



Integrated performance measurement system for firm's human capital building

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Abstract

Purpose – The purpose of the study is to explore the relationship between performance measurement systems (PMSs) and organizational learning (OL) and the impact on firm human capital building.

Design/methodology/approach – Data were collected using a survey instrument. Then, a structural equation model (SEM) was used to test the proposed model.

Findings – The results reveal that PMS, which is designed with three main qualities – valid, comprehensive, and coherent with its environment – has an overall positive relationship with OL and firm's human capital (employee satisfaction and work-related competencies). First, the validity of the individual performance measure is found to be positively linked to employee satisfaction. Second, the comprehensiveness of the PMS and work-related competencies are positively associated. Third, the coherence of the PMS with its environment has a positive relationship with OL but not directly with the human capital indicators. Thus, OL, which is positively associated with both work-related competencies and employee satisfaction, mediates the relationship between the coherence of the PMS and the work-related competencies.

Originality/value – There are some linkages among these three concepts (PMS, OL and human capital) that have not been specifically explored in the existing relevant studies. Previous studies have asserted that human capital could not be utilized and nurtured without supporting infrastructure. Therefore, this study explores the relationships among the three constructs to uncover the additional benefits of PMS and OL for different purposes such as building firm's human capital. This could help firms to improve the utilization of their existing management tools and their competitiveness.

Keywords Performance measurement systems, Organizational learning, Human capital, Performance management

Paper type Research paper

1. Introduction

Over past decades, the business environment has witnessed a shift towards the knowledge economy (Adams, 2008; Adler, 2001; Powell and Snellman, 2004; Siengthai *et al.*, 2010). Intellectual capital (IC) has become an important “driver” in creating competitive advantage and value for a firm. Among the three categories of IC (human capital (HC), customer or relational capital and structural capital), HC is recognized as the most important component in terms of creating long-term competitive advantage and value for a firm in this era of the knowledge economy (Hatch and Dyer, 2004; Hitt *et al.*, 2001; Liu *et al.*, 2009; Petty and Guthrie, 2000). Firms generally develop their HC by investing in human resource development activities (Mayo, 2000; Noel, 2009; Snell and Dean, 1992).

In addition, to deal with the competitive business environment, firms also spend a substantial amount of time and effort on designing and using a performance measurement system (PMS) to achieve the best performance (Bourne *et al.*, 2002; Frigo and Krumwiede, 1999; Waggoner *et al.*, 1999). In the context of Thailand, globalization has forced Thai firms to develop their knowledge workers and improve their performance (Dechawatanapaisal and Siengthai, 2006). Various PMS frameworks



are used in listed Thai firms (Rompho, 2011). The key purposes of PMS are to measure performance and manage strategy. However, a study by Yongvanich and Guthrie (2009) reveals that creating a learning culture and improving employee behaviour are also desirable benefits of PMS.

PMS has been found to have positive linkage with some HC indicators, such as employee commitment (Bart, 2001) and employee job satisfaction (Burney and Swanson, 2010). The PMS enhances the effectiveness of a firm's performance through individual and organizational learning (OL) (Batac and Carassus, 2009; Fried, 2010; Kloot, 1997). Prior studies indicate that HC can be sustained and developed by both individual and OL (Bontis *et al.*, 2002; Moon and Kym, 2006). Hence, the authors argue that there are linkages among these three concepts (PMS, OL and HC). Past studies state that HC could not be utilized and nurtured without supporting infrastructure (Bontis, 1998; Edvinsson and Sullivan, 1996). Therefore, it is of interest to explore the relationship to discover more benefits of PMS and OL for different purposes such as building HC with in a firm. This could help firms improve utilization of their existing management tools and their competitiveness.

In the following sections, the relevant literature on HC, PMS and OL is reviewed. Then, a conceptual model is proposed and hypotheses are formulated. Subsequently, a discussion of the research methods and the research results are presented. Finally, the conclusions and limitations are discussed.

2. HC

In the late 1990s, an increasing interest in knowledge management and learning dramatically increased the amount of attention paid to IC and intangible assets by practitioners (Andriessen, 2004; Bechtel, 2007; Moon and Kym, 2006). Skandia, a Swedish insurance company, was one of the pioneers in IC model development (Edvinsson and Malone, 1997; Wiig, 1997). IC was defined as knowledge that can be converted into value (Edvinsson and Sullivan, 1996; Edvinsson, 1997). Focusing on HC, which is the key component of IC, it is evident that the pioneers in research on HC were economists such as Becker, Mincer and Schultz. In the 1960s, the HC concept was brought into the context of business management (Bechtel, 2007). According to Skandia's model, HC is a combination of knowledge, skill, innovativeness and the ability of each employee to meet the tasks at hand (Bontis, 2001). It is considered an important resource for a firm's competitiveness and the profit lever of the knowledge economy (Bontis and Fitz-enz, 2002; Huselid *et al.*, 1997; Lado and Wilson, 1994).

2.1 HC measurement

During the past ten years, more than 30 methods for valuation or measurement of IC have been proposed (Andriessen, 2004). A comprehensive review of Scholz *et al.* elicits five approaches to measure HC: market-value based, accounting oriented, indicator based, value added and revenue oriented (Pietsch, 2007). Very little of the existing body of measurement methods has been fully proved (Marr *et al.*, 2003). As a result, the measures used are numerous and diverse in past literatures. For example, Kaplan and Norton (1996a, b) proposed employee capability, employee satisfaction and employee sustainability to reflect HC. Edvinsson and Sullivan (1996) provided experience, know-how, skill and creativity as examples of HC indicators. Bontis (1998) used 20 measurement items such as competence ideal level, succession training programme, employee cooperation and employee satisfaction. Pablos (2002),

on the other hand, suggested employee profile, turnover, education, commitment and motivation, training, and employee satisfaction. The literature review uncovers the most widely used indicators as training, education, employee satisfaction, turnover, work-related competencies, seniority and innovativeness; these are shown in Table I.

In this paper, an indicator-based approach is used to measure HC. With reference to the most frequently used indicators, the authors adopt employee satisfaction and work-related competencies to reflect HC (e.g. Chen *et al.*, 2004; Engstrom *et al.*, 2003; Evans, 2004; Moon and Kym, 2006; Pablos, 2002; Petty and Guthrie, 2000). Both of them are important combination embedded in an individual employee, the source of HC. If employees are not satisfied, they do not serve the firm with maximum effort. Their competencies cannot be activated or converted to firm's value added. Also, lacking work-related competencies, employees cannot generate the desired outcomes thereby affecting the firm's performance. The drivers and impacts of these two indicators are stated.

