

The moderating role of human capital management practices on employee capabilities

Nick Bontis and Alexander Serenko



Nick Bontis is Associate Professor at DeGroote School of Business, McMaster University, Hamilton, Canada. Alexander Serenko is Assistant Professor at the Faculty of Business Administration, Lakehead University, Thunder Bay, Canada.

Abstract

Purpose – The purpose of this paper is to suggest and empirically test a model that explains employee capabilities from the knowledge-based perspective. In this model, human capital management practices are employed as a moderator variable.

Design/methodology/approach – A valid research instrument was utilized to conduct a survey of 14,769 current employees of a major North American financial services institution. The model was tested by using the partial least squares (PLS) structural equation modeling technique. A thorough analysis of the role of moderator was carried out.

Findings – Findings provide support for the proposed model and show that employee capabilities depend on his or her training and development as well as job satisfaction levels. Job satisfaction in turn is affected by training and development, pay satisfaction, supervisor satisfaction, and job insecurity. These relationships are moderated by employee perceptions of human capital management practices. The model exhibits the highest predictive power when the employee perceptions of human capital management practices are also high.

Research limitations/implications – With respect to a moderator analysis, no interaction effects of human capital management policies and other constructs were discovered, and the moderator was referred to as a homologizer that modifies the strength of the relationships among constructs through an error term. It was discovered that PLS and moderated multiple regression (MMR) produced very similar structural relationships when a moderator was employed.

Practical implications – The findings may be utilized by knowledge management, organizational behavior, and human resources practitioners interested in the development of strong employee capabilities.

Originality/value – This paper represents one of the first documented attempts to utilize human capital management practices as a moderator in organizational models.

Keywords Human capital, Job satisfaction, Human resource management, Employee development

Paper type Research paper

Introduction

Employee motivation is a central issue in organizational research because it is a leading factor to business success. A strong body of academic literature presents various concepts, theories, and models that attempt to advance people's understanding of underlying motives of employee motivation (Kleinbeck *et al.*, 1990; Locke and Latham, 2002; Ambrose and Kulik, 1999). Employee motivation issues in the context of globalization have become critical to both scholars and practitioners because of radical changes occurring in the nature of workplace structures and job markets (Gresing-Pophal, 2002; Erez *et al.*, 2001).

The ultimate goal of this line of research is to develop a realistic nomological network that would provide an accurate description of factors that lead to the improvement in employee capabilities. Work motivation cannot be measured directly; it is an invisible, internal, and theoretical construct (Pinder, 1997). In order to observe it, researchers employ existing theories and models that capture certain aspects of work motivation. The extant literature presents a

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number of old, well-established motivational theories and several new ones (Ambrose and Kulik, 1999). The traditional theories are: Motives and Needs (Herzberg *et al.*, 1959; Maslow, 1970), Expectancy Theory (Vroom, 1964), Cognitive Evaluation Theory (Deci, 1975), Reinforcement Theory (Skinner, 1969), Equity and Justice Theory (Adams, 1963; Greenberg, 1995), Goal-setting Theory (Locke and Latham, 1990), and Work Design (Hackman and Oldham, 1980, 1975). The new research approaches are Creativity (Basadur *et al.*, 2000; Shalley, 1991), Groups (Cordery *et al.*, 1991), and Culture (Borg and Braun, 1996; Hofstede, 1980).

In addition to these research streams, the relatively new knowledge-based disciplines of knowledge management (KM) and intellectual capital (IC) have gathered strong recognition and representation in academia, business, and government (Bontis, 2002; Choo and Bontis, 2002). A recent meta-analysis of the KM/IC literature demonstrates that this research field is exploding, and that the total number of KM/IC publications is predicted to exceed 100,000 individual contributions by the year 2010 (Serenko and Bontis, 2004). The KM/IC field draws heavily from reference disciplines, for example, human resources, organizational behavior, management information systems and innovation (Bontis, 2001, 1999). By employing a KM/IC research lens, a novel perspective on previously established views is presented. This paper attempts to advance the KM/IC field by combining the exiting scientific principles found in the organizational behavior research with the KM/IC viewpoints. More specifically, it offers a model of employee capability development. The purpose of this model is to present a set of constructs and to outline a series of links that may potentially explain the human capital competitiveness of a firm. The model was tested and validated by the deployment of a company-wide survey that included 14,769 current employees of an organization. Most importantly, it was demonstrated that the inclusion of human capital management practices as a moderating variable improves the predictive power of the model.

