Examining the effect of user satisfaction on system usage and individual performance with business intelligence systems: An empirical study of Taiwan's electronics industry

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ABSTRACT

The advent of new information technology has radically changed the end-user computing environment over the past decade. To enhance their management decision-making capability, many organizations have made significant investments in business intelligence (BI) systems. The realization of business benefits from BI investments depends on supporting effective use of BI systems and satisfying their end user requirements. Even though a lot of attention has been paid to the decision-making benefits of BI systems in practice, there is still a limited amount of empirical research that explores the nature of end-user satisfaction with BI systems. End-user satisfaction and system usage have been recognized by many researchers as critical determinants of the success of information systems (IS). As an increasing number of companies have adopted BI systems, there is a need to understand their impact on an individual end-user's performance. In recent years, researchers have considered assessing individual performance effects from IS use as a key area of concern. Therefore, this study aims to empirically test a framework identifying the relationships between end-user computing satisfaction (EUCS), system usage, and individual performance. Data gathered from 330 end users of BI systems in the Taiwanese electronics industry were used to test the relationships proposed in the framework using the structural equation modeling approach. The results provide strong support for our model. Our results indicate that higher levels of EUCS can lead to increased BI system usage and improved individual performance, and that higher levels of BI system usage will lead to higher levels of individual performance. In addition, this study's findings, consistent with DeLone and McLean's IS success model, confirm that there exists a significant positive relationship between EUCS and system usage. Theoretical and practical implications of the findings are discussed.

1. Introduction

Today, many organizations continue to increase their investment in implementing various types of information systems (IS), such as enterprise resource planning (ERP) and customer relationship management (CRM), primarily because of the belief that these investments will lead to increased productivity for employees (Jain & Kanungo, 2005). Evaluating individual employee performance from IS use has been an ongoing concern in IS research (Goodhue & Thompson, 1995). However, previous studies that examined the relationship between IS usage and individual performance effects have reported contradictory results that range from positive to non-significant, to even a negative relationship. For instance, Goodhue and Thompson (1995) explored the role of task-technology fit on individual performance effects and indicated a positive relationship between IS usage and individual performance. Conversely, Pentland (1989) found a negative relationship between IS use and individual performance. Lucas and Spitter (1999) found that IS use has no impact on individual performance.

Many researchers have recognized user satisfaction as a critical determinant of the success of IS (Bailey & Pearson, 1983; DeLone & McLean, 1992; Doll & Torkzadeh, 1988; Igbia & Tan, 1997). When data computing in organizations has transformed from transactional data processing into end-user computing (EUC), Doll and Torkzadeh (1988) have developed a 12-item and five-factor instrument for measuring end-user computing satisfaction (EUCS) in the EUC environment. Even though EUCS instrument has already been widely applied and validated for various IS applications (e.g., decision support systems (McHaney, Hightower, & White, 1999; Wang, Xi, & Huang, 2007), ERP systems (Somers, Nelson, & Karimi, 2003), and online banking systems (Pikkarainen, Pikkarainen, Karjaluoto, & Pahnila, 2006), it has not been validated.
with users of business intelligence (BI) systems. BI systems were
designed to provide decision-makers with actionable information
delivered at the right time, at the right place, and in the correct form
to make the right decisions (Negash & Gray, 2004). Given these
goals, attributes measured by EUCS such as timeliness, accuracy,
content, etc., are relevant to an evaluation of BI systems. Since an
increasing number of companies have adopted BI systems, there
is a need to understand the impact of EUCS on individual job per-
formance. DeLone and McLean (2003) propose that higher levels
of individual satisfaction with using an IS will lead to higher levels
of intention to use, which will subsequently affect the use of the
system. Most studies investigating system usage at the individual
level terminate at the user acceptance of the computer technol-
yogy rather than at the performance outcome (Dasgupta, Granger,
& McGarry, 2002). The main reason could be attributed to the conven-
tional wisdom that more use leads to better performance. However,
empirical studies that examined the relationship between IS usage
and individual performance effects have reported contradictory
results ranging from positive to non-significant, to even a negative
relationship. Therefore, the purpose of this study is to investigate
whether it is appropriate to adopt the EUCS instrument to mea-
sure user satisfaction with BI systems. Furthermore, this study also
examines the following research question: How does EUCS influ-
ence system usage and individual job performance? In this paper,
we present a model that identifies the relationships between EUCS,
usage, and individual performance. Drawing on Igbiria and Tan’s (1997)
nomological net model, we propose that EUCS has a positive impact
on individual performance both directly and indirectly through system usage. Operational measures for the constructs are
developed and tested empirically, using data collected from
330 respondents in the Taiwanese electronics industry to a sur-
vey questionnaire. Structural equation modeling is used to test
the hypothesized relationships. The structure of this paper is orga-
nized as follows. In Section 2, we review the related literature on
BI systems, EUCS, and performance measures to provide the nec-
essary background information for the study. Section 3 presents
the research framework and develops the hypothesized relation-
ships, while Section 4 describes the research methodology. Section
5 presents the data analysis and results, which are discussed in Sec-
tion 6. Section 7 presents implications for practice and research, and
the final section describes the limitations of the study.

2. Literature review

2.1. Business intelligence (BI) system

Today, many organizations have already implemented ERP sys-
tems, considered to be one of the most significant and necessary
business software investments for firms. ERP systems offer orga-
nizations the advantage of providing a single, integrated software
system that links their core business activities such as operations,
manufacturing, sales, accounting, human resources, and inventory
control (Lee, 2000; Newell, Huang, Galliers, & Pan, 2003; Parr
& Shanks, 2000). As more companies implement ERP systems, they
have accumulated massive amounts of data in their databases.
Although ERP systems are good at capturing and storing data, they
offer very limited planning and decision-making support capabil-
ities (Chen, 2001). It is widely accepted that ERP should provide
better analytical and reporting functions to aid decision-makers
(Chou, Tripuranallu, & Chou, 2005). According to Aberdeen’s sur-
vey report, business intelligence (BI) applications have the highest
percentage of planned implementations by companies using ERP
systems (AberdeenGroup, 2006).

As Mikroyannidis and Theodoulidis (2010) explain, the BI sys-

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