Journal of King Saud University – Computer and Information Sciences (2013) **25**, 229–240

King Saud University

Journal of King Saud University – Computer and Information Sciences

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Towards a unified model for successful implementation of outsourcing and reversibility of information systems

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Received 31 May 2012; revised 20 February 2013; accepted 9 March 2013
Available online 21 March 2013

KEYWORDS

Outsourcing;
Reversibility;
Critical success factors;
Information systems;
Framework model

Abstract Outsourcing information systems services is considered a strategic decision for many organizations because it is a risky endeavor. When issues arise during the outsourcing process, many organizations tend to switch their operations from external vendors back to in-house, i.e., implement reversibility or back-sourcing. There is evidence of sufficient scale to warrant further attention to the reversibility process due to the increased failure of outsourcing projects. One of the main goals of this paper is to provide a conceptual framework that can help implement both outsourcing and reversibility projects successfully. In addition to the risks associated with the outsourcing process, most researches focus on the outsourcing process after the relationship between the vendor and the organization is established, while the activities related to pre-outsourcing and post-outsourcing stages are neglected or given little concern. Another objective of this work is to integrate the outsourcing phase with the pre and post outsourcing phases. This paper also aims to identify the critical factors affecting the outsourcing and reversibility processes, thereby dealing with the outsourcing risks from the beginning rather than as an afterthought.

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Peer review under responsibility of King Saud University.

Production and hosting by Elsevier

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http://dx.doi.org/10.1016/j.jksuci.2013.03.003

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1. Introduction

Outsourcing information systems (IS) services is considered a strategic decision for many organizations because of the many risks associated with each step of the outsourcing process. Sometimes a change in a business process requires the organization to carry out an outsourcing project. An example is the paper tickets which were used by all airlines a few years back; now the Air transportation associations (IATA) regulations require the use of electronic tickets instead of paper tickets. Outsourcing IS services is a risky endeavor, such as any new product development or capital investment (Aubert et al., 1998). According to the press releases and practitioners, many organizations, in the last 10 years, have changed their strategy and started to consider reversibility as a new strategy. Reversibility can simply be defined as bringing back (in-house) already outsourced IS functions with the goal of rebuilding internal IS capabilities (Hirschheim and Lacity, 1998; Lacity and Willcocks, 2000; Whitten and Leidner, 2006; Wong, 2006). Reversibility is considered an exit strategy by organizations due to several risks associated with the outsourcing process such as: the organization did not achieve the desired objectives of outsourcing the internal IS functions; when the relationship with the vendor fails (Wong, 2008); lack of qualification among providers staff; the potential lack of compliance with contracts; and the inability to adapt to new technologies (Gonzalez et al., 2010).

According to Deloitte Consulting, nearly two-thirds of organizations have already brought some forms of outsourced services back in-house (Samuels, 2005; McLaughlin and Peppard, 2006). Gartner Group reported that 56% of small-sized business and 42% of mid-sized business contracts are considering reversibility following the contract end period (Brown, 2004). Fitzgerald and Willcocks (1998) found that 22% of organizations that prematurely canceled their contracts chose reversibility. Lacity and Willcocks (2000) reported a higher reversibility rate of 34%. According to a Compass poll of 70 outsourced US companies, only 4% would not consider taking some or all of their IT functions back in-house when their current outsourcing contracts expire. The report published by the Computer Economics web site for the year 2008/2009 showed that 13% of the respondents indicated that back-sourcing was a higher priority (Computer Economics, 2009). All these reports and statistics reflect that reversibility became a trend that deserves further attention (Dibbern et al., 2004; Hirschheim and Lacity, 2000; Fowler and Fox, 2006). In fact, reversibility of outsourcing information systems is of great concern to both parties of the relationship, the organizations and the vendors. The organization should study the implications of its decision of revoking the outsourced function.

Reversibility drivers lie in four categories: *strategic* which includes changes in strategic directions, changes in IT role, changes in organizational structure (due to acquisition, mergers, etc.); *power* and *politics* which is mainly related to management; O*utsourcing expectation gaps* which include cost, service quality, loss of control, IT resources accessibility (e.g., human capital, knowledge capital, state-of-the-art technology); *Changes in vendor organization* like vendor merger with other organizations and vendor bankruptcy (Wong, 2008).

In addition to the risks associated with the outsourcing process, most researches focus on the outsourcing process after the relationship between the vendor and the organization is established; the activities related to pre-outsourcing and post-outsourcing stages are neglected or given little concern albeit they have direct impact on the outsourcing and reversibility processes.

Therefore, there is an increasing need for a conceptual framework model for outsourcing and reversibility that can be considered as a roadmap for successful implementation of outsourcing projects. Such a framework provides organizations and vendors with a contingency plan for the outsourcing process when outsourcing is to be abandoned. The framework integrates the outsourcing process phase with the pre and post outsourcing phases and identifies the factors that affect each phase.

2. Research work rationale and methodology

The rationale for this research work can be stated as follows:

- The reversibility of the outsourcing process is a concern for both parties of the outsourcing relationship – the organizations that buy outsourcing services and the vendors that sell outsourcing services. Organizations considering outsourcing want to understand why those that have experience in outsourcing choose to exit the strategy and return back to internal IS sourcing strategy, which had been abandoned previously. As for vendors, the trend of reversibility impacts their survival. Vendors want to understand the reasons behind reversibility so they can better formulate their future marketing and service strategies in an effort to attract new clients as well as retain existing clients (Wong, 2008).
- Lack of previous studies in the field of reversibility of the outsourcing process. Most of the researchers focus on the outsourcing process and ignore the factors that affect the success or failure of both the reversibility and the outsourcing activities. The practice of IS reversibility has been fleetingly referred to a number of times in the literature without significant elaboration (Hirschheim and Lacity, 2000). There is some evidence, particularly in the trade press and practitioner literature, that it is of a sufficient scale to warrant further attention to the reversibility process due to the increased failure of outsourcing relationships between vendors and clients (Bushell, 2003; Hirschheim and Lacity, 2009; Overby, 2003).
- Lack of knowledge and experience by organizations and their employees participating in the outsourcing process with the requirements of outsourcing, starting from the 'make or buy' decision, through the motivation for outsourcing, the scope of what to be outsourced, measurement of performance of the outsourcing vendor (Bahli and Rivard, 2005; Lee et al., 2003), vendor selection and management (Sarkar and Ghosh, 1997), contractual issues (Alborz et al., 2003; Loh and Venkatraman, 1992), risk associated with outsourcing, whether to in-source or outsource (Aubert et al., 1998), which could lead to the failure of the relationship and resort to the reversibility process, especially for organizations that consider outsourcing for the first time.
- The complexity and risks of both the outsourcing process and reversibility is an additional and important dimension, since an engagement in an outsourcing process which includes pitfalls make the reversibility process also very difficult and an expensive process (Barbara and Marcolin, 2005).