Theoretical background

The employee satisfaction-employee performance dilemma

Industrial-organizational psychology literature presents a number of factors that motivate employees to perform well on their jobs. Among them, job satisfaction has been one of the most respected, yet controversial, research concepts (Judge *et al.*, 2001). Job satisfaction is an attitudinal variable that reflects an overall assessment of all aspects of one’s job (Spector, 1997). The investigation of workplace attitudes dates back to the 1930s when the Hawthorne studies were conducted (Roethlisberger and Dickson, 1956). Since then, various projects analyzing the relationship between job satisfaction and job performance have been undertaken, but little assimilation has occurred. For example, Brayfield and Crockett (1955) conducted a meta-analysis of nine studies and concluded that minimal or no relationship exists between job satisfaction and performance. Vroom (1964) estimated that not more than 2 percent in output variance is explained by a worker’s level of satisfaction. In contrast, Locke (1970) argued that job satisfaction and dissatisfaction are properly conceived of as outcomes of action, and Herzberg (1957) presented an optimistic view by suggesting that there is a moderate and consistent relationship between employee satisfaction and his or her interest in work, pay, achievement, and recognition. Bontis and Fitz-enz (2002) also argued that employee satisfaction is an important antecedent to various human capital and knowledge management outcomes.

In response to these viewpoints, Judge *et al.* (2001) re-examined the state of the literature relating to the link between job satisfaction and job performance by conducting a

meta-analysis of 312 data sets with a combined sample size of over 54,000. They offer two major conclusions. First, they believe there is a correlation between job satisfaction and job performance. Second, Judge *et al.* (2001) suggest that there exist a number of mediators and moderators that affect the job satisfaction-job performance relationship. With respect to mediators, these may be behavioral intentions, low performance as withdrawal, and positive mood. In terms of moderating variables, these may be personality or self-concept, autonomy, norms, moral obligation, cognitive accessibility, aggregation, and level of analysis.

Figure 1 outlines a part of the integrative model of the relationship between job satisfaction and job performance proposed by Judge *et al.* (2001).

The employment of moderators has been the most common approach to investigate the link between job satisfaction and job performance. For example, it has been demonstrated that the strength of the relationship above depends on the nature of a job (Brown and Peterson, 1993), organizational and time pressure (Bhagat, 1982), career stage (Cengiz, 2002; Stumpf and Rabinowitz, 1981), the affective-cognitive consistency of job attitudes (Schleicher *et al.*, 2004), job complexity (Ivancevich, 1979), organizational tenure (Norris and Niebuhr, 1984), and self-esteem (Inkson, 1978). A variety of other moderators has been utilized. However, there are at least two problems associated with the use of moderators in organizational behavior research. First, usually only one study tested each moderator that makes it difficult to conclude on the validity and generalizability of results. Second, most prior investigations have produced mixed and inconsistent results (Iaffaldano and Muchinsky, 1985). Based on a quantitative and qualitative meta-analysis of the existing literature, Judge *et al.* (2001, p. 390) call for further research “in terms of moderators of the satisfaction-performance relationship”.

What are moderator variables?

An overview of academic literature pertaining to the definitions, roles, and predictive abilities of moderators shows a high degree of variation. For example, some academics state that moderation occurs when the relationship between X and Y depends on the level of Z, whereas others believe that a variable may be considered a moderator only if it interacts with a predictor (for detail, see Carte and Russell, 2003, Table 1, p. 482). Despite this divergence of opinions, most researchers agree that the presence of a moderator modifies that nature and/or the strength of the link between two other constructs. Sharma *et al.* (1981) present a different perspective on the definition and classification of moderators. Particularly, they offer a typology of specification variables by describing three distinct categories of moderators. Figure 2 outlines this typology schema.

