



A Knowledge Asset Management Implementation Framework for Information Systems Outsourcing Projects

Hanlie Smuts^(✉)  and George Maramba

Department of Informatics, University of Pretoria, Pretoria, South Africa
hanlie.smuts@up.ac.za, georgemaramba@gmail.com

Abstract. Organisations are increasingly outsourcing information systems (IS) to external service providers. These IS outsourcing decisions are driven by multiple organisational factors such as outsource vendor expertise and knowledge, process performance improvement due to better IS, and enabling the organisation's ability to focus on its core capabilities. In order to harness such vendor knowledge to achieve business outcomes, the importance of a shared knowledge asset base, between the client organisation and outsource vendor, is emphasised. However, outcomes from IS outsourcing remain poor despite consideration of experience and research. Therefore, the aim of this study is to design and propose a knowledge asset management implementation framework that may be applied in IS outsourcing projects. The proposed framework was evaluated by an experienced programme director and its applicability was tested against a large scale IS outsourcing project. The purpose of such a framework is to enable organisations to manage and institutionalise knowledge assets that are created during the IS outsourcing project and to ensure that the organisation may gain the benefit from such knowledge assets as an outcome of the IS outsourcing arrangement.

Keywords: Knowledge asset management · Information systems outsourcing · Knowledge management · Framework · Knowledge asset management implementation

1 Introduction

Information systems (IS) outsourcing, where an organisation contracts external service providers to effectively deliver IS-enabled business processes, application services and/or infrastructure solutions for business outcomes, is regarded as an important business strategy [1]. Recently, as experience and knowledge have deepened, outsourcing as a business phenomenon has been positioned as an opportunity to be applied to IS activities in line with an organisation's overall sourcing strategy [2]. Several reasons are cited by organisations for adopting IS outsourcing, such as; ensuring a high level of productivity, and to offer maximum quality to their customers [3].

The importance of knowledge management (KM) and a shared knowledge base between the client organisation and outsource vendor, are highlighted as a basis for organisational performance gains [4]. In order to realise these performance gains, an environment for client organisation and outsource vendor knowledge integration must

be created through common language and frequent interaction, consequently fostering knowledge transfer and ultimately, knowledge asset management [5, 6]. Knowledge asset management is a commonly stated objective for organisations, although difficult to achieve, as knowledge creation is rewarded rather than knowledge reuse [7].

However, outcomes from IS outsourcing continue to remain poor despite consideration of experience and research [8, 9]. Recent studies suggest that one of the reasons for this lack of improvement is due to the complex nature of outsourcing agreements as they shift from being a mere cost cutting exercise to one which holds significant strategic and social importance to the organisation [9, 10]. Furthermore, knowledge asset management is considered most valuable in the knowledge-driven economy, although the focus on tasks of knowledge asset understanding and management, have not been prioritised compared to their physical counterparts [11]. While scholars highlight the significance of knowledge asset management in addressing IS outsourcing complexity, little research has been conducted on how organisations manage knowledge assets and knowledge reuse in IS outsourcing circumstances [7, 12, 13]. Therefore, the research question that this paper aims to address is: *“What are the components of a knowledge asset management implementation framework for managing knowledge assets in IS outsourcing projects?”*. By addressing this question, organisations are able to reference an approach to the management of knowledge assets during IS outsourcing projects, ensuring that institutional knowledge is not lost during outsourcing and that new knowledge that is created through the partnership, is captured and managed.

In Sect. 2 we present the background to the study followed by the research approach in Sect. 3. Section 4 details the data analysis and findings, while Sect. 5 concludes the paper.

2 Background

The management of knowledge in the context of IS outsourcing, is a comprehensive course of action that requires focus and commitment throughout an organisation in order to achieve the desired results [13, 14]. The outcome of this organisational focus and commitment, is an important factor for IS outsourcing arrangements, seeing as the aim is to increase the collective knowledge of each other’s knowledge domain [5, 15]. Technology-specific knowledge, such as the IS services provided, flows from the organisation to the outsource supplier, and business-specific knowledge about processes and procedures flows from the supplier to the organisation. The purpose of this knowledge transfer is to increase the knowledge shared by the organisation and the outsource vendor [5, 16]. Knowledge sharing and management in the context of IS outsourcing is not a stand-alone practice; it should be integrated into all aspects of the outsourcing arrangement [5, 15, 17]. The inseparability of IS from the internal production service in the client organisation implies that even in situations of absolute outsourcing, a minimum set of capabilities are retained in-house by the client organisation [18].