IS outsourcing and reversibility is of great concern for organizations and vendors as mentioned earlier. Therefore, the research purpose is to provide organizations and vendors with a model to be considered as a roadmap when considering outsourcing IS functions or reverting back to the already outsourced IS functions. Also, the research aims to identify and categorize the critical factors affecting the outsourcing process of IS and its reversibility in order to minimize the risks associated with either of the two processes.

The research methodology is based on literature review, case studies, interviews and observations. Debate regarding outsourcing and reversibility in the literature makes it necessary to look at the subject in its natural setting. Case study research allows the researcher to ask "how" and "why" questions so as to understand the nature and complexity of the outsourcing and reversibility processes. The literature was reviewed regarding the factors that affect the outsourcing and reversibility processes. Interviews and observations were used as the instruments for the primary data collection. Interviews and observations as mentioned by Hair et al. (2003) provide the researcher with the necessary flexibility to ask related, unanticipated questions, and increase the chances to reveal unforeseeable information hence, improving the quality of the results of the research.

The aim of the case study is to identify the critical factors influencing the success/failure of IS outsourcing and reversibility. These factors can be compared with those found in the literature for each stage of the outsourcing and reversibility process. The findings can then be used by organizations as a guide in future outsourcing and reversibility decisions. As explained earlier, the research purpose is to provide organizations with a model to be considered as roadmap for outsourcing and reversibility. In Jordan as well as in the region, a few of the organizations have experience in the outsourcing process and its reversibility. The research was carried out through a case study conducted at one site and multiple projects; the site selected was the Royal Jordanian Airlines (RJ). RJ is one of the biggest organizations in Jordan, having a diversity of information systems, and has experienced outsourcing for many years. The projects selected for the case study consider two major projects in order to have a better understanding of the factors that affect the outsourcing and reversibility process. One of these projects was considered as a successful outsourcing, while the second project entered the bottleneck situation with the vendor and faced many obstacles.

Observations were also used as a data gathering method to supplement the research with additional information related to the outsourcing process, and its relation to the reversibility process, as well as to see the un-captured and un-memorized reasons that could lead the organizations to success or failure and then to consider reversibility of the outsourcing process. The observations were conducted as an overt participant.

3. Outsourcing process

Before the framework model for outsourcing and reversibility is introduced, it is important to briefly describe the main activities involved in such a process. An IS outsourcing process consists of several related steps, each of which should be carried properly to have a successful outsourcing. These steps are:

3.1. Identifying goals and needs

In order to make an effective decision regarding outsourcing, one of the first steps is to identify the needs of the organization and to understand why outsourcing may or may not be the proper decision (DIR, 1998). Both senior management and IT management involvement is required to conduct an evaluation course. The senior management assumes the roles of identifying the objectives – either financial, business, or technical, as well as defining the scope of the outsourcing evaluation. The IT management assumes the critical role of searching for vendors, creating the detailed request for proposal, evaluating the legitimacy of vendor economies of scale, estimating the effects of price/performance improvements, and providing insights on emerging technologies that might affect the business (Mezak, 2006). Chorafas, presents four sourcing options facing a company at all times: Build, Acquire, Lease and Outsource (Chorafas, 2003). In the course of evaluation, an organization should decide which sourcing option is better, and the decision should consider precisely clarifying what the benefits are of outsourcing against build; cost-benefits analysis should be conducted at this stage. In summary, the decision whether to use external vendors for outsourcing an information system is determined as a trade-off between benefits and costs. Outsourcing can be an efficient and effective alternative to using in-house resources, but a full determination of costs and benefits is required to make that decision. Successful decisions are dependent on having a clear understanding of all the options available (Gonzalez et al., 2005).

Organizations should test their readiness for outsourcing. Readiness means that organizations should have an acceptable outsourcing experience and knowledge, have clear specifications, documentation, methodology, standards and procedures. The organization should have a clear understanding of contracting issues and how they are going to manage the relationship with the vendor (Mezak, 2006).

3.2. Initiation of request for information (RFI)

After finalizing the course of identifying the organization needs and whether to adopt outsourcing its information systems totally or partially, the organization should then search for candidate vendors. Normally, there are three ways for searching for vendors: personal reference, Internet search, and solicitation by the vendor. Personal references are the most common way to find outsourcing vendors (Mezak, 2006). Such a request should be addressed to as many as possible competing and reputable vendors internally or externally. Based on the vendors' replies, a pre-selection should be done and at the same time tuning the specifications document by using the replies being received as the instrument for tuning (Chorafas, 2003).

3.3. Submitting request for proposals (RFP)

The request for proposal (RFP) is created by the project team of the organization; it should precisely and to the minutest details clarify the specifications document (functional and nonfunctional requirements). Creating the RFP is of great importance since it will form the basis for the contract that will be signed later between the organization and the vendor. All respondents to the RFP should respond to the same set of requirements, with few degrees of freedom left to the vendor in order to permit meaningful comparison of cost (Chorafas, 2003). The RFP is an official document stating the organization's outsourcing requirements, including the outsourcing project's scope, location of business activity, reasons for outsourcing, time horizons, and general pricing information. Thus, the RFP should be clearly written, provide sufficient information so that the provider can understand what is being requested (Greaver, 1999).

