

# An Integrated Methodology for the Evaluation of Electronic Port Services

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## ABSTRACT

*This article introduces a formal evaluation methodology for IT investments specifically designed to cope with the needs of port industry. Port industry is a service-oriented industry and, as such, is characterised by the intangible nature of benefits. The goal of this paper is to develop a methodology for the evaluation of container terminal related electronic services that incorporates both strategic and analytic evaluation techniques for performing both ex-ante and ex-post evaluation. Port industry is an interesting case because, although it is characterised by intense competition and ports have to concentrate in satisfying the customers' needs by proving value added services with the use of advanced information and communication technologies (ICT), it is also characterised by a lag in adopting new technologies and techniques compared to other industries. In this paper, the authors present an analysis of the industry's specific needs and proposes a dynamic evaluation methodology specifically designed to satisfy them.*

**Keywords:** *AHP, Balanced Scorecard, Electronic Port Services, IT Evaluation, Port Industry, Service Science, Strategy*

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## INTRODUCTION

Over the last twenty years, global markets are becoming increasingly service-based economies and employment growth is concentrated in the service-providing sectors of the global economy (Spohrer, 2007; IfM & IBM, 2008). Market based services, excluding those provided by the public sector (e.g., education, health care, and government) account for 50% of the total value added to OECD member countries, and have become the main driver of produc-

tivity and economic growth, especially as the use of Information Technology (IT) services has grown (Spohrer, 2005). In today's rapidly changing business environment, agility and innovation are essential for survival. New regulations, rapidly changing technology, increasing competition and heightened customer expectations mean that organizations must become more responsive to changing demands (Demirkan & Spohrer, 2010). Service design, development and delivery all require methods to make service businesses more efficient and scalable. Practitioners need depth and breadth

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in combinations of technology, business, and organizational principles.

Service Science or Service Science, Management and Engineering (SSME) is a multi-disciplinary research and academic effort integrating a variety of disciplines, including engineering, social sciences and management (and more), that seeks to bring together knowledge from diverse areas to improve the service industry's operations, performance, and innovation (Paulson, 2006). The goal of SSME is to increase the productivity of the service industry, promote innovation, and create greater validity and transparency when assessing the value of investments in services (Abe, 2005). SSME aims to understand how an organization can invest effectively to create service innovations and to realize more predictable outcomes (Chesbrough & Spohrer, 2006; Maglio et al., 2006; Spohrer et al., 2006). According to Abe (2005), both service providers and clients are highly dissatisfied with the current assessment and distribution of value that they feel should be attainable through investment in services. A very important element for maximising the value of IT investments in services is to properly evaluate these services prior and after the investment. It is very important to have a formal evaluation methodology specialized for IT services. Most of the traditional evaluation techniques are focused on the industrial sector, assigning more weight to tangibles than to intangibles.

The port industry is a service oriented industry characterised a volatile external environment with high external pressure and intense competition. The demand for transportation services is derivative and depends on the global industrial production and the need for transportation of goods. During the last decades, the port industry has experienced significant changes that had profound affects. The changes were technological (unitisation or containerisation, introduction of informatics), organisational (just-in-time manufacturing, logistics, multimodal transport operation), liberalisation of world markets (globalisation)

and a shift of political attitudes in favour of less state intervention in the economy (Chloumoudis et al., 2003). Operating under the new era the container transportation and port service providers have to concentrate in satisfying the customers' needs proving value added services with the use of advanced information and communication technologies (ICT). This is consistent with the situation in other industries where many in organizations in the manufacturing industry are repositioning themselves in the market as service providers, by offering value-added services wrapped around the core product. Their physical processes remain the same, but their relationships with customers change, and their management and planning processes must evolve to support this change (Dietrich & Harrison, 2006).

According to worldwide best practices, electronic port services generally aim to eliminate underlying operating problems and to provide innovative, quality value added services. Against this background, better service provision as based on electronic port service provision accounts to increased service quality, faster service provision, accessibility of service anywhere and anytime independently of the agencies offering a service, and service provision, reflecting the needs of the respective user at a low cost rate.

The objective of our research is to define a formal methodology to evaluate and select electronic port services for implementation. Our methodology includes both ex-ante evaluation for the selection of the best alternative solution, as well ex-post evaluation after the implementation of the selected electronic port services. Port industry is characterised by a lag in adopting new technologies and techniques compared to other industries. This makes the adoption of a non traditional appraisal method even harder. Our goal is to develop a valid academic approach which will be able to be used by container terminals administrations as a robust, practical and flexible decision support methodology

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