Impact of the Modularity of ERPs on the Information Systems Disintegration

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ABSTRACT

This paper aims to verify a possible impact of the ERP modularity on the information systems disintegration. As an ERP package could be viewed as an integration indicator, it could thus measure the information system integration rate (ISIR). When an ERP is modular, clients who desire to be independent from an ERP vendor could easily buy other subsystems from a third party; and thus the information system integration rate would be low. On the contrary, when an ERP is not modular, clients cannot easily buy, due to some issues, other subsystems from a third party; and thus the ISIR would be high. Consequently, when the level of modularity, proposed by ERP vendors, is modified from low to high; or when clients change their information technology strategy from dependence on an ERP vendor to an independence from this vendor, the information system integration rate could be affected. This paper tries to understand how these changes could impact the information system integration rate; and especially how they could provoke the disintegration of information system.

KEYWORDS

ERP Modularity, Independence from an ERP Vendor, Information System Disintegration, Integration Rate, ISIR

1. INTRODUCTION

After a first evolution, between 1980 and 2000, from Material Requirements Planning and Manufacturing Resource Planning towards an “Enterprise Resource Planning 1st G (ERP 1st G)” including traditional modules like production planning, purchasing, manufacturing, sales, distribution, accounting, and human resources, a second evolution seems since 2005 to be in progress. In order to meet the new needs of users, it is important to take into account, within the framework of an ERP 2nd G, new modules like “Customer Relationship Management (CRM)”, e-business, “Supply Chain Management (SCM)”, “Product Lifecycle Management (PLM)”, “Business Intelligence (BI)”... Therefore an ERP 2nd G = ERP 1st G + new modules (Samara, 15).

An “Integration Rate (IR)” for an “Information System (IS)” could be measured by indicators like an ERP system or by interfaces (EAI, ETL, ESB, XML, etc.) in the IS. An IR acquired thanks to one ERP system (one vendor, one technology, overall vision, native integration between modules, one database…) could be evaluated as higher than an IR obtained by interfaces (several vendors, different technologies, several databases, and interfaces…). Changing users’ needs continuously affects the IR whose evolution could be positive if there is an integration or an increasing in the ability of all subsystems to exchange data; or negative if there is a disintegration or a decreasing to exchange data between subsystems.

Many authors have written about the degree of integration and the maturity of information system: Markus, Samara, Sharif et al., and Bidan et al. (Bidan, 2012; Markus, 2000; Samara, 2004; Sharif...
et al., 2005). Depending on the architecture’s composition, several IS integration rates exist today. Principally, three integration rates of information systems have been emphasized:

1 - “Total Integration of IS (TIIS)” which is a full integration of IS (IR = 100%). E.g., the IS consists of only one ERP 1st or 2nd G (only one vendor);
2 - “Hybrid Integration of IS (HIIS)” which is more or less integrated (50% ≥ IR <100%). E.g., the IS comprises different subsystem: applications, “Best of Breed (BoB)” and/or several ERP systems (several software vendors);
3 - “Disintegrated Information System (DIS)” which is not at all integrated or weakly integrated (IR < 50%). E.g., the IS consists of many applications and/or several ERP systems that are not at all integrated or weakly integrated in an uncoordinated way.

Although many studies have been conducted on the integration of IS, a possible way back or a disintegration from a TIIS to an HIIS or to a DIS (or even from an HIIS to a DIS) has been rarely highlighted (Samara, 2015). However, when a lot of effort, costs and time have been dedicated in order to improve IS integration, it is important, for all stakeholders (vendors, integrators, consultancy firms, clients, etc.), to avoid any kind of IS disintegration (a decreasing of the IR). E.g., a migration from a TIIS, which comprises only one ERP (1st or 2nd G), to an HIIS which comprises this ERP interfaced with other subsystems.

Modularity enables ERP customers to choose, from an ERP package, only some modules that are necessary for their organization. A high level of ERP modularity allows to clients to be independent from the control of one ERP vendor. Therefore, the lack of modularity could lead to a total dependency on an ERP vendor who could be able to impose exaggerated conditions on client. Firms should make an arbitrage in order to decide whether they prefer to be independent from an ERP vendor or not (Lambert, 2001; Naugès, 2007). The IS integration rate could be different depending on this arbitrage. This paper aims to check whether the IS disintegration would be possible due to the ERP modularity.

2. ERP: CONTRIBUTION AND EVOLUTION

The contribution and the evolution of ERP packages within the framework of the information systems could be presented as following:

**ERP as an Indicator of Integration for IS**

An ERP package is an IS that manages, through integration, all aspects of a business (Escalle, 1999; Hammer, 1999; Ratkevičius et al., 2012; Themistocleous, 2001). The IS integration is one of the main reasons for the ERP system adoption (Hyvonen, 2003; Saphis, 2004). Any ERP system pushes a company toward full process integration and solves the fragmentation of data (Dixit, 2011; Hanseth, 2006; Park, 2005; Wier, 2007). A high-level comparison between ERP and EAI as means for enterprise integration is proposed (Lee et al., 2003). Consequently, the implementation of an ERP system (1st or 2nd G sold by one vendor) can be used as an indicator to measure the IS integration rate. A TIIS (IR = 100%) could be reached by only one ERP implementation in the IS.

**ERP’s Position in Information Systems**

The prospect of replacing legacy systems by ERP systems has proven to be irresistible (Caldwell, 1998; Holland, 1999). However, it has also been argued that ERP packages have in fact failed to achieve a total integration and 38% of companies who adopt these ERP solutions do not abandon all their legacy systems (Schonefeld, 2000; Themistocleous, 2001). “One ERP, to cover all needs, has proved largely illusory. The ERP system modules were integrated one after another, but companies generally only incorporated between one and three” (Deshayes, 2004). On average, large groups
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