2.1.1 Employee satisfaction. Employee satisfaction is the degree to which employees like their jobs (Spector, 1997). According to the well-established two-factor theory of Herzberg's (1964), the lack of hygiene factors (supervision, working conditions, co-workers, pay, policies/procedures and job security) leads to dissatisfaction. Motivators (achievement, recognition, the work itself, responsibility, advancement and growth), however, are factors that lead to satisfaction. It has been found that employees' satisfaction is enhanced by providing feedback on both outcomes and process results (McAfee *et al.*, 1995), involving them in decision making, recognition of their contribution and communication with management (Spinelli and Canavos, 2000). Considering the impact of employee satisfaction, past studies consistently reveal that employee satisfaction has a positively direct effect on employee performance which, in turn, improves business outcomes (Antoncic and Antoncic, 2011; Harter *et al.*, 2002; Koys, 2001). Employee satisfaction also results in employee retention and employee commitment. Satisfied employees tend to remain in their firm and staff turnover has a negative relationship with satisfaction (Gu and Siu, 2009; Litschka *et al.*, 2006).

2.1.2 Work-related competencies. Tylor (1911) primarily addressed the concept of competence. From assessing the different ways of accomplishing jobs between the least and the most competent workers, systematic training and development activities could improve worker competence. Boyatzis (1982) defines competency as individual characteristics that result in effective and/or superior job performance. It includes motive, traits, skills, aspect of one's self-image or social role, or a body of knowledge which an employee uses (Cardy and Selvarajan, 2006; Vazirani, 2010). Work-related competencies refer to the belief in one's capacity to perform work activities with skill (Spreitzer, 1995). Past literature revealed that employee competence is improved by both formal (such as training) and informal (such as on-the-job training) learning activities (Drejer, 2000; Dunphy *et al.*, 1997). Employee participation in the competency development initiatives (e.g. training, mentoring, working group) and a stimulating learning environment also results in improvement of employee competence (De Vos *et al.*, 2011). In light of its impact, much of the past literature examines the impact of competencies at the corporate level, which is a collection of individual employee competencies. It was found that competencies are significantly related to company performance (e.g. Hou and Chien, 2010; Menor and Roth, 2008). However, some past studies state that competence by itself cannot lead to a better firm performance. What is necessary is a facilitator such as OL and the company's own strategic planning processes (Neo, 1988) to enhance firm performance.

Human capital indicators	Edvinsson and Malone (1997)	Roos and Roos (1997)	Bonts <i>et al</i> (1998)	Brennan and Connell (2000)	Petty and Guthrie (2000)	Hurwitz <i>et al</i> (2002)	Pablos (2002)	Engstrom <i>et al</i> (2003)	Lengnick-Hall and Lengnick-Hall (2003)	Serrano <i>et al</i>	Carson <i>et al</i>	Chen <i>et al</i>	Evans (2004)	Wang and Chang	Litschka <i>et al</i> (2006)	Moon and Kym (2006)	Namasivayam and Denizci	Longo and Mura (2007)	Tayles <i>et al</i> (2007)	Switzer and Huang	Longo and Mura (2008)	Lin <i>et al</i> (2009)	Total (%)
No. of full-time employees	x																						4
% of employees rotating in from or out to co-operation partners		x																					4
% of full-time permanent employees/total employment	x																						4
% of time spent on routinizing operations		x																					4
Absence rate							x						x										13
Affect one another positively			x					x															9
Age																						x	4
Agreeableness											x												4
Aptitudes																							4
Attitude			x							x													13
Average age of full-time permanent employees	x																						4
Benefit						x																	4
Commitment							x				x												13
Communication skills	x										x												4
Condition of services																							4
Conscientiousness											x												4

(continued)

Table I.
Examples of human capital indicators from the past literature

Table I.

Human capital indicators	Edvinsson and Malone (1997)	Roos and Roos (1997)	Bontis <i>et al.</i> (1998)	Brennan and Connell (2000)	Petty and Guthrie (2000)	Hurwitz <i>et al.</i> (2002)	Pablos (2002)	Engstrom <i>et al.</i> (2003)	Lengnick-Hall and Lengnick-Hall (2003)	Serrano <i>et al.</i>	Carson <i>et al.</i>	Chen <i>et al.</i>	Evans (2004)	Wang and Chang	Litschka <i>et al.</i> (2006)	Moon and Kym (2006)	Namasivayam and Denizci	Longo and Mura (2007)	Tayles <i>et al.</i> (2007)	Switzer and Huang	Longo and Mura (2008)	Lin <i>et al.</i> (2009)	Total (%)
Diversity	x																						9
Education	x																						39
Education cost (annual costs)	x			x																			9
Emotional stability											x												4
Employees give it their all			x					x															9
Employees perform with energy			x					x															9
Employee performance			x					x															9
Employee profile: gender, age, no. of employees																							4
Employee satisfaction																							39
Employees think actions through			x					x															9
Entrepreneurial spirit, innovativeness, proactive and reactive abilities, changeability																							4
Entrepreneurship																							4
Extraversion																							9
Focus on quality																							4
Full-time permanent employees who spend <50% of work hours at a corporate facility																							4
																							4

(continued)

Human capital indicators	Edvinsson and Malone (1997)	Roos and Roos (1997)	Bonts <i>et al</i> (1998)	Brennan and Connell (2000)	Petty and Guthrie (2000)	Hurwitz <i>et al</i> (2002)	Pablos (2002)	Engstrom <i>et al</i> (2003)	Lengnick-Hall and Lengnick-Hall (2003)	Serrano <i>et al</i>	Carson <i>et al</i>	Chen <i>et al</i>	Evans (2004)	Wang and Chang	Litschka <i>et al</i> (2006)	Moon and Kym (2006)	Namasivayam and Denizci	Longo and Mura (2007)	Tayles <i>et al</i> (2007)	Switzer and Huang	Longo and Mura (2008)	Lin <i>et al</i> (2009)	Total (%)
Gender													x							x			4
Grievances/complaints													x										4
Improvement system			x					x															9
Innovativeness (or success rate of new product or creativity)		x																			x		26
Intellectual agility			x					x															13
Intelligence (cognitive ability)											x												9
Internal relations																					x		13
Intrinsic work reflection																					x		9
Know-how																							9
Knowledge sharing									x														4
Leadership and management skill											x												4
Locus of control											x												4
Motivation																							4
Net operating revenues/total number of employees																							22
No. of full-time temporary employees																							4
No. of part-time employees and full-time contractors																							4
Occupational assessment																							4

(continued)

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Openness to experience																							4
Payroll expense/net sales																							4
Personal injury rate							x																4
Persomel turnover		x																					35
Practical application	x																						9
Psychometric assessment																							4
Seniority (no. of years of employment)	x																						30
Training		x																					43
Value-added per employee (Profit + pay/no. of employees)																							4
Vocational qualification																							9
Work environment																							4
Work system effectiveness																							4
Working experience (years)																							9
Work-related competencies																							35
Work-related knowledge	x																						22

3. PMS

Performance measurement is a basic management technique and has been used since 1910 (Neely, 1999; Williams, 2004). In the 1990s, it was widely developed in large firms as a means to measure performance and support strategic management functions (Micheli and Manzoni, 2010; Rantanen *et al.*, 2007). Currently, the use of PMS does not only consist of monitoring or control but also includes performance measurement, decision making, strategy management, communication, behavioural influence, and learning and improvement (Franco-Santos *et al.*, 2007; Kuwaiti and Kay, 2000). In the following sections, the authors discuss PMS' components and effectiveness.