In the next sections we consider IS outsourcing, KM, and highlight the role of knowledge asset management in order to manage knowledge in an IS outsourcing arrangement.

2.1 IS Outsourcing as a Business Phenomenon

IS outsourcing refers to the contractual agreement between the client organisation and an outsource vendor for the transfer of assets and/or the development and implementation of IS within an agreed time period and a specified cost [9, 18]. The transfer of assets view of IS outsourcing is also applicable to subcontracting in IS [19]. Once the outsource vendor has been selected and prior to embarking on transition, several elements should be considered to further guide the outsourcing arrangement process such as a transition planning, communication strategy planning, transfer conditions identification and resource mobilisation [20].

IS outsourcing initiatives consist of many tasks that have to be executed in an interrelated manner [9]. These interdependent steps must enable an organisation to obtain the correct information in order to be able to select the right services for the right reasons, consequently maximising business leverage in the outsourcing arrangement [20, 21]. Several outsourcing lifecycle models exist each consisting of numerous steps. Examples of such interrelated project steps include; the IS outsourcing programme lifecycle consisting of the request for proposal and vendor selection, contracts and negotiations, setup and logistics, programme execution, implementation and testing, and programme completion stages [22]. The three phase IS outsourcing building block approach consists of the architect, engage and govern stages [20]. Alborz et al. [23] defined 3 stages: (1) pre-contract stage (scoping and evaluation), (2) contract stage (negotiation) and (3) post-contract stage. Outsourcing strategy and due diligence operationalise the *pre-contract* stage and contract development the *contract* stage. The *post-contract* stage is operationalised through governance, performance management, contract management, working relationship management and knowledge management.

Such an IS outsourcing project lifecycle guides an organisation in realising the full value that outsourcing can provide to become an informed purchaser, to plan and design the commercial arrangement, to carefully select the best value for money supplier and to put in the appropriate management skills and effort [20, 24]. Outsourcing should give an organisation a strategic advantage and involves judgements about quantitative and qualitative factors [19]. If it fails to deliver these advantages then an outsourcing arrangement should not be considered [22].

In the next section, we present an overview of the KM and knowledge asset management.

2.2 IS Outsourcing and Knowledge Asset Management in Context

The importance of a shared knowledge base between the client organisation and outsource vendor is highlighted as a basis for performance gains, as it creates sensitivity to the organisational environment of the other party and encompasses goals, constraints, interpretations and behaviour [4, 13]. Such an environment for knowledge integration is created through a common language and frequent interaction, consequently fostering knowledge transfer and adding value [5, 6]. Such knowledge asset value add constitutes what is known by the organisation and employees resulting in a potential long lasting, open-ended value. The organisational knowledge asset value may be derived in

two ways: firstly, the degree to which knowledge assets may be abstracted and generalised, and secondly, the extent to which a knowledge asset may be codified [25].

As the same knowledge is used to solve multiple problems, it is recognised that the same IS capability can transform different organisations in different ways [13]. Outsource vendors benefit fully from their knowledge resources as they reuse the same knowledge in different contexts for different customers. Similarly, IS organisations have to design adequate knowledge transfer strategies to build expertise so that new problems can be addressed by reusing the same knowledge [26]. However, the fact that an organisation relies on an outsource vendor does not mean that it should ignore the importance of an ongoing knowledge management programme specifically related to knowledge transfer [6, 27]. Knowledge transfer has come to the fore in response to the increasing size, complexity and scope of organisations, as well as the increasing capabilities of modern IS to support knowledge-orientated activities [13, 28].

Organisations discover the effective deployment of IS management and derive business value from it through experiential learning and hands-on experience. Challenges are not always appreciated unless they are experienced, as the understanding of the value of an IS innovation tends to materialise in an evolutionary manner. Organisations choosing to outsource may unintentionally fragment this knowledge by missing critical learning opportunities, with a resulting loss of ensuing business gains. This necessitates constant assessment of the impact of IS outsourcing decisions on the protection and enhancement of an organisation's knowledge base [6, 27].

Before we present the proposed knowledge asset management implementation (KAMI) framework, we present an overview of the research methodology followed for this research paper.

