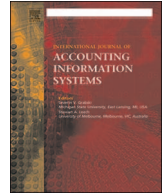


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## Using a robust performance measurement system to illuminate intellectual capital

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### ABSTRACT

The central premise of the “fit-as-mediation” view states that knowledge-related factors could determine the usage and design of specific organizational systems, such as management accounting and control systems. This could, in turn, facilitate information processing and bring about positive organizational outcomes. While the influence of knowledge-based assets on measurable performance has been examined extensively in the intellectual capital literature, little is known concerning the role of an organizational control system in fostering the management of intellectual capital as the most strategic asset for organizations. As such, this study primarily aims to explore what role a performance measurement system plays in terms of the diversity of measurement in the relationship between intellectual capital and organizational performance. We incorporate social capital into the general three-dimensional classification of intellectual capital; namely, human capital, structural capital, and relational capital, to provide a more comprehensive measure of intellectual capital. Further, we conceptualize the diversity of measurement by supplementing the original Kaplan and Norton's BSC model with a new perspective, social and environmental measures. Such integration of financial, customer, internal business process, learning, and growth, along with social and environmental measures could result in an overarching and robust conceptualization of performance measurement; a concept that was barely mentioned in previous literature. We conducted a questionnaire survey involving chief financial officers of 128 Iranian public listed companies. Using the partial least squares (PLS), we find that companies with higher levels of intellectual capital emphasize a greater diversity of performance measures. The findings also show that the diversity of measurement mediates the relationship between intellectual capital and organizational performance. This paper may offer guidance to companies concerning the competencies needed for securing positive organizational outcomes from their knowledge resources, such as intellectual capital.

### 1. Introduction

In modern knowledge-based economies, the primary source of value creation has shifted from tangible factors of production toward intangible resources (Inkinen, 2015). Companies operating in this so-called intangible economy reap considerable proportions of their benefit from intellectual capital factors, such as the quality of relationships, structures and human capital (Segelod, 1998). As firm performance is primarily grounded upon knowledge-related elements, it is critical for organizations to gain clear insights into the creation, management, and measurement of intellectual capital (Kianto et al., 2014). Nonetheless, there are still many challenges and arguments

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concerning the measurement and conceptualization of intellectual capital (Asiaei and Jusoh, 2015). Hence, a need to understand how the multidimensional and comprehensive concept of intellectual capital is discussed and empirically tested is warranted.

A review of the existing literature shows that intellectual capital is an inherently multidimensional concept (Subramaniam and Youndt, 2005; Lee, 2011; Asiaei, 2014). Despite the general consensus about the importance of intellectual capital, a precise conceptualization and definition of intellectual capital remains disputable. Scholars are still unable to agree on the number and type of intellectual capital dimensions to be used (Asiaei and Jusoh, 2015). While Hudson (1993), for example, narrows the scope of the concept to just individual knowledge, other scholars incorporate organizational relationships, infrastructure, culture, routine, and intellectual property into the conceptualization of intellectual capital (Brooking, 1996; Roos et al., 1997). Notwithstanding that extensive work has been carried out on the three-dimensional model of intellectual capital that embraces human, structural, and relational capital, existing research on social capital is much more limited (Wang and Chen, 2013; Delgado-Verde et al., 2011). The inclusion of social capital in the development of intellectual capital is necessary as it provides a better understanding of the intrafirm networks (Tsai and Ghoshal, 1998) or intra-organizational social capital (Maurer et al., 2011). All these are embedded in the quality of interaction among organizational members and between units within a firm. In this regard, this study aims to conceptualize a multidimensional concept of intellectual capital by incorporating social capital as the fourth dimension along with the other three foregoing dimensions. This practice is in line with the conceptualization of intellectual capital that synthesizes all the knowledge and competencies as the means toward sustained competitive advantage (Stewart, 1997).

In practice, organizations are not able to realize their benefits if their strategic resources, primarily intellectual capital and knowledge assets, are not managed appropriately (Coff, 1997; Widener, 2006). Kaplan and Norton's (1996, p. 21) maxim of "if you can't measure it, you can't manage it" signifies that organizational performance would be positively affected through the measurement of the organization's fundamental critical success factors, such as strategic assets. Similarly, Tayles et al. (2007) argue that the design and the nature of management accounting systems, such as performance measurement systems, need to be adequately innovative so that organizations are able to capture the real value and contributions of intellectual capital and other invaluable assets. The performance measurement system, as one of the major elements of management control systems, is perceived as a lever that supports the management of strategic resources (Simons et al., 2000). Relevant information related to the organization's underlying strategic assets is provided through the performance measurement system (Kaplan and Norton, 1996). This implies that some benefits of intellectual capital can influence organizational performance in an indirect manner through the usage of a performance measurement system. As Kaplan and Norton (2001) assert, the effect of knowledge resources is not inevitably direct and immediate. Alternatively, they could affect organizational outcomes via chains of cause-and-effect relationships that involve two or three intermediate stages. Due to this, it is worth examining the mediating effect of performance measurement systems in the association between intellectual capital and organizational performance.

With the foregoing arguments, the contribution of this study is primarily twofold. First, it contributes to understanding the need for all four dimensions of intellectual capital to be integrated to allow a more comprehensive model of intellectual capital. Second, we explore how a comprehensive intellectual capital view, which represents the organizations' most strategic resources, may contribute to improved organizational performance with the support of a robust performance measurement. For this purpose, we conceptualize the performance measurement system as the diversity of performance measures, which is multidimensional in nature. Besides the four original dimensions noted in the diversity of measurement construct that includes financial, customer, internal business process, and innovation and learning, which are largely borrowed from the balanced scorecard framework (Kaplan and Norton, 1992, 2005), the current study also explores an additional dimension termed the social and environmental perspective. Accordingly, this adds another potential contribution to the performance measurement system and intellectual capital literature in that, to date, no study has analyzed all five dimensions of performance measures as the diversity of measurement and linked it to intellectual capital. Incorporating social and environmental measures (Adams et al., 2014) could offer a more comprehensive and robust conceptualization of performance measurement systems, in general, and the diversity of measurement, in particular. This is also in line with the emerging concept of sustainability in that organizations need to have some sustainability indicators for comprehensive organizational performance evaluations covering the economic, environment, and social aspects of performance (Rahdari and Rostamy, 2015). The increased attention on sustainability issues demonstrates the level of interest in many types of organization to use performance measures for both internal and external stakeholders. The inclusion of social and environmental measures also provides the need to embed the sustainability concept into the intellectual capital perspective, which receives less attention in the intellectual capital literature. The results drawn from this study indicate that organizations with higher levels of intellectual capital tend to attach more importance to the diversity of performance measures. Further evidence also reveals that the diversity of measurement mediates the relationship between intellectual capital and organizational performance. Thus, the findings suggest that organizations with higher levels of intellectual capital would achieve significantly superior performance when they use a broader range of performance measures.

The rest of the paper is structured as follows. Section 2 presents a literature review on intellectual capital and the diversity of measurement as well as the development of hypotheses. Section 3 develops the theoretical framework, which explains the mediating role of the diversity of measurement. Section 4 provides the research method, while Section 5 presents the results based on PLS analysis. The final section discusses the findings and implications, as well as the limitations and suggestion for future research.

## 2. Literature review and hypotheses development

### 2.1. Multidimensional view of intellectual capital

A new wave of intellectual capital studies was initiated by a number of scholars in the late 1990s whereby it was conceptualized as the synthesis of all the knowledge and competencies that are perceived as a cornerstone for sustainable competitive advantage

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