3.1 PMS components

Many scholars propose different components of the PMS. Bititci *et al.* (1997) assert that there are five key components, which account not only for the measures but also for the people. These components are: stakeholders, control criteria, external measures, improvement objectives and internal measures. The five main components for Otley (1999) are objectives, strategies, targets, rewards and information flows (feedback and feed-forward loops). In the view of Chiesa *et al.* (2007, 2008), the four components of PMS are the dimensions of performance, indicators, structures and process. Neely *et al.* (1995, 1996) examined the PMS design in three dimensions: first, individual performance measures; second, set of performance measures; and third, relationship between the performance measurement and the environment within which it operates. This framework is supported by many studies (Kennerley and Neely, 2002; Lohman *et al.*, 2004; Olsen *et al.*, 2007; Waggoner *et al.*, 1999).

However, in practice, a PMS is not just a set of measures. As data and information are essential for the system, the authors argue that the scope of a PMS should account for the activities of data acquisition, processing, analysis and information distribution. Otherwise, the PMS and its output cannot be communicated and utilized for performance improvement. To view PMS systematically, in this study, the PMS components of Neely *et al.* (1995) are adopted to identify the PMS scope. To reflect the PMS holistic views, the components also include supporting infrastructure, processes and procedures for data acquisition, collating, sorting, analysis, interpretation and dissemination. Hence, the PMS components in this study are: individual performance measures; a set of measures including processes and procedures for data acquisition, collating, sorting, analysis, interpretation and dissemination; and the relationship of PMS and its environment including supporting infrastructure for the related processes.

3.2 PMS effectiveness

The PMS literature indicates that a PMS can be evaluated for its effectiveness in various dimensions, such as congruence, comprehensiveness and integratedness. Mostly, it is evaluated within the whole system, not by each component (e.g. Burney and Widener, 2007; Eccles and Pyburn, 1992; Van Aken *et al.*, 2005; Flapper *et al.*, 1996; Ittner *et al.*, 2003). However, the authors propose to evaluate the PMS effectiveness by its validity, comprehensiveness and coherence. Each dimension is discussed.

3.2.1 Validity of the individual performance measure. Based on the performance appraisal system, the measuring instrument should be evaluated in terms of validity, reliability (French, 2002; Mondy and Noe, 2008; Snell and Bohlander, 2004) and sensitivity (Zikmund, 1997). Validity reflects the performance appraisal instrument's

ability to measure what the organization wants to measure in terms of employee performance. Past studies suggest that a measure should have technical validity to provide accurate, accessible, reliable, timely and understandable information (Burney *et al.*, 2009; Kaplan and Norton, 1996a; MacBryde and Mendibil, 2003). The reliability of the measure results in a favourable reaction by managers to the PMS and their awareness of the information provided by the system (Malino and Selto, 2001). The technical validity of the performance measure is positively associated with the perception of organizational justice (Burney *et al.*, 2009). Sensitivity is the notion of the performance appraisal instrument's ability to measure variability in employee performance accurately (Zikmund, 1997). Performance measures help firms in their strategic management and control by indicating the performance of past activities and the distance between the firm's current position and its ultimate goal. Therefore, besides the technical validity and sensitivity, our current study argues that providing feedback is another required characteristic. A good measure can be used as part of a control loop by providing feedback for future improvement and learning (Bungay and Goold, 1991; Franco-Santos *et al.*, 2007; Otley, 1999). Complementary to the suggestion, past studies reveal that receiving feedback from a performance measurement report results in performance improvement (Forza and Salvador, 2000; Jones *et al.*, 1993).

In this study, the notion of a valid performance measure refers to a performance measure that can be used to provide feedback on past activities with technical validity and sensitivity. Technical validity refers to the ability of the performance measure to provide accurate, accessible, reliable, timely and understandable information. Sensitivity here is defined as the ability of the performance measure to discriminate between good and bad performance results.

3.2.2 A comprehensive set of performance measures. A number of past studies support the concept that a set of performance measures should include both financial and non-financial measures to avoid short termism and failure to provide data on quality (e.g. Burgess *et al.*, 2007; Chenhall, 2005; Henri, 2006; Ittner *et al.*, 2003; Kaplan and Norton, 1992; Lima *et al.*, 2009; Neely, 1999; Otley, 1999; Said *et al.*, 2003; Ullrich and Tuttle, 2004). Firms employing both financial and non-financial measures achieve higher performance levels (Bryant *et al.*, 2004; Evans, 2004; Grafton *et al.*, 2010; Said *et al.*, 2003; Spencer *et al.*, 2009).

Past literature also suggests that a set of performance measures should be diverse in order to provide various kinds of information regarding the different dimensions of firm performance (Burney and Matherly, 2007; Flapper *et al.*, 1996; Hall, 2008; Tangen, 2005). Furthermore, as performance is affected by internal and external factors, it is necessary to include a set of measures to reflect the relationship of both factors and firm performance (Bititci, 1995; Bititci *et al.*, 1997, 2000; Burgess *et al.*, 2007; Chenhall, 2005; Kennerley and Neely, 2002; Henri, 2006; Marchand and Raymond, 2008). Kaplan and Norton (1996a) suggest that a set of performance measures should include a mixture of performance outcomes and performance drivers to provide information about the direct causes of performance and how the outcome can be achieved. Besides containing a broad set of the measures, the ability to capture trends in performance is also vital (Chenhall, 2005; Ferreira and Otley, 2009; Kaplan and Norton, 1996a, b; Lebas, 1995; Olsen *et al.*, 2007; Otley, 1999). This ability leads to improved performance and promotes learning at both the individual and the organizational level (Ferreira and Otley, 2009). The authors assert that there is another requirement that should be incorporated into a set of evaluation measures and that is

the simplicity of the process and procedure for data acquisition, collation, sorting, analysis, interpretation and dissemination (Franco-Santos *et al.*, 2007; Medori and Steeple, 2000; Neely *et al.*, 1997). Complementary to this argument, free and frequent availability of information from the system is an important characteristic that leads to OL (Kloot, 1997). The more effort is put into the process of data collection, the more difficult it is to convince employees that the system is essential, which in the end affects the use of the system (Kueng, 2000).

