

Chapter 4

RFID:

From Closed Manufacturers' Systems to Supply Chain–Wide Tracking

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ABSTRACT

The use of RFID (Radio Frequency Identification) tracking in closed systems is replacing barcode as dominant tracking system in many industrial sectors because RFID enables reading multiple objects simultaneously without visual contact. To enlarge tracking systems to cover global supply chains, all aspects related to RFID, such as radio frequencies, data content, transmission protocols, and message sets, need to be standardised. By collecting, processing, and distributing information efficiently, organisations should be able to improve the efficiency of their transport logistics processes, lower their operational costs, and improve their portfolio of logistics services. This chapter describes the current perspectives, challenges, and benefits of RFID tracking applications in manufacturing industry. The perspectives derived from review of previous research are validated by using case study method.

INTRODUCTION

Due to the complexity of modern logistics networks, the availability of up-to-date information plays a key role in improving efficiency (Yu, Yan, & Cheng, 2001; Nilsson & Waidringer, 2004).

Automated identification (Auto-ID) enables tracking and tracing of physical goods in a timely, accurate, and cost-efficient manner.

The information gathered using an Auto-ID can be transmitted to an information system in real-time and shared with other parties of the chain. Furthermore, an Auto-ID tracking system represents a major opportunity to improve

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process control, support inventory management, and develop supply chain as more responsive. Eventually, introduction of Auto-ID based tracking may transform the business processes by enabling re-engineering of the supply chain and removing structural constraints that limit the performance of the chain. (McFarlane & Sheffi, 2003; Wamba & Chatfield, 2009)

The main goal of this paper is to describe the current state of RFID tracking applications in manufacturing supply chains in Europe, as well as present its challenges and benefits based on literature review and empirical evidences.

METHODOLOGY

Research methods, in general, can be divided into two mainstreams; quantitative and qualitative methods (Saunders, Lewis & Thornhill, 2009). Quantitative research is “hard-nosed” and data-driven research that tends to optimize control and generalizability, while “soft” qualitative methods maximize realism (Kotzab, Seuring, Müller & Reiner, 2005). This paper employs case-study method, which is one rather popular form of qualitative research (Yin, 2012). The approach of the paper is analytical as it aims to explain reality by reproducing causal relations (seeking the explaining effects) by finding the current cause (Arbnor & Bjerke, 1997).

In order to create a comprehensive picture of challenges and benefits of RFID tracking systems, a descriptive literature review was conducted by utilizing the most relevant scientific articles and other studies. In empirical part of the paper, the findings of literature review were exposed under verification by conducting a case study of a real-life RFID tracking implementation. A case study method is a widely used technique in studying contemporary phenomena in real-life context (Yin, 2002). Considering the fact that RFID implementations are usually unique and they contain several implementation-specific characteristics, therefore,

the authors estimated that the use of case study method would most probably provide the best answers for the research question (McBurnley & White 2009).

As the approach of this study is to verify the findings of literature review with empirical evidence, the main criteria for the case selection is that it should include the majority of those aspects of RFID tracking implementation which arose during the literature review. Therefore, the following three factors favour the selection of RFID tracking implementation in ABB Drivers manufacturing plant in Finland as a case to be studied: (1) The company has a long history with RFID, which allows one to scrutinize the evolution of the system; also, the system was considered to be in mature and stable phase. (2) ABB's RFID tracking implementation is applied to inbound supply chain functions and involves several supply chain partners. (3) ABB is a major player in its industry, and its RFID tracking implementation is conducted in Finland, which is in the frontline of utilising RFID technology.

The information employed in the case study was obtained from two sources. At first, the basic information of implementation was acquired from the case bank of RFID Lab Finland, which is non-profit organization distributing RFID related information. In addition, some press releases of ABB were explored in order to form a solid picture of RFID tracking implementation. Second, the empirical data was acquired by interviewing the Head of Quality and Operational Excellence in ABB Drives Finland. The open questions were derived from the results of the literature review. In practice, the important aspects (i.e. benefits and barriers) identified in previous research were presented to interviewed person, who agreed or rejected the statement, as well as provided additional information for statement in question.

Considering the reliability and validity of employed case study method for the research problem, few issues arise. The level of RFID adoption is still relatively low in many countries, and indi-

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