Figure 1 The integrative model of the relationship between job satisfaction and job performance

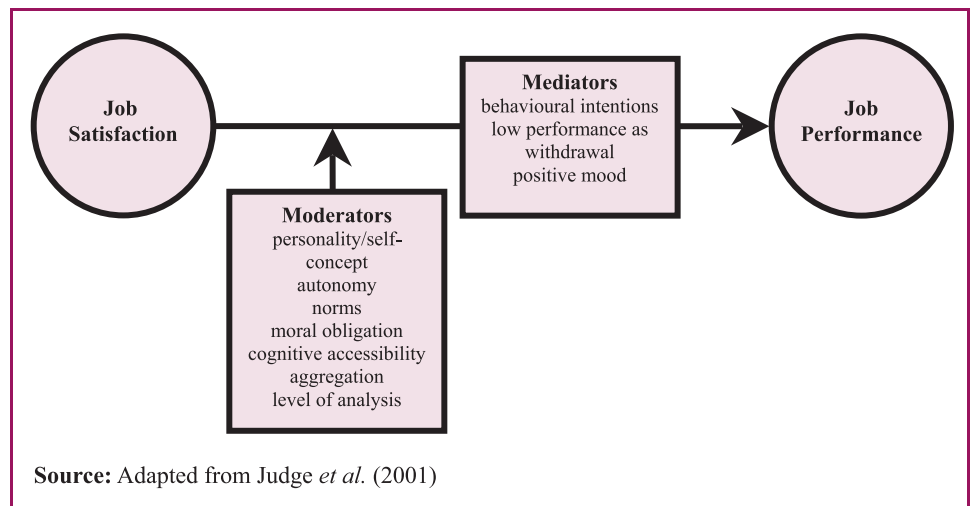


Figure 2 Typology of specification variables

	Related to Criterion and/or Predictor	Not Related to Criterion and Predictor
No Interaction with Predictor	Not a moderator	Homologizer moderator
Interaction with Predictor	Quasi moderator	Pure moderator

Source: Adapted from Sharma *et al.* (1981)

According to the schema, a variable that is not related to the criterion and/or predictor and does not interact with the predictor cannot be classified as a moderator. A variable that does not interact with the predictor, yet is conceptually distinct from both the criterion and predictor, is an homologizer variable (Zedeck, 1971). It affects the strength of the relationship through “partitioning the total sample into homogeneous subgroups with respect to the error variance” (Sharma *et al.*, 1981, p. 292). In other words, it reduces the error term and increases the amount of explained variance. If a variable that is not related to the criterion and predictor interacts with the predictor, it is referred to as a pure moderator. A variable that not only is a predictor itself, but also interacts with the predictor variable is considered a quasi moderator. Pure and quasi moderators modify the form of the relationship between the predictor and criterion. Based on these principles, Sharma *et al.* (1981) offer a framework for identifying moderator variables. Their approach has been often utilized in various studies that involved investigations of the roles of moderators (for example, see Hong and Kim, 2002).

The research framework

In the present study, a knowledge-based viewpoint is accepted as a starting point. It is hypothesized that, in addition to the moderators and mediators identified in the organizational behavior literature, a number of knowledge management and intellectual capital-specific variables may also potentially moderate the job satisfaction-job outcome relationship. As such, this investigation focuses on the role of moderator variables. Moderators were chosen over mediators because knowledge-based constructs both interact and are related to employee perceptions of job attitude and capabilities (see Figure 2). With respect to this study, employee perceptions of human capital management (HCM) practices is selected because it represents a collection of items that closely align with the antecedents of human capital from the IC literature (for a comprehensive review, see Bontis *et al.*, 2000, 1999; Bontis and Nikitopoulos, 2001).

In addition to job satisfaction, there are a variety of other constructs that reflect an employee’s attitudes and perceptions of organizational procedures, for example, rewards and recognition, training and development, supervisor satisfaction, and job insecurity. Each of them is discussed in detail in the following section. From a conceptual perspective, job performance is closely related to employee capabilities. Figure 3 outlines the proposed research framework which includes a direct link between employee perceptions and job attitudes to employee capabilities moderated by human capital practices.

The study’s model and hypotheses

Figure 4 outlines the model of employee capability suggested and tested in this study. This sub-section describes the suggested model and related hypotheses.

