Available online at www.sciencedirect.com
ScienceDirect
International Journal of Project Management xx (2015) xxx – xxx
International Journal of Project Management
www.elsevier.com/locate/ijproman

Key antecedents and practices for Supply Chain Management adoption in project contexts

Davide Aloini [a,*], Riccardo Dulmin [a], Valeria Mininno [a], Simone Ponticelli [b]

[a] Dept. of Energy, Systems, Land and Constructions Engineering, University of Pisa, Largo Lucio Lazzarino, 1-56123 Pisa, Italy
[b] Dept. of Civil, Architectural, and Environmental Engineering, University of Texas at Austin, 301 E. Dean Keeton St., Austin, TX 78712-1094, United States

Received 2 September 2014; received in revised form 25 March 2015; accepted 27 March 2015

Abstract

An adequate identification of antecedents is recognized as fundamental in order to set the basis for connecting the inter-organizational networks in a SCM perspective. This work aims to identify key antecedents of SCM in a project-based environment by using Interpretive Structural Modelling (ISM). This is firstly useful in order to highlight the relationships among the antecedents and to deduce priority for their achievement. The findings provide a hierarchical perspective of the 16 identified antecedents. In particular, three macro-classes of prerequisites were defined: cross-organizational cooperation, rules and procedures — accessibility, and super-ordinate goals. Moreover, results from a longitudinal and illustrative case study are also presented in order to compare the out-coming ISM model with evidence from a success case in the Yacht-building context so offering interesting insights about the implementation process. From a managerial perspective, the proposed model offers a conceptual path for SCM adoption, emphasizing most critical issues that have to be considered and organized in this complex and unpredictable setting.

Keywords: SCM antecedents; Project-based environments; Interpretive Structural Modelling; Case study; Adoption path

1. Introduction

The frequent over-time and over-budget activities and, more widely, the lack of productivity affecting project-based industries have been steadily discussed by academics and practitioners (e.g. Ng et al., 2002; Vrijhoef and Koskela, 2000). The main causes of such problems have been often identified at the interfaces of different organizations (Xue et al., 2007) and several authors in the last decade showed an increased interest about Supply Chain Management (SCM) theories promoting a more efficient division of labor with the objective to improve the project coordination and the cooperation within and across companies (Das et al., 2006). Despite claimed benefits, SCM practices did not find a stable adoption in a project-based environment (Gadde and Dubois, 2010) so that research needs to pay further attention to supply chain implications in this context (Crespin-Mazet and Ghauri, 2007). Specifically, in order to successfully introduce SCM practices, the identification of context-specific preconditions (antecedents) is essential. The antecedents refer to all the technological, managerial, financial, relational and cultural aspects and capabilities which are necessary to the implementation process and could be visibly influenced by temporariness of the supply chain and the uniqueness of the final product such as other peculiar features that characterize the project dimension.

A primary importance is also gained by the analysis of the interrelationships among antecedents in the aim to highlight the priorities among SCM prerequisites, thus providing a support to implement SCM practices.

Accordingly to this research direction, Artto et al. (2008) over-stress the context-specificity of requirements that are

* Corresponding author. Tel.: +39 30 050 2217088, fax: +39 0502217333.
E-mail addresses: davide.aloini@dsea.unipi.it (D. Aloini), Riccardo.dulmin@dsea.unipi.it (R. Dulmin), valeria.mininno@dsea.unipi.it (V. Mininno), simone.ponticelli@utexas.edu (S. Ponticelli).

http://dx.doi.org/10.1016/j.ijproman.2015.03.013
0263-7863/00/

necessary for a successful introduction of SCM approach in such context, moreover, Stock et al. (2010) state that the difficult implementation of SCM practices can be a consequence of the scarce attention given to the identification of context-specific antecedents.

An adequate identification of antecedents is in fact recognized to set the basis for connecting the inter-organizational networks and therefore to enhance the relationship perspective within and among organizations (Mentzer et al., 2001).

Based on this research gap, the present study aims to propose an Interpretive Structural Modelling (ISM) based methodology that allows to identify key antecedents of SCM in project-based environment, highlighting their interrelationships and deducing priority of their implementation. Then results from a longitudinal case study are presented in order to illustrate the experience from a one-off project industry introducing a set of SCM practices with a network of suppliers.