The typical RFP should include an organization executive summary, objective of the RFP, method of receiving RFP from vendor (sealed, by email, etc....), financial offer (separated from functional one), primary contact in the organization, deadline for receiving responses, time frame for implementation, organization special consideration regarding software development methodologies, hardware and tools, the procedure of evaluating vendors, organization policy and responsibilities (Fitzgerald and Willcocks, 1998; Richmond and Seidmann, 1992; Schniedjans et al., 2005).

Also the typical RFP should ask vendors to provide profile information, vendor's clients references for the same project in size and function, resumes, vendor software methodologies, tools required by vendors, vendor project management approach, third party products or relationship, implementation plan, technical requirements, technology used, data migration plan, licenses, escrow agreements, post implementation and maintenance plan, software release rights, type of documentation, test plan and test scenarios, payment terms, currency, taxes, training plan, reversibility plan and each party responsibility, vendor IP rights policy, security issues, etc. (Fitzgerald and Willcocks, 1998; Richmond and Seidmann, 1992; Cross, 1995).

3.4. Vendor selection criteria

Vendor selection is one of the major steps in information systems outsourcing process; selecting a good team to begin with is considered one of the main success factors for outsourcing. Vendor selection is related to the questions like: How can an organization select a vendor? Will it be the best vendor? Is there a better vendor out there that is more experienced, works faster, and costs less? Is there a way to find a team quickly that will also give reliable results? Actually, answering these questions is not simple; it is indeed a complex process (Mezak, 2006).

3.5. Contract signing and management

Contract signing is the first step in the implementation; transition consideration should be clear and include teams responsibility, role of each part, actions to be taken, tasks (priority, time frame and dependency) and assets to be ac-

quired and transferred (DIR, 1998). Outsourcing contracts involve complicated business and legal issues, and are fraught with risks for both the organization and the vendor. Since the organization and the vendor are not partners, because their profit motives are not shared, the organization cannot expect that the outsourcing vendor will act to the best interest of the organization in situations where a conflict of interest arises (Lee, 1996). The written outsourcing contract therefore is the most important instrument for defining the rights, liabilities and expectations of both parties which guides the behaviors of both parties. Thus, it is important for management to understand the complicated business and legal issues involved in IS outsourcing and have some awareness of how these issues should be addressed in the contracts (Lacity and Hirschheim, 1993). Problems in the evaluation of outsourcing contracts, embedded contract mentality, ability to manage contracts and staff transition management were the key issues in evaluating the benefits of the public sector IS/IT outsourcing in a research carried out in Australia (Lin et al., 2007).

4. Conceptual framework for outsourcing and reversibility

In this section, we present the model that fully describes the outsourcing and reversibility process along with the major factors affecting the activities involved in the process. In each step of the proposed model, these factors will be used as the basis for our questions in the case study to confirm the results of the proposed model.

The proposed model was inspired by the stage model of IS outsourcing presented by Dibbern et al. (2004). However, the proposed model extends Dibbern's model by providing a more detailed model; Dibbern's model focuses on the outsourcing process only, while discarding the pre and post outsourcing phases which are very important for the outsourcing and the reversibility of the outsourcing process. This model also provides guidelines for organizations by providing the major factors to be considered during the outsourcing such that reversibility can be facilitated when management decides to do so due to certain situations.

The proposed model is a bidirectional model. On the one hand, organizations can use this model from top to bottom to implement successful outsourcing projects. On the other hand, organizations can use it to implement reversibility by looking at this model in a reverse order. In fact, the outsourcing and reversibility can be viewed as shadow of each other, where reversibility occurs as a result of an outsourcing failure. This means that an organization intending to outsource an IS must seriously consider the factors that could lead to the failure of the project from the beginning – a proactive rather than a reactive approach; in a later stage, if the outsourcing objectives are not met and reversibility comes in place, the organization is ready and prepared for reversibility; otherwise, the reversibility will be subject to many obstacles that will hinder its successful implementation. For example, if an organization outsourced an IS project and did not consider having a scheduled backup of the data in a readable format stored in their environment, at a later stage when management decides to implement reversibility, they will find themselves in trouble with the vendor, in terms of dispute and cost, who stored their data; the vendor could reject or ask for extra costs for doing such a task.

Outsourcing and reversibility can be seen as a plan-driven and iterative software development process, where the discovery of a problem in a previous activity can be corrected by backtracking to that activity and doing whatever necessary to address the problem. This, however, requires that the previous activity has been well-documented and the necessary artifacts are available. This also requires that the necessary risks have been identified and plans have been created to eliminate or reduce them. In fact, considering project risk factors during an SDLC has been advocated by some researchers in order to improve the project success rate (Al-Ahmad, 2012).

The proposed model starts with the outsourcing process since reversibility comes after outsourcing. It divides the process into three stages, namely ***Pre-Outsourcing Stage***, ***Outsourcing Implementation Stage, and Post Outsourcing Stage***. For each stage the model specifies the inputs used by and the outputs resulting from the previous stage. Also each stage is divided into three steps: ***Analysis, Design and Implementation***. In each of these steps, the model specifies the major factors that affect the outsourcing and reversibility processes. The identified factors will be used to provide evidence and find the level of divergence between the literature results and the outsourcing process in the practice.

Organizations can benefit from this model by considering the factors that affect reversibility while they are building the outsourcing relationship. If these factors are not considered from the beginning, it will be hard and costly for an organization to exit the relationship and reverse the functionalities back in-house.

4.1. Pre-outsourcing stage

The pre-outsourcing stage is concerned with the organization's outsourcing decisions. It focuses on the factors to be considered by organizations when they go for outsourcing as well as the factors that affect the reversibility process when such a decision is made by the organization, at any time after the outsourcing process is started.

The pre-outsourcing stage of the proposed model, shown in Fig. 1, drives its inputs from the organization thoughts that they need an IS to facilitate their operations. The organization thoughts results in an initiation of a project. The project needs to be studied in details in order to achieve a successful implementation considering the desired objectives and the available resources.