Job satisfaction may evoke various attitudes depending on the external environment that, in turn, form prospective behaviors on the job. For example, job satisfaction leads to a lower

Figure 3 The study's research framework

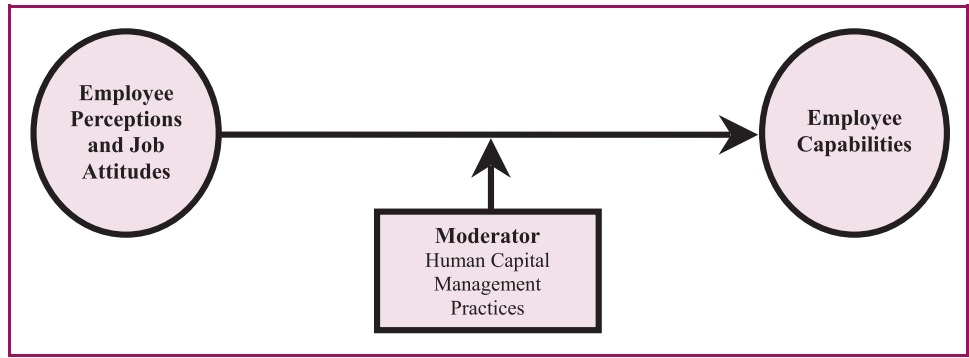
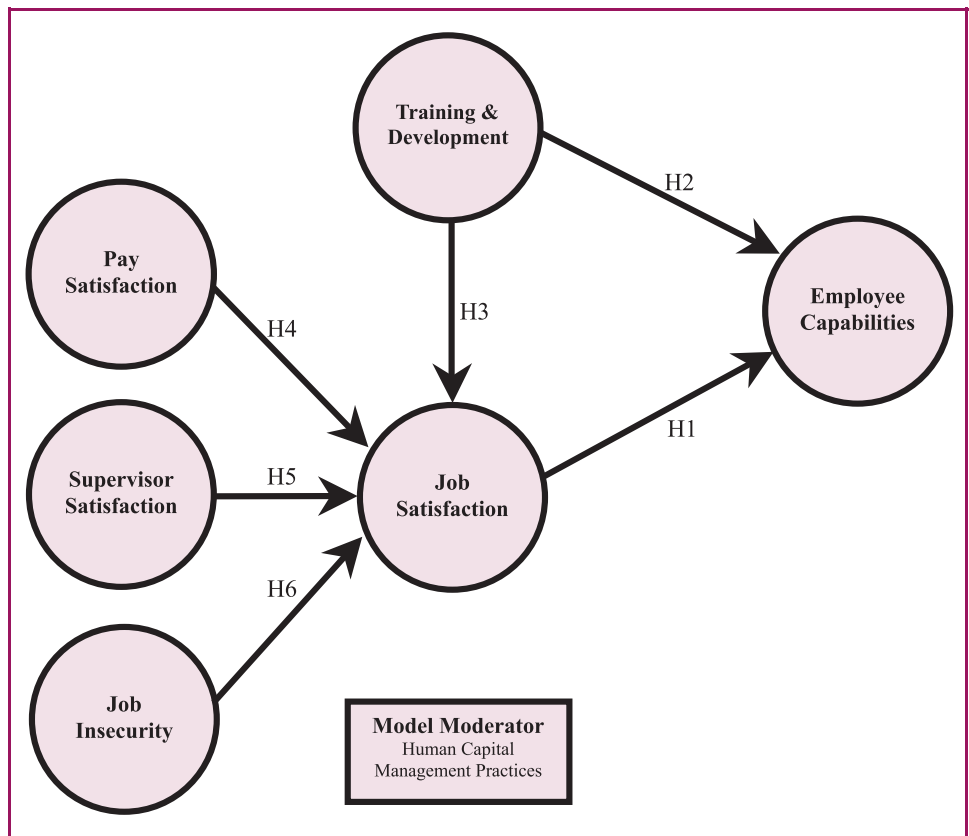