The originality of the present study relies on its attempt to identify a set of prerequisites that promote SCM techniques in one-off project sectors. In so doing, the proposed model also analyzes the interconnections of antecedents and innovatively offers a structured conceptual path for SCM adoption, emphasizing most critical issues that have to be considered and organized in this complex and unpredictable setting. Also, in respect to the "SCM antecedent" stream of literature (Hsu et al., 2014; Kotzab et al., 2011) the work suggests a different perspective of antecedents focusing the analysis on the capabilities (intended as managerial methodologies and technical tool/systems).

The present article is organized as follows. Section 2 examines the previous literature related to project-based SCM. Section 3 raises the research questions of present contribution. Section 4 discusses and motivates the research methodology. Section 5 presents and discusses the model of antecedents and Section 6 highlights the findings from the case study. Finally, conclusions, limitations and future developments of present research are provided in Section 7.

2. Theoretical background

Since the 90s, many scholars recognized the importance of SCM to improve the performance of project-based industries (e.g. construction, shipbuilding) at the strategic, tactical and operational levels (Agapiou et al., 1998). The project literature has been characterized by a growing interest about SCM theories and an increased availability of empirical data has highlighted the improvements that can be obtained with such approach (Eriksson, 2010). The powerful pressures from the external environment, as the increasing level of competition between companies and the harsher requirements of clients in terms of cost, time, quality standards and more reliable planning schedule, have in fact lead project-based companies to extend the traditional intra-organizational project activities (design and execution) to a network of external companies thus making the adoption of a SCM approach more and more important for acceptable project performance.

Despite the rising attention, SCM initiatives still show a lack of efficacy and only a partial success of implementation in the project environment (Gadde and Dubois, 2010). Traditional SCM models in fact were developed for a process-centric context and their transposition in project-oriented contexts is not immediate and structured yet (O'Brien et al., 2002). The relevance of implementing SCM practices along the chain in order to generate value for customers has been investigated for a long time in various sectors (Akintoye et al., 2000; Maleki and Cruz-Machado, 2015) and also revisited more recently at the light of lean and green paradigms (Duarte and Cruz-Machado, 2015; Eriksson, 2010).

Conversely, project industries substantially differ from the stable and continuous supply chains within "goods and service" sectors for a number of specific characteristics: the high complexity and uncertainty in which the production system operates (Fearne and Fowler, 2006); the transitory site configuration managed by temporary supply chain network (Turner and Müller, 2003); the high customer influence on the final product (Pesämaa et al., 2009); the process fragmentation (Baiden et al., 2006); and the complex network of stakeholders, which involves multiple organizations and relationships (Xue et al., 2005). These peculiarities together with a number of cultural factors (e.g. Love et al., 2004) jeopardize the management of relationships between the SC members and are charged to be the rooting causes of the failure to replicate the positive experiences from other sectors.

Nevertheless evidence from project-SCM literature shows that extant contributions did not focus on the antecedents of SCM introduction but rather on relational aspects, such as collaboration in multi-partner projects (Dietrich et al., 2010), integrating technologies (Nikas et al., 2006) and trust among project participants (Hartmann and Caerteling, 2010). Moreover previous empirical research contributions, concerning the analysis of SCM antecedents, stemmed only from process-oriented literature and cannot be easily generalized to other contexts. Halldorsson et al. (2007) for example identified a number of preconditions, such as trust, long-term collaboration and willingness to share costs and benefits, which can be found in inter-organizational relationships studies. Then, a work by Kotzab et al. (2011) investigated the relationships among SCM antecedents in the automotive sector, discerning between internal, joint or external conditions, and SCM-related processes; this categorization represents the foundation to further explore in details the preconditions of SCM approach, but as underlined by the authors themselves, the classification is still quite generic and does not include all the aspects of SCM implementation (Kotzab et al., 2011).

3. Research questions and objectives

Despite the specificities of the project environment and the potential benefits of SCM approach in this context, the literature still reports a lack of research concerning the investigation of SCM antecedents.

Please cite this article as: D. Aloini, et al., 2015. Key antecedents and practices for Supply Chain Management adoption in project contexts, Int. J. Proj. Manag. http://dx.doi.org/10.1016/j.ijproman.2015.03.013