3 Research Approach

The overall objective of this paper was to define a KAMI framework for managing knowledge in IS outsourcing projects. The purpose of such a framework is to assist organisations with the management of knowledge in IS outsourcing projects. In order to achieve this outcome, we followed a design-based approach [29]. Design based research is a “systematic but flexible methodology aimed to improve educational practices through iterative analysis, design, development, and implementation, based on collaboration among researchers and practitioners in real-world settings, and leading to contextually-sensitive design principles and theories” [31:6]. Design based research produces both theories and practical interventions as its outcomes [31] and encompasses five basic characteristics [30]. The first characteristic is *pragmatic*, referring to the research focus on solving current real-world problems through the design of interventions. The *grounded* characteristic points to the fact that the research is grounded in both theory and the real-world context, while *interactive*, *iterative* and *flexible* refer to the nature of the research process. *Integrative* highlights that researchers integrate a variety of research methods and approaches from both qualitative and quantitative research paradigms, depending on the needs of the research. The final characteristic, *contextual*, emphasises that research outcomes are connected with both the design process through which results are generated and the setting where the research is conducted.

With these characteristics guiding our research, we built upon prior literature about IS outsourcing and knowledge asset management in order to create a KAMI framework (pragmatic nature of our research). Our research approach was of a qualitative nature and the context of our research was IS and organisations. We approached our research on both theory and a real-world context (grounded) by considering existing knowledge management implementation frameworks and gaps identified. Thereafter, we designed our proposed KAMI framework through an iterative process by considering and finally, we evaluated the proposed KAMI framework with a real-world case in order to establish its practical application.

Multiple knowledge management system implementation frameworks focusing on operations exist, however, none of the frameworks specifically encompass knowledge asset management across all phases of an IS outsourcing project. Table 1 summarises the frameworks; in each instance listing the focus of the framework, the steps included in the framework and the reference.

Table 1. Overview of knowledge management system frameworks

Focus of framework	Steps	Source
KMS development	Sense making; envisioning; designing; exploring	[32]
KMS process implementation	Acquisition; storage; sharing; retention; application	[33]
KMS process implementation	Creation; acquisition; storing and retrieving; sharing and distribution; transformation; use	[34]
KMS life cycle	Create; organise; store; share; evaluate	[35]
KMS cycle model	Identify; create; store; share; use; learn; improve	[25]
KMS management implementation framework	Acquisition; evaluation; storage and retrieval; utilisation and creation; application; management	[36]
KMS implementation activities	Create; organise; store; share; evaluate	[37]
KMS implementation	Identify; create; store; share; use	[38]
KMS implementation approach	Initialisation; domain mapping; profiles and policies identification; implementation and personalisation; validation	[39]
KMS implementation approach	Draft; planning; analysis; design; development; implementation; control	[40]
KMS implementation factors model	Strategise; implement; organise	[41]
KMS implementation framework and methodology	Strategise; evaluate; develop; validate; implement	[42]

By mapping the KAMI activities in Table 1 to the stages of IS outsourcing presented in Sect. 2.2, a proposed KAMI framework for IS outsourcing projects is derived and depicted in Fig. 1. Cognisance is taken of the unique attributes of the IS outsourcing life-cycle stages and arrows indicate the flow of the diagram. The *pre-contract stage* [23] of

an IS outsourcing project is operationalised through considering the outsourcing strategy where an organisation reflects on the reason and scope for outsourcing, followed by a due diligence evaluating the commercial potential of the outsourcing project. As the organisation is still considering the viability of the IS outsourcing project, the knowledge asset management activities only centre around high level *strategic activities* such as agreeing on the associated principles and governance for managing knowledge assets during the IS outsourcing project and the identification of the accountable organisational structure, as well as the organisational sponsor. The scope of which knowledge assets will be impacted, which knowledge assets will be required for the project and what new knowledge assets will be created during the IS outsourcing project, must also be considered during this strategising activity.