Figure 4 The study's model



propensity of job withdrawal, and job dissatisfaction increases turnover and absenteeism (Hulin, 1991; Shaffer and Harrison, 1998) influencing productivity. Job satisfaction may influence a variety of an employee's affective states, such as mood, that have an impact on a person's behaviour, for example, performance and organizational citizenship (Williams *et al.*, 2000; Williams and Wong, 1999). With respect to this study, employee capabilities (EC) are chosen as a dependent variable. Employee capabilities are one of the most important measures affecting organizational performance (Mayo, 2000). Successful organizations constantly enhance employee capabilities through a variety of special programs (McCowan *et al.*, 1999). Employee capabilities reflect an individual's perception of his or her own knowledge, skills, experience, network, abilities to achieve results, and room for potential

growth. It is believed that highly satisfied employees perceive themselves to be more competitive than their less satisfied counterparts:

H1. Job satisfaction has a positive direct effect on employee capabilities.

Employee training and development (T&D) programs are included in the policies of many organizations around the globe (Goldstein, 1989). The first structured programs for employee educations appeared at the end of the nineteenth century (Grensing-Pophal, 2002). Currently, rapid technological changes and high competition for available jobs have increased demand for T&D. Effective T&D initiatives offer benefits for both organizations and employees. Organizations gain because employees increase their performance, organizational commitment, promotability and become more open to new ideas (Birdi *et al.*, 1997). Employees value training because it improves their chances for reemployment, particularly during an economic recession (Millman and Latham, 2001). In present turbulent time, job security is almost impossible to guarantee. Most employees want to continue being marketable even when they are satisfied with their jobs. Individuals seek self-development, and they are more attached to their professional fields rather than to a particular employer (Bagshaw, 1996). People may consider T&D an investment in the relationship between an organization and employees (Farrell and Rusbult, 1981). Effective, appropriate, and successful training experience serves as an indication that an organization is voluntarily willing to invest in its human capital that both builds employee capabilities and increases their degree of job satisfaction:

H2. T&D has a positive direct effect on employee capabilities.

H3. T&D has a positive direct effect on job satisfaction.

For several decades, employee perception of pay satisfaction (PS) and fairness has traditionally been considered one of the key factors influencing the degree of job satisfaction (Judge and Welbourne, 1994; Lawler, 1981; Heneman and Schwab, 1985; Lawler and Hackman, 1969; Wolf, 1970; Porter, 1962). The level of PS is affected by pay intervention and change programs designed by an organization. PS is important because it represents a significant organizational expense, and it may potentially lead to desirable performance outcomes (Shaw *et al.*, 1999). Pay serves a variety of functions for employees. The prior research shows that people's reactions and attitudes towards a job and a place of work are partially formed by their perceptions of pay satisfaction, which, in turn are related to the actual pay level (i.e., absolute pay) (Motowidlo, 1982). Generally, it makes sense to presume that higher pay should lead to higher pay satisfaction. This intuitive assumption is usually supported by empirical research. Based on the discussion above, PS is included in the study's model:

H4. PS has a positive direct effect on job satisfaction.

The nature and quality of subordinate-supervisor interactions play an important role in influencing various employee perceptions of the workplace (Schaubroeck and Fink, 1998; Jaworski and Kohli, 1991; Brown and Peterson, 1993). Consideration, feedback, acceptance of ideas, concern for a person's needs, support, communication, and contingent approving behavior form the subordinate-supervisor relationship. Good treatment by a superior is usually appreciated by employees. Several investigations report on the importance of high-quality subordinate-manager relationships. For example, trust in management and supervisor feedback is strongly, positively correlated with

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organizational commitment (Folger and Konovsky, 1989), and it is negatively correlated with withdrawal conditions (Schaubroeck and Fink, 1998). Role conflict has a strong negative effect on both job satisfaction and organizational commitment (Brown and Peterson, 1993). According to Konovsky and Cropanzano (1991) supervisor satisfaction (SS) is positively correlated with job satisfaction. Therefore, it is suggested that:

H5. SS has a positive direct effect on job satisfaction.

