Ontological Analysis of An ERP Implementation Success and Education: A Critical System Thinking Approach

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ABSTRACT

Enterprise resource planning (ERP) implementations are plagued by high failure rates. Extant literature has proposed a myriad of critical success factors that contribute to successful ERP implementations, but there is still a gap in understanding the interaction of the complex internal subsystems that play a role in such successes. This study presents an ontological analysis of several subsystems and their interaction at the GCSS-Army ERP implementation. It leverages the system thinking theory and a novel analogous example to explain the interactions and properties of these subsystems.

KEYWORDS


INTRODUCTION

Although there is an upward trend in the ERP implementation globally (Kouki et al., 2009; Liang et al., 2007; Panorama ERP Report, 2015), the estimated ERP implementation failure rate is still high. Improper ERP implementation could spell disaster for both non-profit and for-profit organizations through large decreases in revenue and ineffective logistics (Motwani et al., 2002).

Extant literature demonstrates that the ERP implementation failures are mostly due to implementation complexities with people and processes, rather than technology (Maditinos et al., 2011). While factors related to the roles of people and processes in the success of ERP projects have been examined extensively (Dezdar & Sulaiman, 2009; Norton, 2015; Shaul & Tauber, 2013), there is still a gap in the research that explores the interaction between these variables from a systems thinking perspective. As a result, this paper aims to address the gap by applying the systems thinking theory (STT) to examine the relationship between people and processes during a successful implementation of an ERP system in the US Army.

The rest of this paper is structured as follows. Definitions of the success variables related to the ERP implementation are proposed. This is followed by exploration of the development entities of interest and their overarching roles and responsibilities. Next, the STT framework is examined along with a delineation of its key principles and their impact on the successful ERP implementation example. Finally, the paper concludes with a discussion on implications of this study on the ERP body of knowledge.

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PEOPLE AND PROCESS FACTORS

This study examines the implementation of the Global Combat Support System-Army (GCSS-Army) ERP. This ERP was intended to subsume the US Army legacy logistics systems and was designed to integrate retail and tactical supply, maintenance, and finance. The benefits of this ERP implementation resulted in cost savings derived from a change from the multiple silo-centric systems to a single ERP, increased asset accountability, auditability, visibility, traceability, and broad scale system availability.

The critical system thinking approach (CST) is concerned with how the subsystems of a system interact rationally with each other for common and purposeful objectives (Flood & Romm, 1996). What follows is an in-depth review of key factors, people and processes, examined through the prism of CST as a single entity labeled the development system.

People

The first component of this development system is the people (Hofkirchner & Rousseau, 2015). The three major stakeholders involved in the project included the US Army Combined Arms Support Command (USACASCOM), the Army Enterprise Systems Integration Program (AESIP)—the Product Management Office (PMO), and the lead system integrator (LSI)—Northrop Grumman Corporation. The USACASCOM represented the users and was responsible for providing the functional requirements. The product manager in the PMO was responsible for the management of the scope, cost, and scheduling for the ERP implementation. The LSI was responsible for the development of the ERP system.

A significant relationship between the cohesiveness of the stakeholders and the efficacy of the ERP system existed during the implementation. For example, USACASCOM exercised its development responsibilities through a directorate and embedded its own capability developers with the PMO and the LSI.

The product manager (PdM) at the PMO acted as the project sponsor’s representative whose primary responsibilities included the management of the ERP project’s scope, cost, and scheduling. The PdM ensured that the prescribed and projected development, fielding, and sustainment plans were executed as scoped, were within the budgetary plans, and were completed on time. Moreover, the PdM worked with the USACASCOM and the LSI to maintain a timely rollout of the capabilities and the changes therein.

Finally, LSI was contracted to develop the enterprise system and was responsible for delivering the components of the ERP within the specified project plan. Their representatives provided invaluable consulting as the developer’s subject matter experts.

Processes

Processes represented the second component of the development system. Through the successful ERP implementation, these processes included effective communication and coordination among the people for the purpose of achieving timely resolution to technological concerns. The processes included macro-level discussions, bridging activities, and change management. Finally, any variation in stakeholders’ competencies were addressed through cognitive conflict resolution strategies (Markus, 2004; Lederer, Antonucci, & Goeke, 2011).

The Development System

The development of an effective, efficient, and purposeful ERP system depends largely on how the development system’s subsystems manage their interactions, are interrelated, and are interdependent. A system is “a group of interacting, interrelated, or interdependent elements forming a complex whole” (Durland & Fredericks, 2005, p. 6). Ashmos and Huber (1987) noted that the interrelatedness of a system is such that a change in the property of any of the subsystems would trigger a change in the system itself. The underpinnings in the critical system thinking approach to system development
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