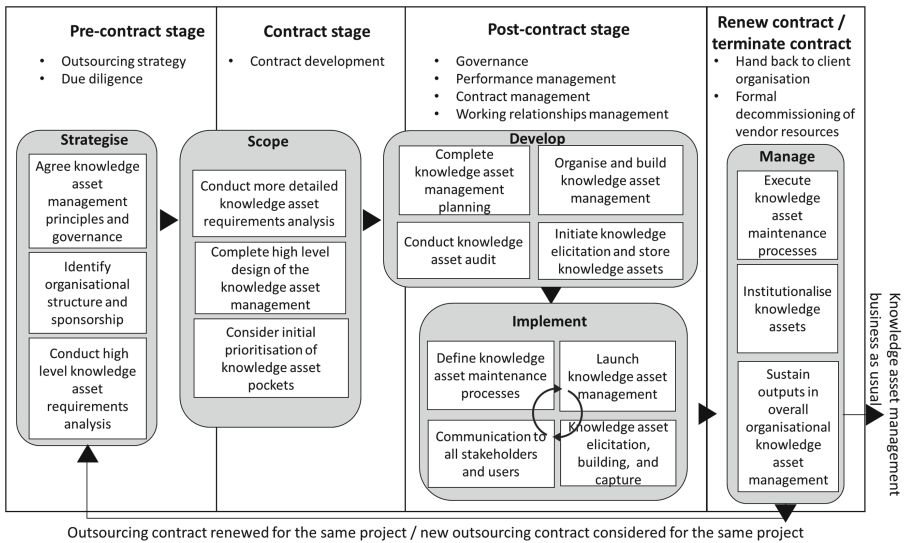


Fig. 1. KAMI Framework for IS Outsourcing Projects

Once the organisation approves that the IS outsourcing project should continue, the project proceeds to the *contract stage* [23]. During this stage the organisation appoints the outsource vendor, normally through a procurement process, and negotiate all aspects of the IS outsourcing contract with the chosen outsource vendor. As it is fairly certain that the IS outsourcing project will proceed, but the contract is just not signed yet, the knowledge asset management activities now move to the *scope phase*. During the scope phase a more detailed knowledge asset requirements analysis must be concluded now that the scope of the IS outsourcing agreement is clear. The identification of knowledge assets impacted will also advise prioritisation as the IS outsourcing project proceeds and with this scope in mind, a high level design of the knowledge asset management system can also be concluded. The scoping of knowledge asset management activities may kick off towards the end of the pre-contract stage, especially once the organisation has completed the due diligence as this activity informs the

scope of the knowledge assets impacted. Towards the end of the contract stage, the initial activities of the knowledge asset management implementation development phase may be initiated to ensure that the KAMI is prepared to kick off shortly after the outsourcing contract is signed. If the time between the signing of the contract and the means to capture knowledge assets is too long, knowledge assets may be jeopardised and even lost. These initial activities include the completion of the KAMI planning, as well as the initiation of a knowledge asset audit relevant to the scope of the IS outsourcing agreement.

Once the organisation and the chosen outsource vendor signed the IS outsourcing agreement, the *post-contract stage* is initiated, [23] focusing on the active management of the outsourcing agreement, the working relationships management and the performance management of the vendor. These activities take place within the agreed contract governance framework. From a KAMI perspective, focus is now on the organisation, building and storing knowledge assets. Knowledge elicitation during this phase is key as the elicitation process may include outsource vendor resources. The definition and implementation of knowledge asset management processes and the training of all stakeholders are important activities during the KAMI *development phase*. The activities in the development phase are cyclical in nature as it has to be managed throughout the entire IS outsourcing contract management stage and last for the duration of the contract term.

Once the IS outsourcing contract reached its termination date, the organisation may choose to extend the contract, procure and appoint a new outsource vendor or ensure that the outsource vendor hands operations over to the organisations. For the first two options, the KAMI process will kick off again as the new extended scope has to be considered. In the instance where an outsource vendor must hand over to the organisation, the KAMI must also be institutionalised and handed over to the identified sponsors and organisational structures. This will ensure that the knowledge assets created during the IS outsourcing project, are maintained and sustained.

We applied the proposed KAMI framework in a proof of concept evaluation in an actual IS outsourcing project. The application and subsequent findings of the KAMI framework are discussed in the next section.