The notion of a comprehensive set of measures in this study is therefore represented by the following characteristics: contains a diverse set of measures (financial and non-financial measures, external and internal measures, performance outcomes and drivers); covers different dimensions of firm performance; has the ability to capture performance trends; and has a simple process and procedure for data acquisition, collation, sorting, analysis, interpretation and dissemination.

3.2.3 Coherence of the PMS with its environment. PMS is a system with processes related to people throughout a firm. Thus, the current study views the coherence of the PMS and its environment as vital. The environmental factors emphasized by most of the previous studies include firm's strategy, reward system and culture. The terms "consistency" or "congruence" have been used synonymously with "coherence". For example, Medori and Steeple (2000) propose that the congruence of measures with a firm's strategy is one of the PMS requirements. Ittner *et al.* (2003) suggest that a coherent strategic PMS is indicated by: overall measurement diversity; alignment between strategy and performance measurement practices (Chenhall, 2005; Hall, 2008); alignment between value drivers and performance measurement practices; and use of measurement alignment techniques.

This study asserts that deviation of measurement practices from the strategy is detrimental to performance. Sim and Koh (2001) find that manufacturing plants that have linkages between their strategic goal and their PMS perform better than those that do not. A PMS with linkages between strategies, goals and operations improves competitiveness (Chenhall, 2005). Besides the linkages of PMS and strategy, the PMS should include measures that are comparable with the firm's competitors because benchmarking is an important role of a PMS (Franco-Santos *et al.*, 2007; Fried, 2010).

In addition, information from the PMS is used as feedback on employee performance. Thus, it is suggested that in order to influence employee behaviour to achieve the desired performance, the PMS should match the reward system and the firm's culture (Atkinson, 1998; Eccles and Pyburn, 1992; Henri, 2006; MacBryde and Mendibil, 2003; Otley, 1999). The firm's culture is one factor that differentiates between a successful and an unsuccessful implementation of PMS (Bourne *et al.*, 2002). A PMS based on a reward system is found to support the development of continuous improvement and encourage organizational trust (Chenhall and Langfield-Smith, 2003). Moreover, as a PMS is related to numerous data and related information, the authors propose that having an appropriate supporting infrastructure for data management is another important requirement. Hence, the characteristics of coherence of the PMS with its environment in this study include: having alignment in strategy and measure; reflecting a strategic causal model; containing measures for external comparison; matching the firm's culture; matching the existing reward systems; and having a supporting infrastructure that enables data to be acquired, collated, sorted, analysed, interpreted and disseminated.

3.3 The link between PMS and HC

Although none of the past studies specifically explore the relationship between PMS and HC, there is some evidence of linkages between the PMS and some HC indicators, such as commitment, satisfaction, attitude and motivation. A study of public administration uncovers a correlation between citizen satisfaction and use of multiple performance measures (internal and external factors) (Kelly and Swindell, 2002). The structure of the performance measurement mechanism is proved to be a factor that affects employee creativity (Chang and Birkett, 2004). A study by Robson (2005) finds that a well-designed PMS changes employee behaviour and automatically leads to improved staff performance. The comprehensive PMS influences managers' cognition and motivation. The stronger the linkage between performance measures and organizational strategy, the higher the level of managers' job satisfaction is (Hall, 2008). A study of Burney and Swanson (2010) found that the greater the emphasis on long-term measures (e.g. customer satisfaction and learning and growth measures), the greater job satisfaction is. Furthermore, labour-intensive firms are found to be likely to emphasize non-financial measures. Firms that rely on HC are more likely to use both financial and non-financial measures in their pay structure (Widener, 2006). Hence, the authors assert that the PMS design has an impact on HC management. Otherwise, there would be no difference between the measurement practices of labour-intensive firms and those of capital-intensive firms.

Given the evidence of some linkages between the PMS and HC as mentioned above, the authors hypothesize the following:

H1. An effective PMS is positively related to firm HC building.

4. OL

OL is the process whereby members of the organization respond to changes in the internal and external environments of the organization by detecting errors that they then correct in order to maintain the central features of the organization (Argyris, 1977). According to the resource-based view, OL is the foundation of a firm that creates its special resources and increases its competitive advantage (Kontoghiorghes *et al.*, 2005; Nonaka, 1991; Tsai *et al.*, 2007). The concept of OL has been studied since 1965 and its popularity has increased significantly.

4.1 Types and dimensions of OL

The types of OL are variably categorized by many scholars (Dodgson, 1993; Fiol and Lyles, 1985; Fried, 2010; Kloot, 1997; Slater and Narver, 1995). Examples are the single-loop, double-loop and deutero learning by Argyris and Schon (1978); adjustment learning, turnover learning and turnaround learning by Hedberge (1981); lower- and higher-level learning from Fiol and Lyles (1985); and generative and adaptive learning from Senge (1990).

From the knowledge perspective, Huber (1991) proposes four constructs of OL: knowledge acquisition; information distribution; information interpretation; and organizational memory. Knowledge acquisition is the process by which knowledge is obtained either through external sources or internal development. Information distribution is the process by which knowledge is spread among the members of an organization. Information interpretation refers to the process by which the distributed information is given one or more commonly understood interpretations. Organizational

memory is the means by which knowledge is stored for future use. It could be in form of organizational systems or rules, procedures and other systems. Batac and Carassus (2009) propose three OL processes: production, distribution and memory or mobilizing. Slightly different, Crossan *et al.* (1999) propose the 4Is framework based on the view that OL is a dynamic process of strategy renewal. The framework contains four social and psychological processes: intuitive, interpreting, integrating and institutionalizing. The first two processes, intuitive and interpreting, take place at the individual level while integration occurs at the group level and institutionalization occurs at the organizational level.

In addition to the dimensions that emphasize OL processes, different OL dimensions are also introduced. The OL dimensions of Hult and Ferrell (1997) consist of team orientation, system orientation, learning orientation and memory orientation. Sinkula use commitment to learning, shared vision and open-mindedness to represent OL, while Pace define OL according to individual support, group support and outcomes. According to Preskill and Torres (1999), OL is indicated by culture, leadership, systems and structures, communication, rewards and recognition, teams, and evaluation or evaluative inquiry (Nafukho *et al.*, 2009). Another OL dimension, which is adopted by Hamel (1991) and Inkpen and Dinur (1998), consists of learning intention, absorption capability and integration capability (Rhodes *et al.*, 2008).

Comparing OL constructs, the authors consider that Huber's (1991) constructs are objective, holistic, simple and match this study's perspectives. The dimensions also have been widely used in prior studies such as Batac and Carassus (2009), Kloot (1997), Lopez *et al.* (2005, 2006), Slater and Narver (1995), Sinkula (1994) Tippins and Sohi (2003) and Tseng and Mclean (2008). Therefore, in this study, the authors identify OL based on the constructs of Huber (1991). The authors then examine the relationship of the PMS (as input) and the HC (as output) and the mediating effect of OL on such a relationship. OL is hypothesized as a process that mediates the two constructs.