Various factors, such as the emergence of new technologies, skills obsolescence, industry deregulation, increased competition on the job market, decreasing union representation, corporate merges and downsizing, have dramatically transformed the nature of contemporary jobs into insecure ones (Roskies *et al.*, 1993; Sanderson and Schein, 1986). Most employees realize that they may potentially lose their current job in future. The degree of an employee's job insecurity (JI) depends on two factors. The first is perceived severity of threat. It reflects the subjective assessment of circumstances that may lead to job loss and their probability of occurrence. The second is perceived powerlessness to counteract the threat of job loss. It refers to lack of protection, unclear performance expectations, authoritarian environment, and inadequate dismissal procedures (Greenhalgh and Rosenblatt, 1984). This radical change in the nature of job security has caused a fundamental transformation in people's perceptions of the workplace. The prior research advocates that perceptions of JI results in resistance to change, propensity to leave, and decreased efforts (Fox and Staw, 1979; Beynon, 1975; Greenhalgh, 1982). Perceptions of JI also influence the extent of job satisfaction. For example, Burke (1998) reports that JI has a negative correlation of -0.17 with job satisfaction. Therefore, it is hypothesized that:

H6. JI has a negative direct effect on job satisfaction.

Recall the incorporation of various moderator variables into the existing organizational behavior models has produced mixed and controversial results. Despite myriad of those moderators, to the best of the authors' knowledge, no study has employed knowledge-based moderator variables. To bridge that void, a moderator reflecting the HCM practices of an organization is included in the suggested model. Human capital is a key component of the IC of most contemporary organizations (Nonaka and Takeuchi, 1995). Companies that possess inimitable human capital possess sustainable competitive advantage in the long run. Also, it is the major source of organizational success and economic prosperity of nations (Ulrich, 1998; Bontis, 2004). Human capital is a source of innovation and strategic renewal. It should be noted that there is no literature to support this attempt, and the employment of HCM as a moderator variable is exploratory in nature. The following hypothesis is proposed:

H7. The relationships among the constructs within the suggested nomological network are moderated by employee perceptions of HCM practices.

To estimate all relationships, the following set of related hypotheses is presented:

H7a. The direct effect of job satisfaction on employee capabilities is moderated by HCM practices, such that the effect is stronger for those individuals who perceive HCM to be more effective.

H7b. The direct effect of T&D on employee capabilities is moderated by HCM practices, such that the effect is stronger for those individuals who perceive HCM to be more effective.

- H7c. The direct effect of T&D on employee satisfaction is moderated by HCM practices, such that the effect is stronger for those individuals who perceive HCM to be more effective.
- H7d. The direct effect of PS on employee satisfaction is moderated by HCM practices, such that the effect is stronger for those individuals who perceive HCM to be more effective.
- H7e. The direct effect of SS on employee satisfaction is moderated by HCM practices, such that the effect is stronger for those individuals who perceive HCM to be more effective.
- H7f. The direct effect of job loss on employee satisfaction is moderated by HCM practices, such that the effect is stronger for those individuals who perceive HCM to be more effective.

Methodology

In order to empirically validate the proposed model and to test a moderating role of human capital management practices, a survey of the current employees of a major North American financial services institution was conducted (further referred to as “ABC Institution”). The research instrument was developed by International Survey Research LLC (ISR) under the supervision of ABC Institution. ISR is the world’s leading research organization specializing in the development and implementation of customized employee surveys for various organizations, multinational companies, and government offices. ISR has over 30 years of experience, and has surveyed more than 35 million employees from 2,100 companies in 106 countries (see www.ISRsurveys.com).

The survey consisted of two parts. The first part asked questions about the length of employment and job responsibilities. The second part presented questions pertaining to the suggested model. A number of other questions were also presented that are not reported in the present study. No personal questions that might potentially identify respondents were posted. The order of questions was randomized that reduced common method bias associated with the administration of unsupervised surveys soliciting self-reported measures (Podsakoff *et al.*, 2003; Podsakoff and Organ, 1986; Woszczyński and Whitman, 2004). Note that this research instrument is the intellectual property of ISR, and as such it may not be presented in this paper as per a non-disclosure agreement with ABC Institution. All employees of ABC Institution were approached with the request to fill out an online version of this survey. Their participation was optional and confidential. There were no rewards or other benefits for the completion of this questionnaire.