4 Application of the KAMI Framework

In order to do a proof of concept evaluation of the KAMI framework, we applied the KAMI framework to a real world IS outsourcing project from an organisation operating in the Information Communication Technology (ICT) sector in South Africa (SA). The organisation utilises an IS multi-sourcing approach as a strategy with a significant number of IS projects and IS operational functions that are outsourced. The specific IS outsourcing project used for the proof of concept evaluation was for the replacement of a large scale legacy system that was outsourced to two vendors, necessitating the appointment of a systems integrator. The scope of work outsourced included business process modelling, high level solution design and architecture, an implementation programme work plan and a data migration strategy. A programme director, an experienced, independent consultant, appointed by the organisation to work with both outsource

vendors, systems integrator, as well as the organisation's IS outsourcing project team members, applied the proposed KAMI framework to the project in order to establish its applicability to a real-world situation. We believed that such an experienced programme director overseeing a complex IS outsourcing agreement will be in a position to provide valuable insight into the practical application of the proposed KAMI framework. As the IS outsourcing project was in progress already i.e. in the post-contract phase, the programme director mapped the proposed KAMI framework to the project and could, in addition to providing feedback, also share lessons learnt in terms of the early stages of the IS outsourcing project.

The programme director provided comments based on each stage of the IS outsourcing project and related KAMI framework activities. For the *strategise phase* as part of the *pre-contract stage*, the programme director indicated that by considering an overview of the knowledge asset management principles as well as high level scope, presents great advantages. Market knowledge, knowledge of the strategic objectives informing the IS outsourcing and knowledge about the operational benefits that will be derived from the outsourcing, are important. A key enabler identified by the programme director pointed to the outsource vendor knowledge of the client organisation. Such knowledge ensures that engagement takes place at the correct organisational level, that the external skills from the outsource vendor complement existing skill sets and that emphasis is placed on the up-skilling of the client organisation in terms of managing an outsource partner. As knowledge exchange in the pre-contract phase of IS outsourcing deals with the structure of the agreement, negotiation position knowledge and negotiation skills are key. In terms of requirements analysis at this stage of the project, identification and documentation of organizational intellectual property, knowledge of different outsource models, quantification of the business case for outsourcing and multiple benchmarks and performance measure identification present major knowledge exchanges. These particular knowledge exchanges are considered as part of the high level knowledge asset requirements analysis.

In terms of the *scope* phase of the framework, the programme director highlighted knowledge exchange in terms of how the knowledge audit methodology procedure step attracted significant input. These included a knowledge repository of the client organisation business processes, knowledge of service level agreements, project planning, support constructs, scope of outsourcing, resource mobilization time and the definition of a model to retain key knowledge and skill in the organisation. Due diligence, live demonstrations and presentations, research and intelligence re outsource vendors and the knowledge embedded in a lessons learnt repository, informed the initiative scoping procedure. The knowledge audit and initiative scoping steps were relevant in the hand-over between the post-contract and contract phases. Prioritisation focuses on the understanding of the key objectives of knowledge transfer into measurable services and products in order to inform vendor selection. Technology solution assessment in the *contract* phase pointed to the assessment of a solution benchmarking repository and an outcomes based assessment of the usability of the perceived end product.

The programme director highlighted that the *post-contract* stage included multiple knowledge exchanges in terms of planning. These include knowledge of joint execution key drivers and processes, contract management, escalation paths and the planning of the work contribution of the outsourcing arrangement with appropriate stakeholders.

A key step in the *development* phase is the knowledge elicitation procedure where knowledge is exchanged through integration sessions, knowledge sharing sessions and a culture of knowledge sharing is fostered. During the building procedure, traceability of knowledge elements, agreed way of work, organisational monitoring capabilities and joint delivery presented opportunities for knowledge exchange. The planning and knowledge elicitation procedures are positioned within the hand over between the contract and post-contract stages. The *implement* phase includes key knowledge exchange identified and points to conducting formal knowledge transfer workshops of learning that has taken place during the project in order to create a lessons learnt knowledge base. As this procedure is in the post-contract phase, formal knowledge transfer mechanisms from outsource vendor to client organisation must be facilitated and sufficient planning for hand over time must be allocated. With a strong focus on maintenance and support, knowledge transfer regarding the monitoring of the service level agreement, housekeeping and general operational tasks, and decommissioning of vendor resources must be enabled. A knowledge repository with all relevant solution information, decisions made during the project and risks identified and mitigated, including proper security controls, must be created. Here well-defined quantifiable business benefits linked to well defined and measureable business processes, facilitation of proof of concept and demonstrations of the solution, as well as the creation of a common knowledge repository between the client organisation and outsource vendor as part of the outsourcing arrangement, are important knowledge exchanges. The programme director highlighted the utilisation of joint documentation responsibilities between the client organisation and outsource vendor. The KAMI activities in the implement phase of the KAMI framework are cyclical in nature and has to be managed throughout the entire period of IS outsourcing contract execution.