The pre-outsourcing stage is divided into three phases, namely Analysis, Design and Implementation. The analysis phase focuses on the steps needed to translate the inputs into tasks and identifies, based on these tasks, the factors affecting the outsourcing and reversibility process. The design phase focuses on the steps to be considered by organizations in order to implement the tasks specified in the analysis phase and again identify the factors affecting the outsourcing and reversibility process. The implementation phase focuses on the factors affecting the outsourcing and reversibility process as a result of implementing the decisions taken during the design phase of the pre-outsourcing process in the proposed model.

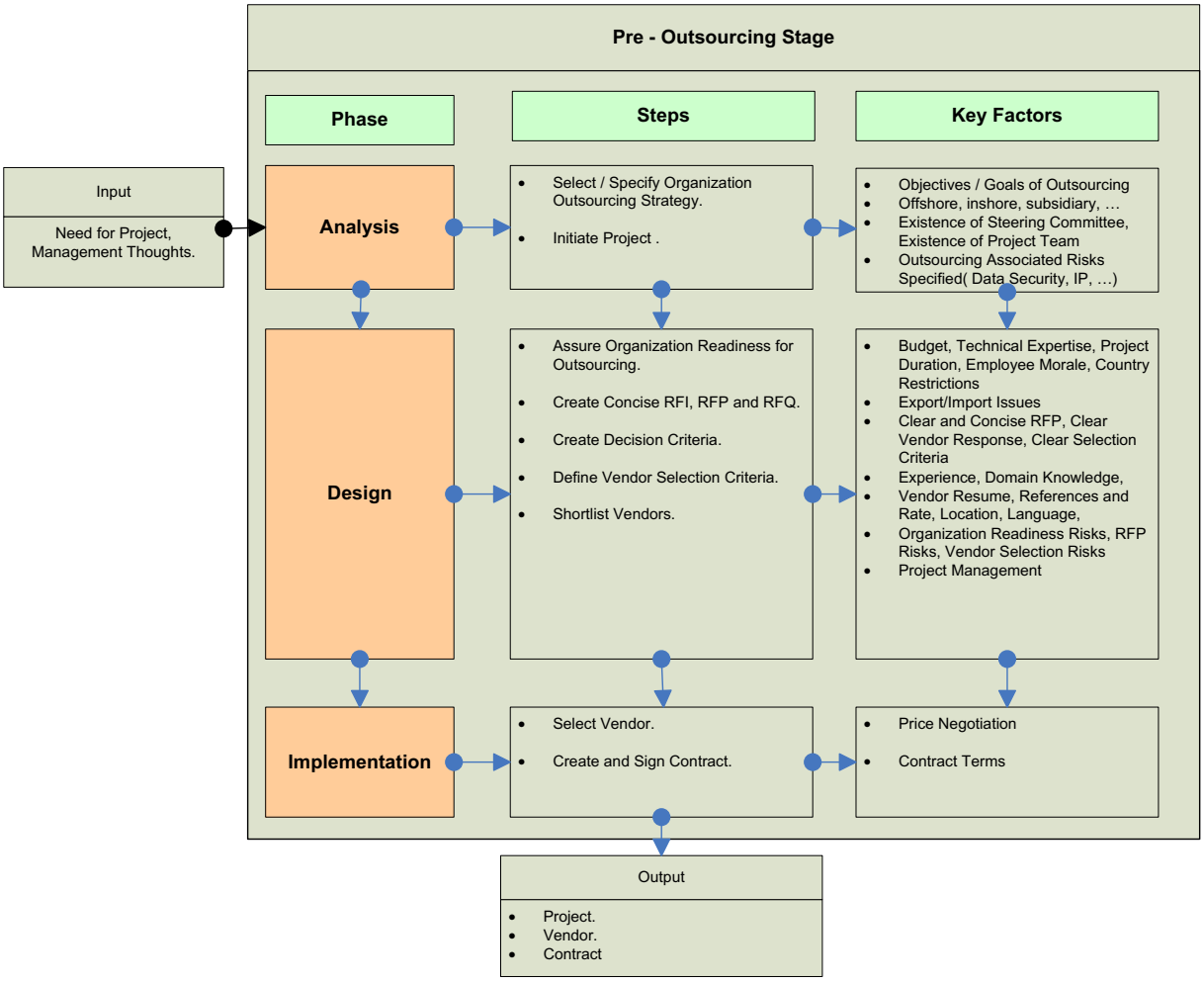

Figure 1 Pre-outsourcing stage for outsourcing and reversibility (developed for the purpose of this research).

4.1.1. Pre-outsourcing stage – analysis phase

The analysis phase shown in Fig. 1 includes two major steps. During the first step, the organization should clearly specify its outsourcing strategy (King, 2001). The goals and objectives of outsourcing and types of outsourcing the organization is looking for should be stated clearly. During the second step, the project is initiated which marks the start of the outsourcing or reversibility project. The team responsible for carrying out the tasks and a steering committee responsible for controlling and following up the whole project are created (Wideman, 1986).

4.1.2. Pre-outsourcing stage – design phase

The design phase of the pre-outsourcing stage is considered the most important stage in the outsourcing process. As indicated in Fig. 1, the design phase consists of several major steps: (1) the organization project team should assure the organization readiness for outsourcing; (2) the project team should create a concise request for information (RFI), request for proposal (RFP), and request for quotation (RFQ); (3) the project team should create the decision criteria; (4) the project team should agree on the vendor selection criteria and (5) vendor selection (Koh et al., 1999; Webb and Laborde, 2005; Michell and Fitzgerald, 1997).

4.1.3. Pre-Outsourcing stage – implementation phase

The output of the design phase of the pre-outsourcing stage is a shortlist of vendors. A shortlisted vendor is selected according to the decision criteria agreed by the project team. The selection is mainly based on the vendor records and the functionality provided. The implementation phase will focus on selecting the best vendor from the shortlist based on rates provided by vendor, negotiated prices, and sign contract and Service Level agreements (SLA) (Michell and Fitzgerald, 1997).

