4. CONCLUSION, RECOMMENDATION & FUTURE RESEARCH**

Overall, the topics dealt with in the papers were fairly widespread covering IS, IT, e-government, cloud computing, GIS, ERP, and knowledge management. The numerical differences between papers published on various topics in other countries and those in Saudi Arabia can be regarded as an indication of the areas for future research.

There was no paper on information security in the case of Saudi Arabia. Since this is an important aspect of the rapidly increasing use of cloud computing and big data analytics, more research needs to be done in Saudi Arabia. Even in the case of other countries, there was only one paper on information security. Hence, more research is required in other countries as well.

There were 13 papers from other countries and only seven from Saudi Arabia on IS. This means research on IS needs to be substantially increased in the case of Saudi Arabia. This is especially important as large-scale digital transformation of public services is happening in Saudi Arabia as a part of its Vision 2030 programme.

There were three papers each in both cases on e-government. Since citizens access various services and utilities through e-government, research on this topic also needs to be substantially increased.

### Limitations of this review

This review was qualitative. A systematic quantitative review would have provided more information. Only the first five pages of Google Scholar were searched for selecting the papers in both cases. By this narrow

selection, a large number of more useful papers might have been left out. Future research will be a systematic review in which various databases will be used to select papers with a PRISMA flow diagram. This review can be considered as exploratory.

### References:

- Abdullah, A.-S., Rogerson, S., Fairweather, N. B., & Prior, M. (2006). The motivations for change towards e-government adoption: Case studies from Saudi Arabia. *E-government Workshop*, 6(1), 1-21.
- AbouZahr, C., & Boerma, T. (2005). Health information systems: the foundations of public health. *Bulletin of the World Health Organization*, 83, 578-583. Retrieved January 19, 2024, from [https://www.scielosp.org/article/ssm/content/raw/?resource\\_ssm\\_path=/media/assets/bwho/v83n8/v83n8a10.pdf](https://www.scielosp.org/article/ssm/content/raw/?resource_ssm_path=/media/assets/bwho/v83n8/v83n8a10.pdf)
- Abu-Musa, A. A. (2011). Exploring Information Systems/Technology Outsourcing in Saudi Organizations: An Empirical Study. *Journal of accounting, business & management*, 18(2), 17. Retrieved January 19, 2024, from <https://openurl.ebsco.com/EPDB%3Agcd%3A8%3A4658456/detailv2?sid=ebsco%3Aplink%3Ascholar&id=ebsco%3Agcd%3A66709978&crl=c>
- Alassafi, M. O., Alharthi, A., Walters, R. J., & Wills, G. B. (2017). A framework for critical security factors that influence the decision of cloud adoption by Saudi government agencies. *Telematics and Informatics*, 34(7), 996-1010. doi:10.1016/j.tele.2017.04.010
- Alatawi, F. M., Williams, M. D., & Dwivedi, Y. K. (2013). Exploring importance of environmental factors for adoption of knowledge management systems in Saudi Arabian public sector organisations. *International Journal of Electronic Government Research (IJEGR)*, 9(4), 19-37. doi:10.4018/ijegr.2013100102