Finally, in the *contract ended/terminated stage*, the programme director emphasised knowledge maintenance procedures in two important areas. Firstly, the institutionalisation of appropriately transparent knowledge transfer channels, where client organisation stakeholders are kept up to date on the processes used, including the rationale for vendor selection and subsequent contract terms. Secondly, the facilitation of focus group meetings where all key stakeholders are mandated to attend and participate with access to a central document repository to ensure transparency to all participants in the process. He also identified the unique contribution of communication and change management and indicated that it should not be limited to the final phase only. He stressed the value of having communication and change management at initiation of the outsourcing project through to the close out of the project.

In addition, the senior programme director commented on the advantages of the KAMI framework based on his experience with large scale IS outsourcing programmes and also made KAMI framework improvement suggestions. Firstly, he reflected on the cyclical nature of the KAMI framework as he experienced that knowledge assets are often lost when an IS outsourcing contract is terminated or ends. The cycles indicated in the KAMI framework ensures that the organisation considers to capture these knowledge assets before the outsource vendor exists. The programme director reflected on the management of 3 knowledge flows namely, new knowledge created by the joint IS outsourcing team, organisation-to-vendor knowledge exchange, and vendor-to-organisation knowledge exchange. He believed that although it was implied in the

KAMI framework, it will add value to make it explicit, especially as different mechanisms may be applied in order to manage these different knowledge flows. The programme director highlighted that he believes two distinct sets of knowledge assets must be managed: firstly, the knowledge assets created by the IS outsourcing project related to the business rationale for using outsourcing, e.g. the implementation of a new software solution. Secondly, he indicated that knowledge assets are also utilised in the management of the IS outsourcing agreement, e.g. the project documentation, outsourcing process knowledge, negotiation guidelines, contract management knowledge etc. He mentioned that he believes it will add great value of the KAMI framework guided both of these knowledge asset sets. By including the second knowledge asset set, namely the IS outsourcing project assets, it will enable the commercial team to negotiate and include key knowledge asset management principles in the commercial agreement with the outsource vendor. The programme director stressed that the fact that a contract which includes knowledge asset management clauses, will assist in enforcing the vendor to share knowledge as some contract payments may be linked to the delivery of knowledge sharing. Lastly, he suggested that the inclusion of an agreement on a knowledge taxonomy related to the project within the context of the bigger organisation should form part of the *stratigise* phase of KAMI. This will be important for the institutionalisation of the knowledge assets created during the IS outsourcing project and when the assets have to be integrated into the organisational knowledge context.

5 Conclusion

The implementation of knowledge management at an organisational level is a key enabler for managing the knowledge assets in the organisation during the implementation of an IS outsourcing arrangement. In order to assist organisations embarking on IS outsourcing to pro-actively manage their knowledge assets during the IS outsourcing project, the aim of this study was to develop a KAMI framework. The KAMI framework was designed based on the analysis of multiple KM frameworks and then evaluated by an experienced senior programme director. The objective with this proof of concept evaluation was to establish whether the KAMI framework was applicable to IS outsourcing projects where multiple knowledge exchanges take place, namely; organisation-to-vendor knowledge exchange, vendor-to-organisation knowledge exchange and new knowledge that was created by the IS outsourcing implementation project. The proof of concept evaluation was done through an interview with the senior programme director and the data regarding knowledge exchange in an IS outsourcing project that he managed, was analysed and reported in the context of the KAMI framework. The data included comments regarding each of the stages of the IS outsourcing lifecycle.

It was established that due to the iterative nature of the KAMI framework, the activities were well suited to be applied in the context of an IS outsourcing project. The KAMI framework captured the knowledge asset management activities well and the proposed activities aligned well to the execution of the IS outsourcing stages. The programme director made suggestions for the improvement of the proposed KAMI framework and this may be included in future research. Furthermore, the revised KAMI

framework may be applied in an actual IS outsourcing project to test the applicability of the framework in a real-world IS outsourcing project scenario. In addition, a comparative study may be conducted between the KAMI framework and the ISO standard for knowledge management systems (ISO 30401:2018).