4.2. Outsourcing implementation stage

The outsourcing implementation stage is a shared project between the organization and the vendor. The implementation stage deals with the tasks to be carried out by each party in order to have a successful implementation of the outsourced IS. This stage also considers the successful reversibility through setting a contingency plan. This stage involves the start-up activities of planning the transition and implementation of the outsourced agreement as well as establishing the detailed budget and administrative functions needed for its management, and formally launching of the project.

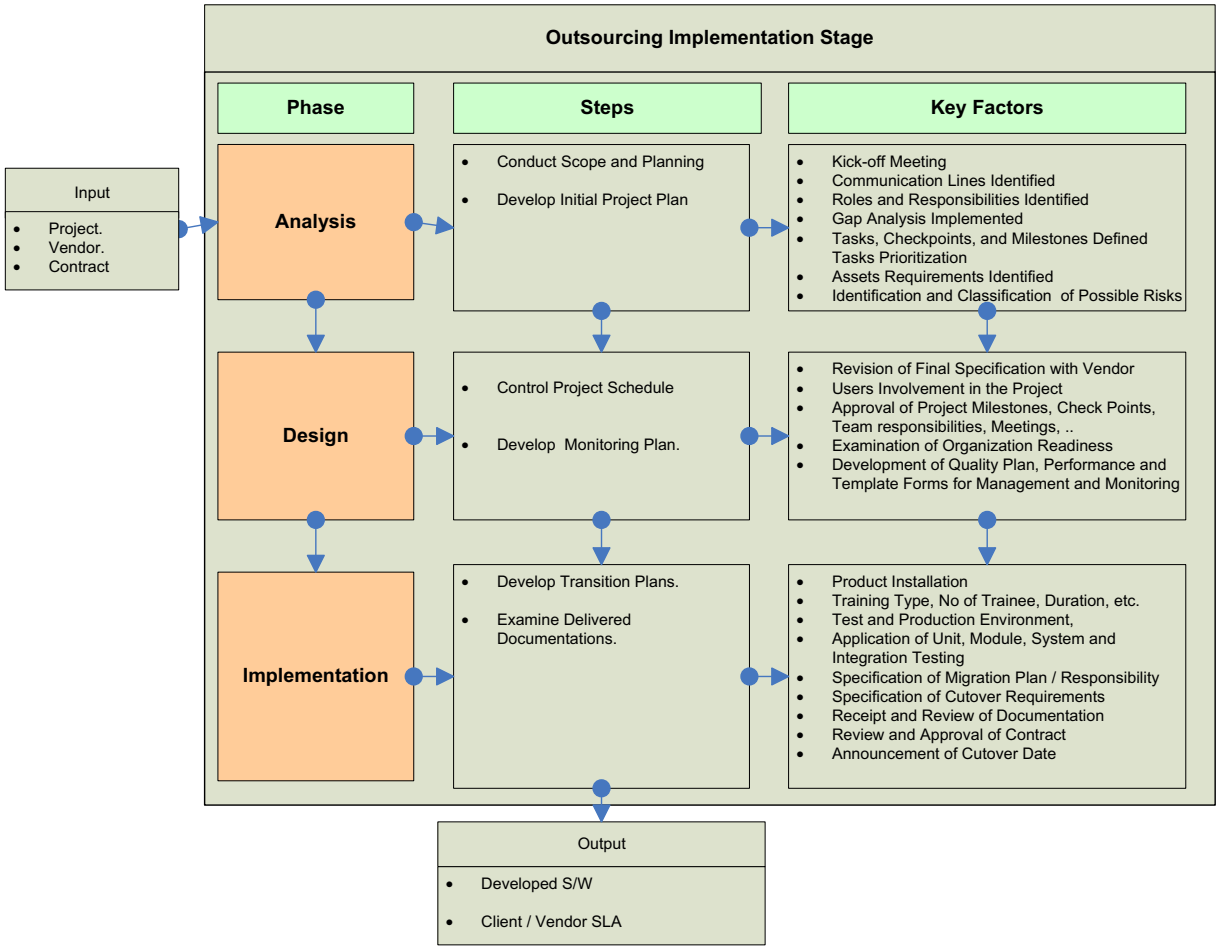

Figure 2 Implementation stage for outsourcing and reversibility (developed for the purpose of this research).

The implementation stage of the proposed model is shown in Fig. 2. The output of the pre-outsourcing stage (contract and project) forms the input of the implementation stage. The contract and project include many risks that need to be managed carefully in order to achieve the desired objectives of the outsourced IS.

Again, the implementation stage is divided into three phases: analysis, design and implementation. The analysis phase focuses on how the project leaders of both parties will carry out the project starting from the kick-off meeting to the development of the project plan. The design phase focuses on the steps to be considered by the organization and vendor to make sure that the project plan will be implemented according to the specified time, resources and cost. It includes finalizing the gap analysis and signing final specification and requirements documents, preparations required, identifying each party responsibilities, developing a migration plan, a testing plan, and developing monitoring templates. The implementation phase focuses on the installation of the developed outsourced system, examining the documents delivered by the vendor and the cutover preparation. All these tasks should be carried out according to the signed agreements between both parties. The output of this stage will be the developed IS and the signed SLA.

4.2.1. Outsourcing implementation stage – analysis phase

The analysis phase is of high importance due to the tasks associated to it. As shown in Fig. 2, the analysis phase includes two major steps: scope and planning of the project and the development of the initial project plan to be followed during the project.

4.2.2. Outsourcing implementation stage – design phase

The design phase of the implementation stage will concentrate on three major issues: first, controlling project schedule and budget by the organization team; second, creating a monitoring plan with the vendor; third, developing training, test and migration plans.

4.2.3. Outsourcing implementation stage – implementation phase

The first factor in the implementation phase is developing an installation plan. An installation plan can be created either by the vendor or by the organization with the vendor's direction. This depends on how the agreement is built. The system could be hosted at the vendor's premises, and in this case the vendor should carry out the installation. If the system is hosted at the organization's premises on the other hand, then it becomes the organization's responsibility to carry out the

installation. Finally, the installation could be carried out by both parties. The installation plan should specify the size of the database, disk space required and the system architecture.

