

Chapter 92

Systems for Knowledge Management along the Supply Chain

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ABSTRACT

This chapter explains the role of knowledge management systems, whether technology-based or people-based, in service supply chain management. A systematic literature review was carried out to identify relevant examples of both successful and unsuccessful knowledge management systems. These are analyzed in terms of process, people and technology aspects, and the activities in the knowledge life-cycle (create, acquire, store, use, refine, transfer) that they support. These include systems used within a single organization, systems shared with supply chain partners, and systems shared with customers, the latter being the least common. Notable features are that more systems support knowledge exploitation than knowledge exploration, and that general-purpose software (e.g., internet search, database) is used more than software specific to knowledge management (e.g., data mining, “people finder”). The widespread use of mobile devices and social media offers both an opportunity and a challenge for future knowledge management systems development.

INTRODUCTION

This chapter takes the starting point that, with the move towards the servitization of manufacturing (Lightfoot, Baines, & Smart, 2013), all supply chains are service supply chains. Communication and collaboration between supply chain partners is central to effective performance; the focus in this chapter is on one aspect of this - knowledge. We will not attempt to define knowledge precisely here: philosophers have addressed this issue for millennia without reaching universal agreement. Rather, we take the pragmatic stance that knowledge is whatever the people involved in a particular supply chain system say that it is. We do however need to define both knowledge management and, in the next section, knowledge management systems.

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There are many definitions of knowledge management. We prefer the early definition of the person who actually coined the term, Karl Wiig (1994):

In its broadest sense, knowledge management (KM) is a conceptual framework that encompasses all activities and perspectives required to making the organization intelligent-acting on a sustained basis. KM includes activities for gaining overview of, dealing with, and benefiting from the areas that require management attention by identifying salient alternatives, suggesting methods for dealing with them, and conducting activities to achieve desired results.

The most frequently researched topic in both supply chain KM and the entire KM literature is knowledge sharing, but you will notice that this term does not appear in Wiig's definition. This is because the over-arching term knowledge sharing is too abstract and unfocused to guide a business initiative. It has to be directed towards a specific purpose, and often a specific type of knowledge activity. This leads us into the basics of KM that we need to cover as a foundation for our look at knowledge management systems (KMS). We start with three fundamental but related distinctions: types of knowledge; KM strategies; and KM purpose.

Following the work of Polanyi (1966), there are two types of knowledge: explicit, which can be set out independently of the "knower", for example in documents or rules, and tacit, which cannot be explained, only performed/demonstrated. Any "piece" of knowledge has both tacit and explicit components.

A closely-related distinction concerns the organization's KM strategy. It is generally accepted that there are two basic strategies (Hansen, Nohria, & Tierney, 1999). Codification focuses mainly on explicit knowledge, while personalization is more concerned with tacit knowledge. A codification strategy generally requires greater technological support. Organizations use a mix of the two strategies, the precise nature of that mix being a matter of continuing debate in the literature.

The distinction in KM purpose is between knowledge exploitation and knowledge exploration (March, 1999). Exploitation is making use of knowledge that the organization already has; exploration is finding or creating knowledge that is new to that organization. Again it is important to note that these are not mutually exclusive, but rather there is a continuum with exploitation and exploration as the end-points (Oshri, Pan, & Newell, 2005). Codification strategies are likely to involve exploitation, whereas personalization may be either or both.

Figure 1 shows knowledge activities in more detail. Broadly speaking, exploration is more associated with the activities on the left hand side of the Figure (create, acquire, refine), and exploitation with those on the right hand side (store, use, transfer). Note that "forgetting" out of date knowledge is more of an exploration activity, too, though we will not be saying more about deliberate forgetting in this chapter. The other six activities (create, acquire, store, use, refine, transfer) broadly correspond to the six most common categories in Heisig's (2009) comparison of KM frameworks. Transfer of knowledge is especially relevant in a supply chain context.

As we shall see, KM has already been applied in many aspects of supply chain management, including outsourcing, new product development, decision support, risk management, procurement, build-to-order and performance improvement (Marra, Ho, & Edwards, 2012). It will become clear in the next section that in our view, any KM initiative includes some form of KMS.

In the remainder of the chapter, we first explain the principles of KMS, then look at actual and potential examples of KMS for the supply chain based on a systematic literature review, and finally speculate briefly on future developments.

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