- Alatawi, F., Dwivedi, Y. K., Williams, M. D., & Rana, N. P. (2012). Conceptual model for examining knowledge management system (KMS) adoption in public sector organizations in Saudi Arabia. *tGov Workshop '12 (tGOV12)*, May 8 – 9 2012, Brunel University, West London, 12. Retrieved January 19, 2024, from [https://d1wqtxts1xzle7.cloudfront.net/30657678/t-Gov\\_Fatmah\\_Alatawi-libre.pdf?1391834656=&response-content-disposition=inline%3B+filename%3DCONCEPTUAL\\_MODEL\\_FOR\\_EXAMINING\\_KNOWLEDGE.pdf&Expires=1705678769&Signature=Hl-CeLZsFDn1k77NYd30gVdiMC21d9hUCVVoioG7IR](https://d1wqtxts1xzle7.cloudfront.net/30657678/t-Gov_Fatmah_Alatawi-libre.pdf?1391834656=&response-content-disposition=inline%3B+filename%3DCONCEPTUAL_MODEL_FOR_EXAMINING_KNOWLEDGE.pdf&Expires=1705678769&Signature=Hl-CeLZsFDn1k77NYd30gVdiMC21d9hUCVVoioG7IR)
- Alghazi, A., Li, M., Cui, T., Wamba, S. F., & Shen, J. (2018). Misalignment between Business and IT Strategic Objectives in Saudi Arabia Public Sector Organisations. In W. Cho, M. Fan, M. Shaw, B. Yoo, & H. Zhang (Ed.), *Digital Transformation: Challenges and Opportunities. WEB 2017. Lecture Notes in Business Information Processing, vol 328.*, pp. 212-220. Springer, Cham. doi:10.1007/978-3-319-99936-4\_2
- Alharbi, F., Atkins, A., & Stanier, C. (2016). Understanding the determinants of Cloud Computing adoption in Saudi healthcare organisations. *Complex & Intelligent Systems*, 2, 155-171. doi:10.1007/s40747-016-0021-9
- Al-Khowaiter, W., Dwivedi, Y., & Williams, M. (2013). Conceptual model for examining the adoption and success of human resource information systems in public sector organisations in Saudi Arabia. *UK Academy for Information Systems Conference Proceedings* (p. Art 3). AIS. Retrieved January 19, 2024, from <https://aisel.aisnet.org/ukais2013/3/>
- Alkrajji, A. I. (2020). Weighting the challenges to the effectiveness of business intelligence systems in organisations: an empirical study of government organisations in Saudi Arabia. *Journal of Decision Systems*, 29(2), 102-127. doi:10.1080/12460125.2020.1770436
- Almajed, A., & Mayhew, P. (2013). An investigation of the critical success factors of IT projects in Saudi Arabian public organizations. *IBIMA Business Review*, Article ID 260919. doi:10.5171/2013.260919
- AlMindeel, R., & Martins, J. T. (2021). Information security awareness in a developing country context: insights from the government sector in Saudi Arabia. *Information Technology & People*, 34(2), 770-788. doi:10.1108/itp-06-2019-0269
- Almuqrin, A., Mutambik, I., Alomran, A., & Zhang, J. Z. (2023). Information System Success for Organizational Sustainability: Exploring the Public Institutions in Saudi Arabia. *Sustainability*, 15(12), 9233. doi:10.3390/su15129233
- Al-Ruithe, M., Benkhelifa, E., & Hameed, K. (2018). Key issues for embracing the cloud computing to adopt a digital transformation: A study of saudi public sector. *Procedia computer science*, 130, 1037-1043. doi:10.1016/j.procs.2018.04.145
- Alsanea, M., & Wainwright, D. (2014). Identifying the determinants of cloud computing adoption in a government sector—A case study of Saudi organisation. *International journal of business and management studies*, 6(2), 29-43. Retrieved January 21, 2024, from <https://dergipark.org.tr/en/download/article-file/255758>