The training plan should be developed by the vendor; it should cover all the system modules and all activities inside each module. The type of training should be specified as well. It could be to train the trainer or train the whole users. This also depends on the project size, number of staff to be trained, number of modules, and the system complexity. Also the staff and vendor communication and language skills, duration, location of the training should be specified. The training should be carried out on a separate test environment which is different from the production environment; the same environment will also be used for testing.

The testing plan should be provided by the vendor and carried out by the organization team who should deeply test each single activity to ensure that the functionality is provided as needed and documented in the specifications. The test plan should include different test methodologies which include activity test, unit test, module test and system test, integration and interfacing testing with other systems. Testing should be carried out by functional and technical users. Different types of testing should be carried out including black-box testing or code testing if the IS source code is available.

During the test plan, the users should log and notify the vendor team with any unexpected outputs, errors, and bugs to be fixed before moving to production. The testing phase usually ends up by signing the user acceptance test letter (UAT), which indicates that the IS conforms to the desired functionalities and agreed upon specifications.

The migration plan is of great importance for outsourcing and reversibility. A migration plan is not required in case the system is new, especially if the organization does not have electronic files of the information required by the system. However, it is an important task when the system is already built and having the information on a database or spreadsheets. The migration plan can start at an early stage during phase two; the vendor should specify the minimal required information by the system, and should provide templates to be used by the organization team who should provide the information according to the specified templates. In some cases, the developed system by the vendor might require certain information which was not used by the organization. In such cases the vendor should have default values or use dummy information to close the gap between the old or manual system and the current system.

The migration plan usually includes routines and application program interfaces (API). These API's should be tested to ensure that all the provided information is correct, no conflicts in the data exist, and the API's are running smoothly. Finally, the vendor migration templates should specify which of the items are mandatory and which are optional. Also it should specify the data types of each element and its length, the starting and ending position of each element, the template format (text files, spreadsheet, etc....), and the numeric and alphanumeric format and padding methods.

Finally, system documentations should be received and reviewed by the organization team; it should include all required documentations, analysis and design documents, database documentations, data dictionary, entity relationship diagrams, system process flow, system integration and system interfacing documents. System documentation is of high importance for the outsourced project and its possible reversibility.

Verifying and validating all the previous plans and steps, aligning them to the signed agreement with the vendor as well as to the specification documents and project scope, the IS most likely becomes ready to be moved for production. The cutover could be planned and announced; planning cutover could require special requirements like stopping the work for certain days or working at weekends, though the resources should be available and according to the plan.

The output of the implementation stage is the developed IS. Usually in outsourcing a service level agreement is signed with the vendor for the project support and enhancements. These two outputs form the basis for the third stage of the model (Post-Outsourcing Stage).

4.3. Post outsourcing stage

The post outsourcing stage is a major stage which focuses on controlling and auditing the delivered IS. This stage actually is highly related and dependent on the previous two stages since auditing and controlling should take place almost on all the issues discussed in the previous stages. For this reason, this stage is presented in a different manner. It explains only the steps and key factors of each phase. All the issues in this stage are of high effect on the outsourcing and reversibility decisions.

4.3.1. Post outsourcing stage – analysis phase

The analysis phase in the post outsourcing stage is the most important one in the model. Based on the results of this phase, the organization decides to stay with the vendor, look for a different vendor, or consider reversibility.

Fig. 3 summarizes the major steps and key factors to be considered by the organization team and management. Re-evaluation of the whole process in the analysis phase should take place. The organization management and project team should assess and monitor the whole process, revisit all the steps and processes, specify the strength and weaknesses, boost the strength and address the weaknesses by implementing a SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis and enhancing the work around solutions and shortcuts.

The model specifies three steps to be considered and deeply investigated. These steps are based on the input of this stage and are related to the stakeholders and assets involved. These three steps are: first, monitoring and evaluating the delivered information system; second, evaluating and managing contract and vendor; third, evaluating and managing the organization staffs who work on the delivered product.

4.3.2. Post outsourcing stage – design phase

The post outsourcing design phase focuses on how the organization is going to monitor, evaluate and manage the key issues explained previously in the analysis phase. The model, as indicated in Fig. 3, implies the use of metrics and standard measurements, using tools that help in measuring and facilitating the success of the outsourced IS, and investing in organization staff and governing the relationship with the vendor.

Osei-Bryson and Ngwenyama (2006) stated that an important mechanism for managing the performance of outsourcing vendors is incentive contracts, but to develop an outsourcing