References

1. Piotrowicz, W., Kedziora, D.: Outsourcing of information technology and business processes in Poland: motivations and environmental factors. *Manag. Glob. Transit.* **16**(4), 307–333 (2018)
2. Jeong, J., et al.: Enhancing the application and measurement of relationship quality in future IT outsourcing studies. In: 26th European Conference on Information Systems (ECIS2018), Portsmouth, UK (2018)
3. Norina, P., Camelia, M.: Outsourcing management: outsourcing services worldwide and in Romania. *Econ. Sci. Ser.* **XVIII**(1), 376–381 (2018)
4. Cruz, N.M., Perez, V.M., Cantero, C.T.: The influence of employee motivation on knowledge transfer. *J. Knowl. Manag.* **13**(6), 478–490 (2009)
5. Blumenberg, S., Wagner, H., Beimborn, D.: Knowledge transfer processes in IT outsourcing relationships and their impact on shared knowledge and outsourcing performance. *Int. J. Inf. Manag.* **29**, 342–352 (2009)
6. Beyah, G., Gallivan, M.: Knowledge management as a framework for understanding public sector outsourcing. In: 34th International Conference on System Sciences. IEEE, Hawaii (2001)
7. Davenport, T.H.: Process management for knowledge work. In: vom Brocke, J., Rosemann, M. (eds.) *Handbook on Business Process Management 1*. IHIS, pp. 17–35. Springer, Heidelberg (2015). https://doi.org/10.1007/978-3-642-45100-3_2
8. St. John, J., Guynes, C.S., Vedder, R.: The client–vendor offshore relationship: success factors. *Inf. Syst. Manag.* **31**(2), 120–125 (2014)
9. Nurye, S.A., Molla, A., Desta, T.A.: Factors influencing knowledge transfer in onshore information systems outsourcing in Ethiopia. *Afr. J. Inf. Syst.* **11**(4), 279–298 (2019)
10. Roy, S., Sivakumar, K.: Global outsourcing relationships and innovation: a conceptual framework and research propositions. *J. Prod. Innov. Manag.* **29**(4), 513–530 (2012)
11. Smuts, H., et al.: Knowledge asset management pertinent to information systems outsourcing. *Adv. Intell. Syst. Comput.* **353**, 43–55 (2015)
12. Teo, T.: Knowledge management in client-vendor partnerships. *Int. J. Inf. Manag.* **2012**(32), 451–458 (2012)
13. Vishwakarma, H.R., Tripathy, B.K., Kothari, D.P.: An architectural design for knowledge asset management system. In: Muttou, S.K. (ed.) *System and Architecture*. AISC, vol. 732, pp. 329–338. Springer, Singapore (2018). https://doi.org/10.1007/978-981-10-8533-8_31
14. Archer-Brown, C., Kietzmann, J.: Strategic knowledge management and enterprise social media. *J. Knowl. Manag.* **22**(6), 1288–1309 (2018)
15. Aydin, M.N., Bakker, M.E.: Analyzing IT maintenance outsourcing decision from a knowledge management perspective. *Inf. Syst. Front.* **10**, 293–305 (2008)
16. Bandyopadhyay, S., Pathak, P.: Knowledge sharing and cooperation in outsourcing projects: a game theory analysis. *Decis. Support Syst.* **43**, 349–358 (2007)
17. Balaji, S., Ahuja, M.K.: Critical team-level success factors of offshore outsourced projects: a knowledge integration perspective. In: *Proceedings of the 38th Hawaii International Conference on System Sciences*. IEEE, Hawaii (2005)

