Computers in Industry 70 (2015) 1–12

Contents lists available at ScienceDirect

Computers in Industry

journal homepage: www.elsevier.com/locate/compind

An operational "Risk Factor Driven" approach for the mitigation and monitoring of the "Misalignment Risk" in Enterprise Resource Planning projects

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ARTICLE INFO

Article history:
Received 23 April 2014
Received in revised form 4 December 2014
Accepted 23 January 2015
Available online 28 February 2015

Keywords:
Misalignment Risk
ERP project
Risk factor
Success factor
Control
Monitoring

ABSTRACT

Enterprise Resource Planning (ERP) systems offer standard functionality that has to be configured and customized by a specific company depending on its own requirements. A consistent alignment is therefore an essential success factor of ERP projects. For this purpose, we propose an operational "Risk Factor Driven" approach that allows for the mitigation and monitoring of what we call the "Misalignment Risk". This risk corresponds to the probability of the occurrence of misalignment, associated with the loss due to misalignment if it occurs. The mitigation aims to identify and treat the "Misalignment Risk Factors" (MRFs) influencing the Misalignment Risk. We suggest four steps to deal with MRFs, based on: (i) their classification according to the ERP project stages, (ii) the definition of their mutual influences, (iii) variables detailing them and (iv) related management practices to treat them. The monitoring assesses the evolution of the Misalignment Risk. From an academic point of view, the approach constitutes real progress for the alignment problem solving. By managing it as a risk, it guides researchers in the understanding of this major issue. The approach furthermore provides effective support and guidance to companies implementing ERP systems. It is illustrated through the application to the ERP project of a Small and Medium Enterprise. This application shows that it can be used in contexts where the ERP project expertise level is low.

1. Introduction

In the current context of fierce competition, manufacturing companies' Information Systems (IS) are increasingly based on "off-the shelf" products such as ERP – Enterprise Resource Planning – systems. If implemented effectively, these systems can provide business benefits such as real-time data availability, improved visibility, and increased task automation [1–4]. However, ERP projects are risky and present a high rate of failure [3,5–7]. One of the main reasons for failure is the inability to manage the "fit" or alignment between the standard functionalities of the ERP system and the company's real needs [1,8–13]. When the ERP system does not meet the requirements, misalignment appears as an unsatisfactory outcome of the project.

From this point of view, misalignment can be managed as a risk. A risk in Information System projects is defined by [14] as the probability of an unsatisfactory outcome and the loss to the parties affected if the outcome is unsatisfactory. Ref. [14] illustrates this definition through the example of a satellite-platform project. The manager of this project calculated (i) a probability of 40% that the software will have a critical error and (ii) an associated loss of $20 million investment in the case of the error occurrence. Based on the definition of [14], it is proposed in this paper to define the "Misalignment Risk". This is the probability of misalignment occurring, associated with the loss if misalignment occurs. Even though alignment management has gained some interest in the past years, the notion of Misalignment Risk has never actually been defined or studied as such in the literature. It is generally decomposed and merged with all other risk components of an ERP project, under several terms such as: "process failure", "correspondence failure" [15], or even "organizational impact" [16].

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http://dx.doi.org/10.1016/j.compind.2015.01.010
0166-3615/

According to the ISO/IEC Guide 73 [17], risk management consists in risk identification, treatment and monitoring. Risk treatment is "the process of risk modification" [17] whereas risk monitoring consists in continually "checking, supervising, critically observing or determining the status [of the risk] in order to identify change from the performance level required or expected". The Misalignment Risk has to be treated through mitigation, which decreases the risk probability. This involves: (i) the identification of the features of the project, defined as risk factors in [18], that influence the probability value; and (ii) the definition of actions to treat them.

In the literature, risk factors are directly linked to project failure, and their relation to a specific risk is not detailed. ERP risk management approaches like [19–22] are moreover useful for identifying and assessing the risks of an ERP project in general, but remain too general to treat and monitor the risks efficiently.