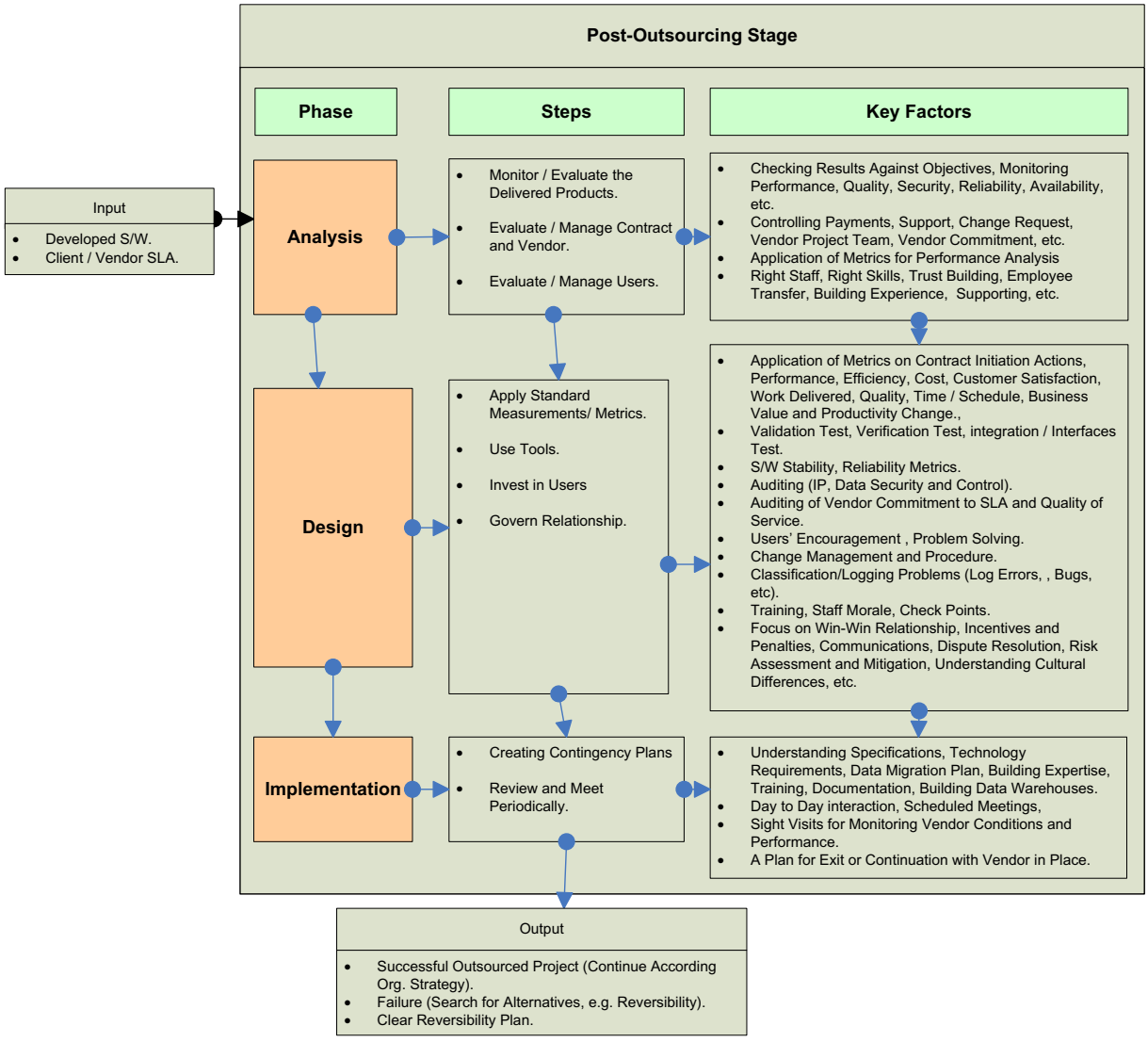

Figure 3 Post-outsourcing stage for outsourcing and reversibility (developed for the purpose of this research).

contract, an IS manager must quantify risks and benefits. However, methods and tools for analyzing and quantifying outsourcing risks that IS managers have at their disposal are rudimentary. They offer a method and some mathematical models for analyzing risks and constructing incentive contracts for IS outsourcing.

4.3.3. Post outsourcing stage – implementation phase

The implementation phase of the post outsourcing stage is concerned with the outcomes of the design phase. Based on the results of monitoring, managing and applied metrics, the organization should re-evaluate its position in outsourcing. The organizations in this phase should reach a point to set a clear and concise contingency plan, as well as to continue in the iterative process of the previously explained steps in the analysis and design phase.

5. Critical factors influencing outsourcing and reversibility

Based on the previous discussions, we can summarize the top five critical factors that influence outsourcing and reversibility as presented by the model. The top five critical factors are listed in order of importance:

1. **Scope and objective of outsourcing**: outsourcing is not suitable for all organizations or for all business cases. It should be considered for business value and strategic advantages, prior to establishing an outsourcing initiative. The objectives of outsourcing should be clearly determined, assessed and evaluated. In addition, all requirements should be defined comprehensively and unambiguously.
2. **Management commitment:** lack of management commitment influences outsourcing and reversibility. True commitment to a successful outsourcing initiative requires executive involvement and perseverance to resolve business problems prior to establishing an outsourcing process. Management need to plan, lead and force the change.
3. **Project planning:** a project plan is the nerve of outsourcing and reversibility. Proper project plan includes dedicating the best internal resources from both the organization and vendor, empowering team through incentives, training, listening, etc. Estimating the proper time required to handle the IS properly is also part of planning.

4. **Precise RFP, vendor assessment contractual issues, and relationship management:** RFP and contracts are the references that govern the relationship with the vendor. The vendor selection process is also an important factor. Organizations should craft all these issues precisely in order to achieve the desired results of outsourcing or reversibility. Relationship management should establish a win–win situation. Relationship management includes communications management, work administration, knowledge management, staff management, financial management and technological change management. Also the continuous revising, modifying or termination of the relationship through specifying the arguments or events contributing to call for continuity, re-evaluation, modifications or even exiting the relationship.
5. **Assessment of the outsourcing and reversibility business risks:** risk assessment and management as indicated earlier is associated with each step of the outsourcing process. Risks should be assessed carefully to ensure certainty. Risks assessments require precise monitoring plans, tools and metrics.

6. Case study

This research was based on a case study; interviews and observations were used as the instruments for the primary data collection. The aim of the case study was to collect the information about the factors that caused an outsourcing project fail or succeed. These factors were then compared with those mined from the literature for each stage of the outsourcing and reversibility processes. A model was then proposed that documented the findings of the research work in light of the case study.

The case study selected to support this model was conducted at Royal Jordanian Airlines (RJ) during the period of 2009–2010. RJ is a big reputable company in Jordan operating in the field of transportation since 1963, having a diversity of information systems. RJ experienced outsourcing for many years with almost all of its information systems.

In 2004 and as part of its strategy, RJ decided to join one of the major airlines alliances in the world. RJ then decided to outsource the legacy systems in order to fulfill the requirements of the alliance. RJ now considers outsourcing information systems as a strategy rather than developing in-house.

The selected projects for the case study are: RJ loyalty program and the Human Resource Management System (HRMS). RJ loyalty program is a major project that is needed by the alliance, and should be interfaced to the systems of the alliance members. RJ loyalty program was outsourced to a company specializing in such programs. HRMS is also one of the major projects outsourced later in order to integrate the organization resources and automate the whole process. It is outsourced to a well-known company specializing in implementing Oracle solutions.