18. Miozza, M., Grimshaw, D.: Modularity and innovation in knowledge-intensive business services: IT outsourcing in Germany and the UK. *Res. Policy* **34**, 1419–1439 (2005)
19. Akomode, O.J., Lees, B., Irgens, C.: Constructing customised models and providing information for IT outsourcing decisions. *Logist. Inf. Manag.* **11**(2), 114–127 (1998)
20. Cullen, S., Willcocks, L.: Intelligent IT outsourcing: eight building blocks to success. In: Remenyi, D. (ed.) *Computer Weekly Professional Series*, p. 224. Butterworth-Heinemann, Oxford (2003)
21. Gartner: Marketplace realities in strategic outsourcing, R-17–7896, pp. 1–22. Gartner Inc. (2002a). Editor
22. Sood, R.: IT, Software and Services: Outsourcing & Offshoring, p. 178. AiAiYo Books, Austin (2005)
23. Alborz, S., Seddon, P., Scheepers, R.: A model for studying IT outsourcing relationships. In: 7th Pacific Asia Conference on Information Systems, Adelaide, South Australia (2003)
24. Gellings, C.: Outsourcing relationships: the contract as IT governance tool. In: Proceedings of the 40th Hawaii International Conference on System Sciences. IEEE, Hawaii (2007)
25. Evans, M., Dalkir, K., Bidian, C.: A holistic view of the knowledge life cycle: the knowledge management cycle (KMC) model. *Electron. J. Knowl. Manag.* **12**(2), 85–97 (2014)
26. Mohamed, M.D., et al.: information systems outsourcing drivers and service delivery of commercial banks in Kenya. *Int. J. Bus. Manag. Res.* **3**(1), 10–14 (2019)
27. Smuts, H., et al.: Framework for managing shared knowledge in an information systems outsourcing context. *Int. J. Knowl. Manag. (IJKM)* **13**(4), 1–30 (2017)
28. Niederman, F.: International business and MIS approaches to multinational organisational research: the cases of knowledge transfer and IT workforce outsourcing. *J. Int. Manag.* **11**, 187–200 (2005)
29. Sandoval, W.A., Bell, P.: Design-based research methods for studying learning in context: introduction. *Educ. Psychol.* **39**(4), 199–201 (2004)
30. Wang, F., Hannafin, M.J.: Design-based research and technology-enhanced learning environments. *Educ. Tech. Res. Dev.* **53**(4), 5–23 (2005)
31. Edelson, D.C.: Design research: what we learn when we engage in design. *J. Learn. Sci.* **11**(1), 105–121 (2002)
32. Moteleb, A.A., Woodman, M., Critten, P.: Towards a practical guide for developing knowledge management systems in small organizations. In: 10th European Conference on Knowledge Management, Vicenza, Italy (2009)
33. Badimo, K.H., Buckley, S.: Improving knowledge management practices in the South African healthcare system. *Int. Sch. Sci. Res. Innov.* **8**(11), 3449–3455 (2014)
34. Bolisani, E., Bratianu, C.: The emergence of knowledge management. *Emergent Knowledge Strategies. KMOL*, vol. 4, pp. 23–47. Springer, Cham (2018). https://doi.org/10.1007/978-3-319-60657-6_2
35. Evans, M., Ali, N.: Bridging knowledge management life cycle theory and practice. In: International Conference on Intellectual Capital, Knowledge Management and Organisational Learning ICICKM 2013–Conference Proceedings (2013)
36. Karemente, K., et al.: Knowledge management frameworks: a review of conceptual foundations and a KMF for IT-based organizations. *Strengthening the Role of ICT in Development*, p. 35 (2009)
37. Meher, D.P., Mahajan, N.: Study of knowledge management frameworks (2013)
38. Mostert, F., Snyman, I.: Analysis of the South African surrogate for a TMRP-6 anti-tank mine. In: 23th International Symposium on Ballistics (2007)

39. Amine, M.M., Ahmed-Nacer, M.: An agile methodology for implementing knowledge management systems: a case study in component-based software engineering. *Int. J. Softw. Eng. Appl.* **5**(4), 159–170 (2011)
40. Orenga-Roglá, S., Chalmeta, R.: Methodology for the implementation of knowledge management systems 2.0. A case study in an oil and gas company. *Bus. Inf. Syst. Eng.* **61**(2), 195–213 (2017)
41. Butler, T., Heavin, C., O'Donovan, F.: A theoretical model and framework for understanding knowledge management system implementation. In: Clarke, S. (ed.) *Evolutionary Concepts in End User Productivity and Performance: Applications for Organizational Progress*, Information Science Reference, pp. 204–225, Hershey, New York (2009)
42. Smuts, H., et al.: A framework and methodology for knowledge management system implementation. In: *Proceedings of the Annual Research Conference of the South African Institute of Computer Scientists and Information Technologists*. ACM, Vanderbijlpark, Emfuleni, South Africa (2009)