4.2 The link between PMS and OL

Several studies confirm that PMS can lead to learning and improvement (e.g. Atkinson, 1998; Forza and Salvador, 2000; Franco-Santos *et al.*, 2007; Huber, 1991; Lebas, 1995; Neely *et al.*, 1995; Otley, 1999). OL occurs when employees use PMS information to reassess their beliefs about the causal relationship of their activities and the desired results (Atkinson, 1998; Fried, 2010). The PMS provides double-loop learning through the flow of information based on the measures and its causal model (Lebas, 1995; Micheli and Manzoni, 2010; Otley, 1999). Feedback from the PMS enhances the OL capability of the management, which is referred to as strategic learning (Kaplan and Norton, 1996b; Malina and Selto, 2001). In response to this argument, it is found that the development and usage of PMS leads to strategic learning processes (Fried, 2010).

Kloot (1997) views the PMS as part of the management control system. The study reveals that if a management control system's characteristics fit into the four constructs of OL, namely, knowledge acquisition, information distribution, information interpretation and organizational memory, it will create a generative or double-loop learning environment. Batac and Carassus (2009) find that basic control mechanisms (such as accounting and budgetary control, management control) can produce OL. Well-founded performance measures enhance employee belief in the PMS

and their commitment to performance improvement as well as increased OL concerning performance measurement (Wouters, 2009). Similarly, Oliver (2009) finds that clear and consistent performance measures, which support the strategic objectives, support the learning environment by providing information for decision making, facilitating rapid and effective learning and enabling the acquisition and development of information, knowledge and understanding. Hence, the authors hypothesize that:

H2. An effective PMS is positively related to OL.

4.3 The link between OL and HC

IC is the current stock of knowledge in an organization that can be developed and maintained by OL (Bontis *et al.*, 2002). Learning can develop the inimitability of a firm's HC (Hatch and Dyer, 2004). Some evidence of a linkage between OL and some HC indicators such as innovation, satisfaction and commitment are given.

Egan *et al.* (2004) find a positive relationship between learning culture and job satisfaction among information technology employees. Kontoghiorghes *et al.* (2005) find that some characteristics of a learning organization are a strong relationship with adaptation to change, innovation and organizational performance. A study by Lopez *et al.* (2005) confirms the positive impact of OL on innovation, corporate competitiveness and economic/financial results. In addition, Rhodes *et al.* (2008) assert that learning intention and integration capability have the greatest positive relationship with process innovation in terms of knowledge transfer compared with social capital networks. Knowledge-sharing practices, the backbone of learning, have a positive relationship with HC and ultimately result in positive firm performance (Hsu, 2008). Moreover, improvement in OL activities can increase both employee job satisfaction and organizational commitment (Rose *et al.*, 2009). Based on the literature review, the authors therefore hypothesize that:

H3. OL is positively related to firm HC building.

4.4 The mediating effect of OL

Based on the previous discussion of the relationship between PMS and HC, PMS and OL as well as OL on HC, it is this study's assertion that OL itself mediates the relationship between PMS and HC. None of the previous studies has identified this linkage. However, there is some evidence of OL's mediating effect on the relationships of other variables and some HC indicators (such as competencies, satisfaction and innovation).

Real *et al.* (2006) confirm the mediating role of OL in both the relationship between the information technology and the employee competencies and the relationship between the information technology and all the levels of business performance. Hsu (2008) reveals that the innovation strategy and top management values have a significant positive impact on competencies through the organizational knowledge-sharing practices that form the backbone of OL. Hsu *et al.* (2009) find that OL has a significant intervening effect on the relationship between organizational culture and firm performance, in which employee satisfaction is one of the six performance indicators. Recently, it was found that OL partially mediates the impact of total quality management on innovation (Huang *et al.*, 2011). In addition, Mu and Benedetto (2011)

assert that OL mediates the effects of strategic orientations on new product commercialization (innovation). Thus, the authors hypothesize the following:

H4. OL mediates the relationship between PMS and firm HC building.

5. Conceptual model

This study proposes that firms should design their PMS and OL processes to build up their HC and achieve a long-term competitive advantage. The PMS and OL concepts have the common purpose of changing or adapting a firm to fit into its environment. Both have impact on HC, which is one of the most important resources for a firm's competitiveness and value.

The PMS can be used in both diagnostic and interactive styles (Abernethy and Brownell, 1999; Ferreira and Otley, 2009; Henri, 2006; Simons, 2000; Tuomela, 2005). The diagnostic control systems are used to motivate, monitor and reward the achievement of specified goals. The interactive control systems are used to stimulate OL and the emergence of new ideas and strategies. The budget system used with the interactive style supports the learning needs and adaptation required when strategic change occurs (Abernethy and Brownell, 1999). Furthermore, interactive use of performance measures is apt to improve the quality of strategic management and to increase the commitment to strategic targets (Tuomela, 2005). These constitute evidence of the effect of the style or manner of PMS use on learning. Therefore, the style of PMS use is a control variable in this study. The current study also considers other common factors that can influence OL and HC as control variables. These are the firm's size, whether or not it is listed on the stock exchange, industry, employee years of service and employee job level (Lopez *et al.*, 2006; Tsang, 1997).

Based on the review of relevant literature, a conceptual model for this study is proposed to investigate the impact of PMS and OL on HC building, as illustrated in Figure 1.

The hypotheses of our study are:

H1. An effective PMS is positively related to firm HC building.

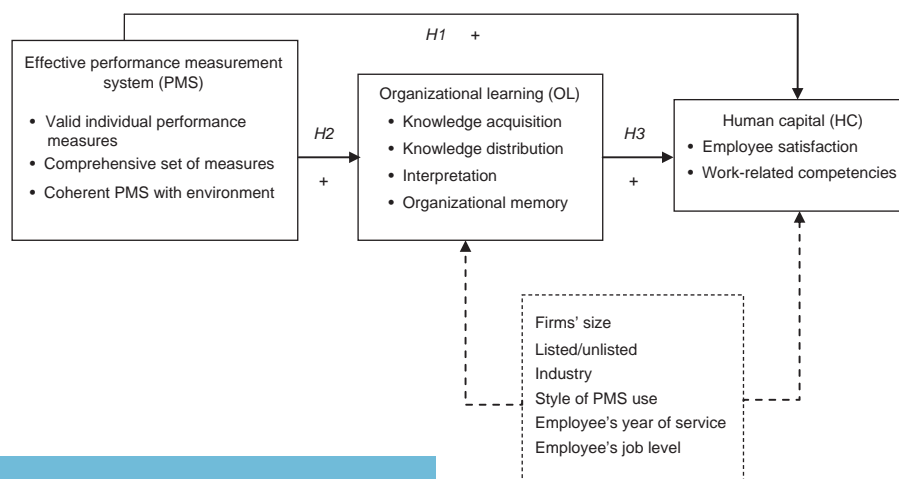


Figure 1. The conceptual model illustrating the impact of the relationship of an effective performance measurement system and organizational learning on firm human capital

H2. An effective PMS is positively related to OL.