- Alshardan, A., Goodwin, R., & Rampersad, G. (2016). A benefits assessment model of information systems for small organizations in developing countries. *Computer and Information Science*, 9(1), 1-20. doi:10.5539/cis.v9n1p1
- Alzahrani, N. A., Abdullah, S. N., Mohamed, I., & Mukred, M. (2021). The adoption of geographic information systems in the public sector of Saudi Arabia: A conceptual model. *Mathematical Problems in Engineering*, Article ID 1099256. doi:10.1155/2021/1099256
- Alzighaibi, A., Mohammadian, M., & Talukder, M. (2016). Factors affecting the adoption of GIS systems in the public sector in Saudi Arabia and their impact on organizational performance. *Journal of Geographic Information System*, 8(3), 396-411. doi:10.4236/jgis.2016.83034
- Ayyash, M. M., Ahmad, K., & Singh, D. (2012). A hybrid information system model for trust in e-government initiative adoption in public sector organisation. *International Journal of Business Information Systems*, 11(2), 162-179. doi:10.1504/IJBIS.2012.048889
- Basri, W. S., & Sulaiman, M. (2012). Factors affecting information communication technology acceptance in public organizations in Saudi Arabia. *International Journal of Computer Science & Information Security*, 10(2), 118-139. Retrieved January 19, 2024, from [https://d1wqtxts1xzle7.cloudfront.net/37355203/03-JournalOfComputerScienceIjcsisVol.10No.2February2012.pdf?1429518648=&response-content-disposition=inline%3B+filename%3DImproving\\_Mobility\\_in\\_eXtreme\\_Programmin.pdf&Expires=1705677362&Signature=AfiFoQmmv-q-](https://d1wqtxts1xzle7.cloudfront.net/37355203/03-JournalOfComputerScienceIjcsisVol.10No.2February2012.pdf?1429518648=&response-content-disposition=inline%3B+filename%3DImproving_Mobility_in_eXtreme_Programmin.pdf&Expires=1705677362&Signature=AfiFoQmmv-q-)
- Brdesee, H., Corbitt, B., & Pittayachawan, S. (2013). Barriers and motivations affecting information systems usage by Hajj-Umrah religious tourism operators in Saudi Arabia. *Australasian Journal of Information Systems*, 18(1), 5-23. Retrieved January 20, 2024, from [https://ap-st01.ext.exlibrisgroup.com/61RMIT\\_INST/upload/1705724347319/n2006041339.pdf?Expires=1705724467&Signature=mZymal8SWcG19dXzrXUUs4UtC4XZngQdeJfFEaK-srFcPWpcQDKbWRkTSRo~j3D5QjF33GdRINDWa7sJ5r35Xnx1zTGwHQhcuSPM6Ym~6HQlo91m5qg2KiUwLRzv8UPjEU4IvXipu6](https://ap-st01.ext.exlibrisgroup.com/61RMIT_INST/upload/1705724347319/n2006041339.pdf?Expires=1705724467&Signature=mZymal8SWcG19dXzrXUUs4UtC4XZngQdeJfFEaK-srFcPWpcQDKbWRkTSRo~j3D5QjF33GdRINDWa7sJ5r35Xnx1zTGwHQhcuSPM6Ym~6HQlo91m5qg2KiUwLRzv8UPjEU4IvXipu6)
- Bygstad, B. (2005). Managing the dynamics of mutual adaptation of technology and organisation in Information Systems development projects. *Software Process: Improvement and Practice*, 10(3), 341-353. doi:10.1002/spip.234
- Cats-Baril, W., & Thompson, R. (1995). Managing information technology projects in the public sector. *Public administration review*, 55(6), 559-566. Retrieved January 18, 2024, from <https://www.jstor.org/stable/3110347>
- Cavicchi, C., & Vagnoni, E. (2023). Digital information systems in support of accountability: The case of a welfare provision non-governmental organisation. *The British Accounting Review*, 55(5), 101112. doi:10.1016/j.bar.2022.101112
- Cordella, A., & Iannacci, F. (2010). Information systems in the public sector: The e-Government enactment framework. *The Journal of Strategic Information Systems*, 19(1), 52-66. doi:10.1016/j.jsis.2010.01.001
- DNB. (2023). *Public administration organisations in Saudi Arabia*. Retrieved January 18, 2024, from Dun & Bradstreet: [https://www.dnb.com/business-directory/company-information.public\\_administration.sa.html](https://www.dnb.com/business-directory/company-information.public_administration.sa.html)
- Faro, B., Abedin, B., & Kozanoglu, D. C. (n.d.). Continuous transformation of public-sector organisations in the digital era. *25th Americas Conference on Information Systems, AMCIS 2019*. Retrieved January 19, 2024, from [https://opus.lib.uts.edu.au/bitstream/10453/136254/4/OCC-148780\\_AM.pdf](https://opus.lib.uts.edu.au/bitstream/10453/136254/4/OCC-148780_AM.pdf)
- Ghazi, A., Cui, T., Shen, J., Fosso, S., & Li, M. (2020). A qualitative study of the strategic alignment perspective of public-sector organisations in Saudi Arabia in the digital age. *Pacific Asia Conference on Information Systems (PP=ACIS)*, 22 June 2020. AIS Electronic Library. Retrieved January 20, 2024, from [https://web.archive.org/web/20210811224529id\\_/https://aisel.aisnet.org/cgi/viewcontent.cgi?article=1092&context=pacis2020](https://web.archive.org/web/20210811224529id_/https://aisel.aisnet.org/cgi/viewcontent.cgi?article=1092&context=pacis2020)
- Goh, J. M., & Arenas, A. E. (2020). IT value creation in public sector: how IT-enabled capabilities mitigate tradeoffs in public organisations. *European Journal of Information Systems*, 29(1), 25-43. doi:10.1080/0960085X.2019.1708821
- Grimsley, M., & Meehan, A. (2007). e-Government information systems: Evaluation-led design for public value and client trust. *European Journal of Information Systems*, 16, 134-148. doi:10.1057/palgrave.ejis.3000674
- Hammad, M. Z., Yahaya, J. B., & Mohamed, I. B. (2024). A model for enterprise resource planning implementation in the Saudi public sector organization. *Heliyon*, 10, e24531. doi:10.1016/j.heliyon.2024.e24531
- Hasan, H., & Pfaff, C. C. (2007). Emergent Conversational Technologies that are Democratising Information Systems in Organisations: the case of the corporate Wiki. In D. N. Hart, & S. D. Gregor (Ed.), *Information Systems Foundation Workshop: Theory, Representation and Reality*, 27-28 September 2006, ANU (pp. 197-210). The Australian National University. Retrieved January 19, 2024, from <https://library.oapen.org/bitstream/handle/20.500.12657/33716/459291.pdf#page=207>
- Heeks, R. (2006). Health information systems: Failure, success and improvisation. *International journal of medical informatics*, 75(2), 125-137. doi:10.1016/j.ijmedinf.2005.07.024