The reason behind selecting those two projects was that one of these projects experienced a successful outsourcing (loyalty program), whereas the other project (HRMS) faced many obstacles and the objectives were not met. The design of the case study was based on selecting RJ staff who participated in these two projects for interviews. A judgment sampling technique was used. The sample selected consisted of staff who have worked on the selected two projects. Also the staff was selected from different levels so that they cover different related areas of the projects including the management, IT employees, human resources and finance departments. Open ended questions were designed based on the factors stated by the model. The purpose was to obtain a comprehensive and concise view of information systems outsourcing practices in RJ as additional evidence.

Observations were also used as a data gathering method to supplement the research with additional information related to the outsourcing process and its relation to the reversibility process, as well as to see the un-captured and un-memorized reasons that could lead the organizations to success or failure and then to consider reversibility of the outsourcing process. The observations were conducted as an overt participant.

In each phase, the key factors were identified based on the literature; then these factors were mapped to one of the outsourcing stages. The interview questions were phrased based on these factors. The interviewees were asked to rate the factors and explain how they could affect outsourcing and reversibility from their own experience. For example, one of the key factors in the pre-outsourcing stage, as shown in Fig. 1, is "the existence of a project team". This factor was then translated into a matrix as shown in the next table; for each factor, a set of issues pertaining to the key factor have been identified and the respondents were asked to mark the effect of each issue on the outsourcing and reversibility using a sale of high, medium or low. The majority of respondents indicated that these issues were very important and have medium to high impact on outsourcing/reversibility. Therefore, the existence of a skilled project team should be considered during the outsourcing or reversibility processes; this factor has been emphasized in the key findings of this research given in the next section. For each key factor in the model, a similar table was produced.

Key factor	Issues to be considered	Effect on outsourcing	Effect on reversibility	Overall rate
Existence of project team	Team domain knowledge	H	H	H
	Team experience in outsourcing	H	H	H
	Team management support	H	H	M
	Team size	M	M	M

The analysis of the interviews and observations, using the structure presented by the model, has confirmed the key factors for successful/failure of outsourcing and reversibility of IS. It has also shown the usefulness of implementing the model for successful outsourcing/reversibility of the two outsourced projects. The main objective of the case study in this research was, therefore, to support the model findings and provide additional evidence by comparing theory with practice in the field of IS.

7. Key findings and contributions

In this section, we present a number of key findings and contributions of this research work. The main findings, identified based on the case studies, can be summarized as follows:

1. Outsourcing and reversibility are two long, complex and multi-step processes which encompass a variety of risks associated with each stage. Outsourcing and reversibility are highly related to each other. However, reversibility

depends on outsourcing, which means that the key factors for reversibility should be considered and handled properly during the outsourcing process. Otherwise, reversibility will be difficult to implement.
2. Risks related to each step of the process should be identified and mitigated. Mitigating outsourcing risks will serve similarly the reversibility process later. Higher management involvement and support will contribute significantly to risk mitigation.
3. Outsourcing and reversibility should be viewed as a project in its own right. Therefore, organizations seeking outsourcing or reversibility should pay considerable attention to project requirements in terms of action plan, resources, skills, budget, time and support.
4. Organizations seeking outsourcing should test their readiness for outsourcing; organization's readiness includes setting proper requirements and specifications, experience in crafting RFP and RPI, experience in contract crafting, negotiating and managing, having enough and experienced human resources in the domain knowledge. The same should apply for reversibility.
5. Vendor selection and relationship governing is an important factor for outsourcing and reversibility. Vendor monitoring, evaluating and auditing is important; the organization should have a contingency plan because in outsourcing one should expect the unexpected.
6. Communication is the integral part of the process which requires both parties attention to keep the project in the proper and effective channels.
7. The organization staff and vendor team are the nerve of the process that control all steps and try to overcome obstacles; paying considerable attention for project teams of both parties is required, empowering and encouraging staff is important, and incentives, training, and experience is essential.

The contributions of this research work can be stated as follows:

1. The development of a new model that can be applied to both outsourcing and reversibility projects. The model divides the outsourcing process into three stages to describe the activities involved in outsourcing and reversibility. The model is designed to be used by both the outsourcer and the vendor.
2. The model presents the factors that can affect the success or failure of outsourcing and reversibility. This will provide a better understanding of the outsourcing and reversibility process; the model integrates activities in the outsource process that relevant and important for possible reversibility, instead of considering reversibility as an afterthought.
3. The extension of outsourcing by relating it to reversibility as one unified process. The major factors that affect outsourcing also apply to reversibility as well. The unification of the two processes means that the outsourcing activities should be carried out with full consideration of the possibility to implement reversibility at any point during the outsourcing project lifecycle.
4. The use of case studies conducted at a large company to support the proposed model.

8. Conclusion and future work

Outsourcing and reversibility practices have led to success and failure stories. Many researches have addressed outsourcing and reversibility as opposite phenomena. This article addressed the issues concerning the outsourcing and reversibility as one unified process. The article proposed a model to close the gap between outsourcing and reversibility. The model divides the outsourcing/reversibility process into three stages, each of which in turn is divided into three main steps. Each step is explored and investigated through an explanatory study of the literature concerning the major factors to be considered by organizations when implementing an outsourcing or reversibility project.

The model introduced the critical factors to be considered in each stage of the outsourcing/reversibility process in order to achieve a successful outsourcing/reversibility. As a proof of concept to support the risk factors identified by the model, this work used a case study including two outsourced projects. These two outsourced projects represent different situations in order to link literature to practice. Interviews and observations were used as a method of data collections.

As a future work, the model will be applied to different outsourced IS projects from the start to end within organizations of different industries, sizes, and countries in order to validate the usefulness of the model in terms of increasing the success rate of the outsourcing or reversibility processes. Finally, the proposed model can also be applied from the vendor's point of view rather than only the outsourcer's viewpoint.

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