H3. OL is positively related to firm HC building.

H4. OL mediates the relationship between PMS and firm HC building.

6. Research method

6.1 Sample and data collection

The current study uses a cross-sectional and multi-industry sample. The targeted respondents are those individuals who work for firms in Thailand. The data were collected by both hard copy and web-based questionnaires. The authors used lists of alumni and current evening MBA and Executive MBA students from a university in Thailand. These students are employed in a variety of firms across a variety of sectors. As it has been suggested that formal PMS and OL are more often in place and more structured in large firms than in small firms (Henri, 2006; Lopez *et al.*, 2006; Tsang, 1997), some requirements of listed firms in the Stock Exchange of Thailand (SET) and the Market of Alternative Investment are then applied as criteria to ensure that the respondents' firms were not too small and not in the start-up stage. The criteria are paid-up capital in common shares of not < 20 million baht and operating for at least three years. These criteria were inserted into the first part of the questionnaire.

6.2 Measurement of constructs

6.2.1 *PMS*. A new seven-point Likert scale instrument (ranging from 7 = completely agree to 1 = completely disagree) was developed for this study based on Burney *et al.* (2009), Chenhall (2005), Hall (2008) and the literature review to measure the PMS effectiveness. The instrument is divided into three parts to measure the three dimensions of a PMS: the validity of individual performance measures (seven items), the comprehensiveness of the set of measures (six items) and the coherence of the relationship between the PMS and its environment (seven items).

6.2.2 *OL*. An instrument for the measurement of OL was adopted from Lopez *et al.* (2006). The instrument was based on their exhaustive review of OL literature and other reliable instruments of Bontis *et al.* (2002), Goh and Richards (1997), Huber (1991), Hult and Ferrell (1997) and Nonaka *et al.* (1994). A seven-point Likert scale is used for each of the statements corresponding to each OL dimension. The OL is measured in the following four dimensions: knowledge acquisition (nine items), information distribution (six items), information interpretation (five items) and organizational memory (six items).

6.2.3 *HC*. The HC indicators of this study are employee satisfaction and work-related competencies. Employee satisfaction is the degree to which employees like their jobs (Spector, 1997). Four items to measure the employee satisfaction were adopted from studies by Moon and Kym (2006) and Longo and Mura (2007). Work-related competencies refer to the belief in one's capability to perform work activities with skill (Spreitzer, 1995). Three items to measure work-related competencies were adopted from Spreitzer (1995).

6.2.4 *Control variables*. The control variables are measured as follows. An instrument to measure the style of PMS use was adapted from Abernethy and Brownell (1999), with the aim of capturing the interactive use of the budget system. The instrument was based on Simons's levers of control (Simons, 2000). All the

questions are asked using a seven-point Likert scale. A high score (this study considers the average score as more than 4) represents interactive use of the PMS. A low score represents diagnostic style of use. According to the interactive style as delineated by Simons (2000), PMS is used on a regular basis in manager decision-making activities. Data generated are important to the highest levels of management and are used throughout the organizations. In the diagnostic style, the PMS is used for monitoring organizational outcomes and correcting deviations from the preset standards of performance. The firm's size is based on paid up capital, which is the same as the SET criterion, while the rest of the control variables (listed or unlisted, industry, employee years of service and employee job level) are from respondents' profiles, which appeared in the first part of the questionnaire.

In the questionnaire, definitions of PMS, OL and HC were provided at the beginning of each part. In the process of research instrument development, the authors translated and back-translated all the items of the instrument (from English to Thai and from Thai to English) to ensure semantic equivalence. Furthermore, to ensure reliability and validity, the questionnaire of this study was reviewed by two anonymous academics and two anonymous professionals who are involved in PMS in two large firms. A pilot test was conducted with 98 employees. The validity and reliability of the questionnaire were analysed by SPSS. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy of each dimension was 0.7 or higher. The factor loading of each factor was >0.7 , which is higher than the recommended cut-off point of 0.6 (Nunnally, 1976). The Cronbach's α of each dimension was >0.8 , hence larger than the recommended cut-off point of past studies (Hinkin, 1998; Nunnally, 1976). These statistical results showed a high level of validity and reliability of the questionnaire. Some wording was adjusted slightly and some items were removed to be more concise. Finally, the 53 items of the instrument were used to measure the PMS, OL and HC.

7. Results

The following sections present the findings of the study. First, the profile of the respondents is described and discussed. Then, the results of the measurement model and the hypotheses testing using AMOS are presented.

7.1 Profile of the respondents

A total of 2,000 questionnaires were distributed to targeted respondents and 662 were returned. Screening out the returned questionnaires that were incomplete and failed to meet the requirements left 298 usable questionnaires (a response rate of 15 per cent). The authors used a *t*-test to compare the difference of the average scores of the variables between the hard-copy (100) and the web-based (198) questionnaires. There was no significant difference in the average scores of the variables between the two survey methods ($p > 0.05$).

About 55 per cent of the respondents are lower than management level or professional. A total of 24 per cent are junior management or supervisors and 21 per cent are middle management or higher. In terms of years of service for the current firms, 33 per cent of the respondents have been working with their current firms for less than three years. A total of 48 per cent have been working with their current firms for three years or more but less than ten years. A total of 18 per cent have been working with their current firms for ten years or more. About 51 per cent of the respondents are in the financial sector, 20 per cent in the service sector and

29 per cent in other sectors. The majority (69 per cent) work in very large firms that have paid up capital of one billion baht or more. A total of 13 per cent work in large firms that have paid up capital between 300 and one billion baht, and 18 per cent of the sample respondents work in small firms that have paid up capital between 20 and 300 million baht.

7.2 Test of the measurement model

The authors used AMOS 18 to conduct confirmatory factor analysis (CFA) of all the constructs. The standardized factor loading (standardized regression weight) between the latent variable and the observed variable reflects the construct validity. A factor loading of 0.5 or higher is suggested and ideally should be 0.7 or higher (Hair *et al.*, 2006). The goodness of fit of the model is indicated by the CMIN/df, goodness-of-fit index (GFI), comparative fit index (CFI) and root mean square error of approximation (RMSEA) (Byrne, 2010). The CMIN/df ratio is suggested to be < 5 (Wheaton *et al.*, 1977). The GFI and CFI are recommended to be > 0.9 and the RMSEA should be < 0.07 with a CFI of 0.9 or higher (Hair *et al.*, 2006). However, the extensive review by Byrne (2010) suggests that the RMSEA should be < 0.05 .