Results

Descriptive statistics

The actual response rate to the survey ranged from 20 percent to 40 percent, which is considered acceptable in this type of research (Frohlich, 2002). Note that the actual response rate may not be reported since it may potentially lead to the identification of ABC Institution. Overall, 14,769 usable responses were obtained. Although no gender information was collected, it was assumed that 50 percent of all respondents were female given that female employees constitute one-half of the entire workforce of ABC Institution. Figures 5 and 6 present the data pertaining to employment and current job tenure.

Measurement model

The partial least squares (PLS) method was employed to estimate the measurement model. PLS is a common structural equation modeling data analysis technique that is commonly used in business research including various knowledge-based studies in the fields of KM and IC (Seleim *et al.*, 2004; Bart and Bontis, 2003; Bontis *et al.*, 2002; Bontis and Fitz-enz, 2002; O’Regan *et al.*, 2001; Bart *et al.*, 2001; Bontis, 1998). PLS was chosen over covariance-based techniques (e.g., LISREL) because it places fewer restrictions on data

Figure 5 Total length of service with ABC Institution

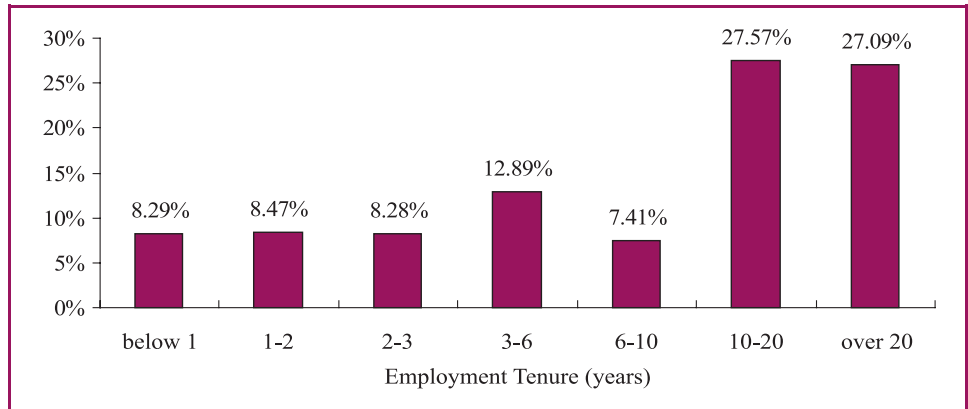
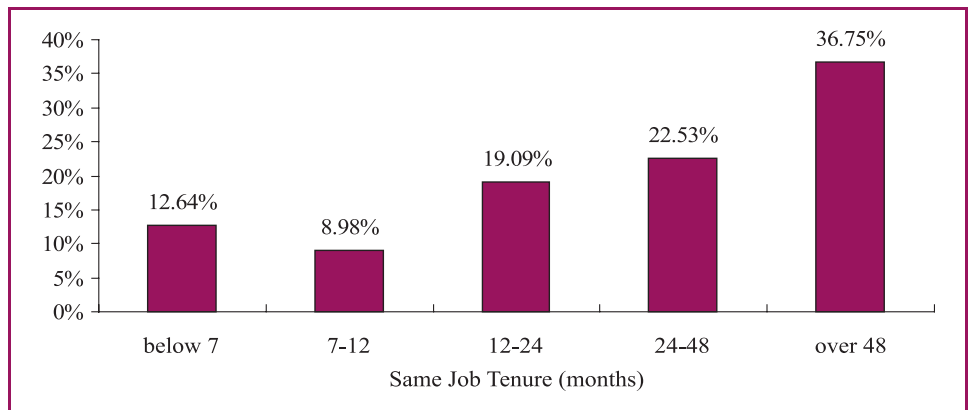


Figure 6 Length of having same job responsibilities



distribution and normality (Gefen *et al.*, 2000; Chin, 1998). PLS also has a number of advantages over LISREL in terms of the estimation of interaction effects (Chin *et al.*, 2003).

Table I summarizes item statistics and loadings. It shows that the loadings of all items exceeded the required threshold of 0.7, and therefore explains at least 50 percent of the variance in a construct (Nunnally, 1978). All residual variance values were relatively low, and all item-to-total correlations were above the cut-off point of 0.35. Therefore, no measurement items were dropped.