The aim of this paper is therefore to provide operational means for the mitigation and monitoring of the Misalignment Risk during ERP projects. We propose an operational "Risk Factor Driven" approach (see Fig. 1) that establishes the link between the Misalignment Risk and its influencing Risk Factors. Then, in order to mitigate the Misalignment Risk, we suggest four steps to deal with the Misalignment Risk Factors, based on: (i) their classification according to the ERP project stages, (ii) the definition of their mutual influences, (iii) the variables detailing them, and (iv) related management practices to treat them. For the risk monitoring, we propose two monitoring steps. The first one takes place at the beginning of the project and enables to anticipatively avoid the Misalignment Risk. The second step takes place at the beginning of each stage of the ERP project life cycle, until the "business blueprint" stage. This second step enables to reactively optimize or avoid the Misalignment Risk.

The structure of the remainder of this paper is as follows. Section 2 discusses the literature on risk factor characterization in ERP projects and selects the risk factors that influence the Misalignment Risk. Section 3 presents the operational "Risk Factor Driven" approach we propose, and Section 4 details its illustration on the case study of a French SME implementing an ERP system. Finally, Section 5 concludes on the usefulness of such an approach and proposes some research perspectives.

2. Related studies on risk factor characterization

The literature review draws on specific search facilities like ScienceDirect, ISI Web of Science, Scopus, Springer, IEEE-Xplore. The following keywords guided our research, bearing in mind that SFs and RFs are close concepts: "Risk Factor" (RF), "Success Factor" (SF), "risk management", "ERP project", "ERP implementation", "identification", "treatment". Whereas a RF leads to project failure, a SF leads to the exact opposite as it makes the project successful [23,24].

We selected 83 papers that were published from 1999 to 2013, including 70% published during the last five years. These papers propose four kinds of contributions (see Table 1): (i) lists or sub-lists of RF/SF, (ii) classifications according to the RF/SF nature (internal/external to the ERP project), (iii) classifications of the RF/SF according to the ERP project life cycle stages and (iv) influences between RF/SF (causality, co-variance, and residuality). We then exploited these papers to define the set of RFs linked to the Misalignment Risk.

2.1. Risk factor lists

Because of the high number of papers proposing RF/SF lists, and by unifying the vocabulary, we obtain our own list of 29 RFs (see Table 2). We group the RFs by synonymous and complementary notions. For example the notions of "incomprehensive requirements" and "incomplete requirements" complete each other to form the "Poor requirement definition" factor. This list thus constitutes a kernel of ERP project RFs that can be exploited to mitigate the Misalignment Risk.

We remove the RF "Difficulty of managing multi-sites aspects". Indeed, the underlying difficulty of this aspect is the difficulty to manage different specific needs from a site to another. Thus, this RF can be managed through the RF "Poor requirement definition".

2.2. Classification by nature

The first way to classify RFs/SFs is by their nature, e.g. internal vs. external to the ERP project team [25–27], and project management vs. system aspects [25,28–33]. The first classification

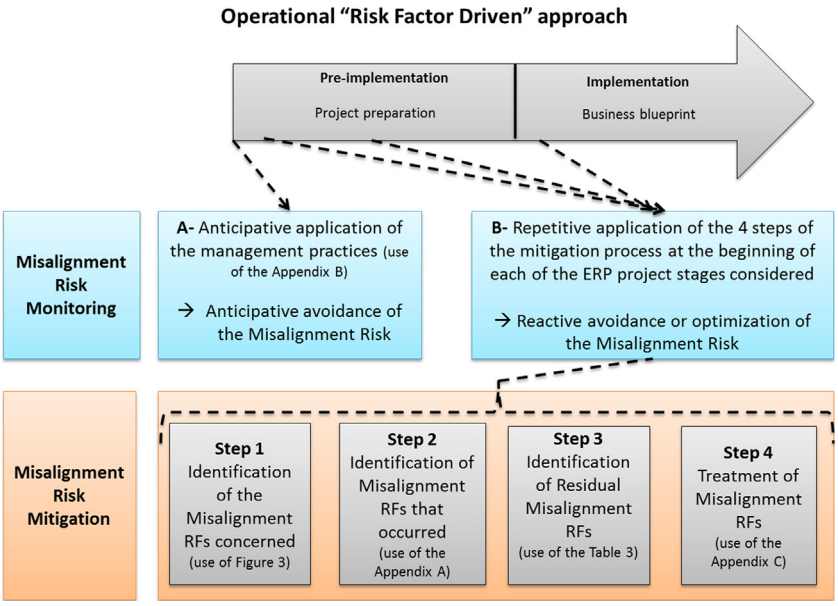

Fig. 1. ERP project life cycle.