As this study aims to examine the individual impact of each PMS component (validity of performance measure, comprehensive set of performance measures and coherent PMS with its environment) on each HC indicator (employee satisfaction and work-related competencies), a first-order model of each PMS component and each HC indicators is used in the measurement model. Unlike the measurement of PMS and HC, a second-order model of OL is used. The reason behind the use of a second-order model of OL instead of first order is that OL is a process that must incorporate all components, namely knowledge acquisition, knowledge distribution, knowledge interpretation and organizational memory. Each component alone is not considered as OL. Thus the components cannot be separately tested. Since the objective of this study is to test the mediating effect of overall OL on the relation between PMS and HC, second-order model of OL and factor score from SPSS is then used. The technique of using factor score was adopted in various past studies (e.g. Grafton *et al.*, 2010; Lopez *et al.*, 2006).

The potential threat of common bias was assessed with Harman's one-factor test via exploratory factor analysis. Common method bias is a serious problem when a single latent factor accounts for more than 50 per cent of the total variance of the measures (Podsakoff *et al.*, 2003). A total of 53 items was entered into the analysis. Eight factors with eigenvalue > 1 were extracted. None of the factors accounts for more than 50 per cent of the total variance. Hence, common bias is not a threat in this study.

CFA results of all constructs indicate a good model fit. All the observed variables of each construct have a factor loading of > 0.5 (ranging from 0.6 to 0.9) and there is a significant correlation with its latent variable ($p < 0.001$). The CMIN/df ratio of all the models is < 5 . All the GFI and CFI scores are > 0.9 except for the GFI of organizational memory (0.896), which is slightly < 0.9 . All the RMSEA scores are < 0.07 , the cut-off point suggested by Hair *et al.* (2006). Thus, all the first-order models are reliable and the fitness of the models is good.

Regarding the second-order model of OL, its constructs are presented in the four dimensions of knowledge acquisition, knowledge distribution, knowledge interpretation and organizational memory. The score of each dimension was created by using the factor score of observed variables in each dimension (using SPSS).

The factor loadings of the observed variables in each OL dimension ranged from 0.6 to 0.8. Then, AMOS 18 was used to conduct the CFA to test the construct validity and model fit of the second-order model. The results of the CFA present construct validity with a factor loading >0.07 and a significant correlation with OL ($p < 0.001$). The CMIN/df ratio is <5 . All the GFI and CFI scores are >0.9 and the RMSEA is <0.07 , the cut-off point suggested by Hair *et al.* (2006). Discriminant validity between constructs was also assessed regarding to Fornell and Larcker (1981) technique. In this study, shared variance between each constructs (the validity of individual performance measures, the comprehensiveness of the set of measures, the coherence of the PMS and its environment, employee satisfaction and work-related competencies) and OL was compared against the average variance extracted (AVE) of OL. The AVE of OL is greater than all shared variance. Discriminant validity of the OL is then confirmed. So, the second-order model of OL is valid and suggests a good fit.

7.3 Test of the hypotheses

To test the hypotheses, the PMS is represented in the three separated components, HC is represented in two separated indicators, and the second-order model of OL is used. In this model, five constructs (which are a valid individual performance measure, a comprehensive set of performance measures, a coherent PMS with its environment, employee satisfaction and work-related competencies) are created by using the factor score from SPSS. Even though this approach may artificially improve the model fit index, CFA of each construct was conducted to confirm validity before entering the scores into AMOS. Hence, the measurement model is then valid. A structural equation model (SEM) with the maximum likelihood technique is used to test the hypotheses. To confirm the model fit and demonstrate that the study results are not sensitive to issues of normality, Bollen-Stine bootstrapping (which does not assume multivariate normality) is used (Kline, 1998). Also, comparing parameters estimates from maximum likelihood technique and bootstrap technique is conducted to confirm the result (Nevitt and Hancock, 2001). The results of test show no indication of a non-normality problem.

The significant results of the model from SEM the maximum likelihood technique are shown in Figure 2.

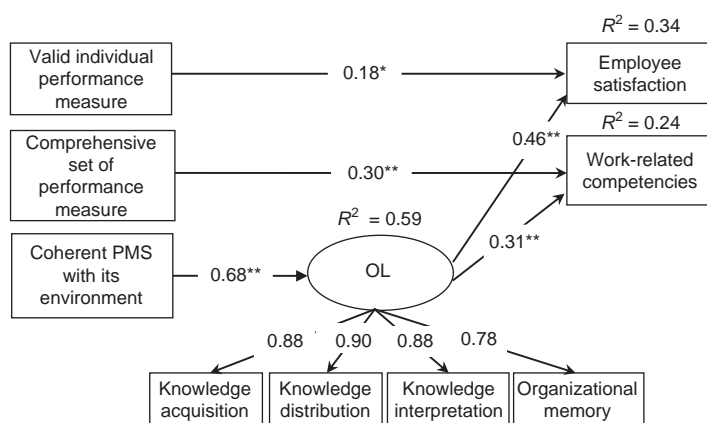


Figure 2. Depiction of the significant results showing standardized coefficients

Notes: *,** p -values significant at $p < 0.01$ and $p < 0.001$, respectively

The statistical results from SEM show a χ^2 of 56.784 (df = 36) and a probability level of 0.015, CMIN/df of 1.577, GFI of 0.967, CFI of 0.989 and RMSEA of 0.044. The indices suggest that the model has a very good fit with the data. The R^2 coefficients suggest that the model explains 59 per cent of the variance in OL, 34 per cent of the variance in employee satisfaction and 24 per cent of the variance in work-related competencies. Bollen-Stine bootstrap p -value (0.264) is > 0.05 . Parameters estimates from maximum likelihood technique and bootstrap technique is similar. Therefore, the robustness of the model is confirmed.

The results partially support *H1* which states that an effective PMS is positively related to firm HC building and *H2* which states that an effective PMS is positively related to OL. For *H1*, not all the PMS components have a significant positive relationship with work-related competencies and employee satisfaction. A valid individual performance measure has a significant positive relationship with employee satisfaction ($p < 0.01$) but is insignificantly related to work-related competencies. A comprehensive set of performance measures has a positive relationship with work-related competencies ($p < 0.001$), while its relationship with employee satisfaction is insignificant. On the other hand, a coherent PMS and its environment has no significant association with both work-related competencies and employee satisfaction. Regarding *H2*, only “coherent PMS with its environment” is positively associated with OL ($p < 0.001$). In contrast, the results clearly support *H3* (OL is positively related to firm HC building). OL has a positive relationship with HC, both work-related competencies and employee satisfaction ($p < 0.001$).