- Hofstede, G. (2011). Dimensionalizing Cultures: The Hofstede Model in Context. *Online Readings in Psychology and Culture*, 2(1), 1-26. doi:10.9707/2307-0919.1014
- Holohan, J., & McDonagh, J. (2017). How information systems managers align business and information systems strategies in public service organisations: a practice-based taxonomy. *17th European Academy of Management Conference, 21-24 June 2017, Glasgow, Scotland*. 21, pp. 21-24. University of Strathclyde Business School.
- Kallberg, M. (2013). Issues with contact centres—as a new interface between public organisations and citizens. *Records Management Journal*, 23(2), 90-103. doi:10.1108/RMJ-01-2013-0002
- Kelegai, L., & Middleton, M. (2004). Factors influencing information systems success in Papua New Guinea organisations: a case analysis. *Australasian Journal of Information Systems*, 11(2), 57-69. doi:10.3127/ajis.v11i2.116
- Khando, K., Gao, S., Islam, S. M., & Salman, A. (2021). Enhancing employees information security awareness in private and public organisations: A systematic literature review. *Computers & security*, 106, 102267. doi:10.1016/j.cose.2021.102267
- Madkhali, A., & Sithole, S. T. (2023). Exploring the role of information technology in supporting sustainability efforts in Saudi Arabia. *Sustainability*, 15(16), 12375. doi:10.3390/su151612375
- Magboul, I. H., Chew, K.-W., & Raman, M. (2016). A conceptual model of information system usage for better improvement in organisations. *International Journal of Business Information Systems*, 22(3), 362-374. doi:10.1504/IJBIS.2016.076877
- Nandi, M. L., & Nayak, G. K. (2008). Information systems management in public sector organizations. *International Conference on Information Technology, 17-20 December 2008, Bhubaneswar, India* (pp. 289-294). IEEE. doi:10.1109/ICIT.2008.68
- O'Hara, M. T., Watson, R. T., & Kavan, C. B. (1999). Managing the three levels of change. *Information System Management*, 16(3), 63-70. doi:10.1201/1078/43197.16.3.19990601/31317.9
- Piccoli, G. P. (2019). *Information systems for managers: texts and cases* (4th ed.). Prospect Press, Inc.
- Rishi, B., & Goyal, D. P. (2009). Critical success factors in the development of strategic information systems in Indian public sector organisations: an inter-organisational analysis. *International Journal of Indian Culture and Business Management*, 2(5), 469-492. doi:10.1504/IJICBM.2009.025276
- Saleh, A.-Z. I. (2010). Development of a soft system model to identify information and communications technology issues and obstacles in government organisations in Saudi Arabia. *Journal of Theoretical & Applied Information Technology*, 20(2), 93-104. Retrieved January 21, 2024, from <https://www.jatit.org/volumes/Vol20No2/5Vol20No2.pdf>
- Santa, R., Echeverry, A. M., Sánchez, P. A., & Patiño, J. I. (2014). System and operational effectiveness alignment: The case of e-government in Saudi Arabia. *International Journal of Management Science and Engineering Management*, 9(3), 212-220. doi:10.1080/17509653.2014.905219
- Saxena, D., & McDonagh, J. (2020). Exploring Enterprise Information Systems Procurement in Public Service Organisations. *Electronic Journal of e-Government*, 18(1), 69-83. doi:10.34190/EJEG.18.1.005
- Shehry, A. A., Rogerson, S., Fairweather, N. B., & Prior, M. (2009). The key organisational issues affecting e-government adoption in Saudi Arabia. *International Journal of Electronic Government Research (IJEGR)*, 5(4), 1-13.
- Shoniregun, C. A. (2004). An investigation of information systems project failure and its implication on organisations. *International Journal of Services Technology and Management*, 5(1), 25-41. doi:10.1504/IJSTM.2004.004024
- Sundberg, H., & Sandberg, K. W. (2012). Managing Stovepiped Organisations-A Comparison of Public and Private Organisations. *International Journal of Public Information Systems*, 2(1), 39-54. Retrieved January 19, 2024, from <https://www.diva-portal.org/smash/record.jsf?pid=diva2%3A26299&dsid=6014>
- Talukder, M., AlSheddi, A., Sharma, D., & Islam, R. (2022). Do religious values influence the decision of Saudi Arabian public sector employees to adopt Government Resource Planning systems? *IEEE Access*, 10, 90271-90286. doi:10.1109/ACCESS.2022.3199915
- Wiredu, G. O. (2012). Information systems innovation in public organisations: an institutional perspective. *Information Technology & People*, 25(2), 188-206. doi:10.1108/09593841211232703

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