Chapter 6.7
Empirical Investigation of Critical Success Factors for Implementing Business Intelligence Systems in Multiple Engineering Asset Management Organisations

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ABSTRACT
Engineering asset management organisations (EAMOs) are increasingly motivated to implement business intelligence (BI) systems in response to dispersed information environments and compliance requirements. However, the implementation of a business intelligence (BI) system is a complex undertaking requiring considerable resources. Yet, so far, there are few defined critical success factors (CSFs) to which management can refer. Drawing on the CSFs framework derived from a previous Delphi study, a multiple-case design was used to examine how these CSFs could be implemented by five EAMOs. The case studies substantiate the construct and applicability of the CSFs framework. These CSFs are: committed management support and sponsorship, a clear vision and well-established business case, business-centric championship and balanced...
team composition, a business-driven and iterative
development approach, user-oriented change man-
age, a business-driven, scalable and flexible
technical framework, and sustainable data quality
and integrity. More significantly, the study further
reveals that those organisations which address the
CSFs from a business orientation approach will
be more likely to achieve better results.

INTRODUCTION

Background

Engineering asset management organisations
(EAMOs), such as utilities and transportation
enterprises, store vast amounts of asset-orientated
data (Lin, Gao, Koronios, & Chanana, 2007).
However, the data and information environments
in these organisations are typically fragmented
and characterised by disparate operational, trans-
actional, and legacy systems spread across multi-
ple platforms, diverse structures, and different
data formats (Haider, 2007; Haider & Koronios,
2003). The plethora of different systems makes
it very difficult, even impossible, for a system in
one functional unit to communicate with systems
in other units. This lack of integration of infor-
mation systems, together with the large volumes
of transactional data which might be spread in
different pools across the enterprise, can lead to
increased difficulties in analysing, summarising,
and extracting actionable information resulting in
suboptimal management performance (Ponniah,
2001). Moreover, heightened competition resulting
from market deregulation as well as increased
regulatory compliance and governance require-
ments, such as the Sarbanes-Oxley ordinance in
the U.S. and the CLERP 9 Acts in Australia,
have demanded greater accountability for deci-
sion making within such organisations (Logan &
Buytendijk, 2003; Mathew, 2003).

On the other hand, existing management
information systems are no longer adequate for
EAMO's modern business needs and not always
meeting the expectations of decision makers at
all hierarchical levels (Olszak & Ziemba, 2007).
These systems were unable to handle the integra-
tion of different, dispersed, and heterogenic data
within such enterprises. Nor could they effectively
interpret such data in any broader contexts or
discover new data interdependencies (Bui, 2000,
cited in Olszak & Ziemba, 2007; Gray & Watson,
1998), due to improper techniques of data ac-
quisition, analysis, discovery, and visualisation
(Olszak & Ziemba, 2007). Therefore, in response
to these pressing challenges of information disper-
sion and compliance requirements, EAMOs are
compelled to improve their business execution
and management decision support through the
implementation of a contemporary BI system
(Olszak & Ziemba, 2007).

According to Negash (2004), “BI systems
combine data gathering, data storage, and knowl-
edge management with analytical tools to present
complex internal and competitive information to
planners and decision makers.” Whilst Moss and
Atre (2003) state that “it is an architecture and
a collection of integrated operational as well as
decision-support applications and databases that
provide the business community easy access to
business data.” Stated simply, the main tasks of a
business intelligence (BI) system include “intelli-
gent exploration, integration, aggregation and
a multidimensional analysis of data originating
from various information resources” (Olszak &
Ziemba, 2007). Implicit in this definition, data is
treated as a highly valuable corporate resource,
and transformed from quantity to quality (Gan-
gadharan & Swami, 2004). As a result, critical
information from many different sources of an
asset management enterprise can be integrated
into a coherent body for strategic planning and
effective allocation of assets and resources. Hence,
meaningful information could be delivered at
the right time, at the right location, and in the
right form (Negash, 2004) to assist individuals,
departments, divisions, or even larger units for