Furthermore, the result suggests that *H4*, which states that OL mediates the relationship between PMS and firm HC building, is partially supported. OL has a mediating effect on the association between the coherence of PMS with its environment and HC (both work-related competencies and employee satisfaction). The authors perform bootstrapping to identify the existence of an indirect effect of this PMS component on work-related competencies and on employee satisfaction with OL as a mediator. The results confirm the existence of both indirect effects. The standardized indirect effect of the PMS component on work-related competencies is 0.212 at the 95 per cent confidence interval (ranging from 0.103 to 0.339). The standardized indirect effect of the PMS on employee satisfaction is 0.313 at the 95 per cent confidence interval (ranging from 0.208 to 0.419). Therefore, the results reveal that OL is a mediator of the relationship between the PMS component and HC (both work-related competencies and employee satisfaction).

8. Discussion and conclusion

In the current study, it is asserted that besides the well-accepted functional benefits of PMS – control and performance improvement – PMS also helps enhance OL and in this way builds HC. An effective PMS is proposed in this study to be composed of valid individual performance measures, a comprehensive set of measures and coherence of the PMS with its environment. With the three components, a PMS can improve both OL and HC. Meanwhile, OL is hypothesized to be a mediator of the relationship between the PMS and the HC. Overall, our findings provide empirical results supporting the positive impact of PMS and OL on HC building.

First, the authors find that a valid individual performance measure has a significant positive relationship with employee satisfaction. A valid individual performance measure is assessed in terms of technical validity (accurate, accessible, reliable, timely

and understandable) and the sensitivity of the feedback provided. Our result is supported by claims in the organizational behaviour literature that reveal that feedback on employee past performance has a positive impact on job satisfaction (Eskildsen and Nussler, 2000; Robbins, 2003). This is likely because a valid measure provides reliable and understandable feedback which results in a positive employee perception or belief in the performance measurement. Employees' perception of fairness is an antecedent to work-related outcomes including job satisfaction (Johnson *et al.*, 2006). Hence, job satisfaction occurs when employees perceive that the results of past performance are valid.

Second, a comprehensive set of performance measures is positively associated with work-related competencies. A comprehensive set of performance measures provides a holistic view of firm performance. It provides the performance in different dimensions including performance outcomes and drivers. The key activities that have direct effects on the desired outcome can be identified and more attention will be obtained from management. Business operations need continuous improvement. In this way, managers or firms can identify the competencies in need of development or improvement to enhance the critical performance outcomes. At the same time, simple processes of the system to acquire, analyse and distribute the information facilitate and encourage managers to use the information or reports produced. The reports provide hard evidence to explain past performance. They present the skill level of individual employees and their performance can be tracked (Green, 1999). This can support the improvement of employees' work-related competencies.

Third, the coherence of the PMS with its environment is positively linked with OL. The result is consistent with the past studies which reveal that PMS has a positive relationship with learning (such as Fried, 2010; Kloot, 1997; Oliver, 2009). A coherent PMS enhances the learning environment by providing information that presents causal relationships. The information enables employees to detect problems and think about how to avoid undesirable outcomes. As a result, learning and changes occur. Synchronization of the system with the firm's culture and reward system encourages employees to use the system. As the PMS is a database that employees can use to acquire knowledge and to store knowledge for future use, it enables processes of knowledge acquisition and organizational memory. It is also used as a platform to share, analyse and distribute performance results from different units of firms. This enables the processes of information distribution and interpretation. The availability of supporting infrastructure facilitates OL processes.

Fourth, OL has a positive relationship with both HC indicators. With respect to the positive relationship between OL and job satisfaction, the results support the studies of Egan *et al.* (2004) and Rose *et al.* (2009). This is probably because employee satisfaction can be attributed to two factors: environmental antecedents (extrinsic) and personal factors (intrinsic) (Spector, 1997). Environmental antecedents are related to the work itself and the work environment. Personal factors are individual attributes and characteristics. Working conditions such as communication, task variety or responsibility are believed to have strong influences on job satisfaction (Chiva and Alegre, 2009). OL provides both extrinsic and intrinsic factors that lead to job satisfaction. The OL processes provide a working environment for employees to learn and respond to change. More communication among employees and management takes place. Employees have more opportunities to learn and improve themselves. They feel that they have more value added. Hence, more job satisfaction is experienced.

According to the positive association between OL and work-related competencies,

the result of our study supports the claim that competence is developed by learning (Drejer, 2000; Dunphy *et al.*, 1997), as OL encourages and facilitates employees to acquire new knowledge both internally and externally. The processes provide the opportunity for employees to share and learn from others in different forms such as teamwork, meetings and joining with external parties. These enable employees to obtain new information to improve their individual knowledge and skills.

Finally, the association of the coherent PMS and both HC indicators are fully mediated through OL. The results of this study provide the empirical evidence to uncover the mediating effect of OL on the relationship of PMS and HC. It suggests that firms with a coherent PMS tend to have effective OL, which in turn leads to the improvement of employee satisfaction and work-related competencies.

In sum, this study sheds light on another benefit of PMS besides monitoring and control. It presents how each PMS component has a significant impact on the improvement of HC (employee satisfaction and work-related competencies) and OL. It suggests that a valid individual performance measure has a direct positive impact on employee satisfaction. A comprehensive set of measures has a direct positive impact on work-related competencies. The coherence of PMS with its environment is directly associated with OL and indirectly associated with both HC indicators through OL. On the other hand, OL has a direct positive effect on both HC indicators and enables firms to gain more benefits from the PMS in improving their HC. The result suggests that each component of the PMS has a different effect on HC and OL. Thus, to build HC, firms should consider their PMS from a holistic viewpoint and design the system with each component, starting from the individual measure, a set of measures and the relationship of the PMS and its environment. Firms should emphasize the coherence of the PMS with its environment as this can improve both OL and HC.

Furthermore, firms should support the embedding of OL into the organization as the OL has a critical role in the relationship between the PMS and HC. They should encourage their employees to use information from the PMS for learning and to improve their performance. Valid and comprehensive information from the PMS provides knowledge for employees regarding the result of past activities, what and how each factor influences the performance and the tendency of the performance. Different aspects of firm performance help employees to understand the current status of the firm. When the management communicates the results, the information is distributed. Then, the embedded OL will expedite the information distribution throughout the firm and allow employees to analyse and interpret the information. Change and improvement will occur during OL processes. As a result, work-related competencies and job satisfaction are then enhanced.

9. Limitations and future research

This study is subject to some limitations that should be considered when drawing conclusions from the results. First, a new and original instrument was developed to measure the PMS construct based on a literature review and some items from the instruments used in past studies. Although the statistical results of the new instrument show satisfactory reliability and validity, future research should further refine and validate the instrument. Second, the authors use two indicators, employee satisfaction and work-related competencies, to represent HC. It is possible that using other indicators (such as employee commitment, attitude and innovativeness) may yield different results. Thus, it would be interesting to extend the research investigations to

other HC indicators. Last, as this study is cross-sectional research, cause-effect relationships may not be conveniently inferred.

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