A matrix of loadings and cross-loadings was constructed to test discriminant validity (see Table II). In order to establish the discriminant validity of measures, the loadings of a certain item with its associated construct (i.e., factor or latent variable) were compared to its cross-loadings. All items demonstrated higher loadings on their associated factors in comparison to their cross-loadings. Therefore, it was suggested that the discriminant validity of survey items was established.

Table III outlines item means, reliability, internal consistency, and convergent validity of the research instrument. All constructs demonstrated high reliability since Cronbach's alpha of the scales were above 0.7 (Cronbach, 1951). Fornell and Larcker's (1981) measures of internal consistency and convergent validity of a construct were greater than 0.7 and 0.5 threshold respectively. In addition, the measure of convergent validity was estimated by reviewing the *t*-tests for the item loadings (Anderson and Gerbing, 1988; Hatcher, 1994). The inspection revealed that all *t*-values were significant at 0.000 level. This shows that all indicators effectively measured the construct they belonged to.

Table I Item statistics and loadings

<i>Item</i>	<i>Mean</i>	<i>Std dev.</i>	<i>Loading</i>	<i>Error</i>	<i>Item-total correlations</i>
PS1	4.17	1.16	0.841	0.293	0.656
PS2	4.27	1.08	0.777	0.396	0.571
PS3	3.49	1.44	0.734	0.461	0.550
PS4	3.73	1.24	0.751	0.436	0.576
T&D1	4.54	0.87	0.763	0.417	0.568
T&D2	4.31	1.12	0.875	0.234	0.803
T&D3	4.33	1.08	0.901	0.188	0.843
T&D4	4.24	1.76	0.906	0.178	0.844
SS1	4.65	0.80	0.799	0.362	0.739
SS2	4.59	0.92	0.762	0.420	0.701
SS3	4.65	0.82	0.814	0.337	0.754
SS4	4.55	0.96	0.835	0.303	0.790
SS5	4.57	0.92	0.869	0.245	0.831
SS6	4.55	0.93	0.786	0.383	0.730
SS7	4.64	0.82	0.877	0.230	0.840
SS8	4.63	0.81	0.889	0.210	0.855
SS9	4.42	0.95	0.754	0.432	0.691
JI1	1.95	1.29	1.000	0.000	–
JS1	4.60	0.78	0.754	0.430	0.604
JS2	4.57	0.79	0.826	0.317	0.672
JS3	4.57	0.85	0.875	0.234	0.761
JS4	4.36	0.77	0.869	0.245	0.750
EC1	4.67	0.69	0.785	0.384	0.524
EC2	4.55	0.83	0.802	0.357	0.547
EC3	4.68	0.63	0.814	0.337	0.559

Table II Item loadings and cross-loadings

	<i>PS</i>	<i>T&D</i>	<i>SS</i>	<i>JI</i>	<i>JS</i>	<i>EC</i>
PS1	0.841	0.536	0.486	–0.198	0.610	0.422
PS2	0.777	0.509	0.513	–0.179	0.534	0.407
PS3	0.734	0.382	0.331	–0.149	0.473	0.305
PS4	0.751	0.399	0.368	–0.173	0.470	0.331
T&D1	0.550	0.763	0.543	–0.215	0.642	0.461
T&D2	0.471	0.875	0.472	–0.164	0.468	0.457
T&D3	0.493	0.901	0.517	–0.170	0.496	0.499
T&D4	0.526	0.906	0.523	–0.192	0.529	0.485
SS1	0.486	0.486	0.799	–0.194	0.523	0.424
SS2	0.429	0.466	0.762	–0.145	0.438	0.394
SS3	0.470	0.588	0.814	–0.170	0.523	0.429
SS4	0.427	0.474	0.835	–0.154	0.456	0.390
SS5	0.457	0.482	0.869	–0.192	0.501	0.373
SS6	0.419	0.444	0.786	–0.147	0.445	0.370
SS7	0.468	0.499	0.877	–0.188	0.507	0.374
SS8	0.475	0.512	0.889	–0.174	0.512	0.411
SS9	0.441	0.459	0.754	–0.177	0.467	0.377
JI1	–0.242	–0.233	–0.226	1.000	–0.276	–0.207
JS1	0.438	0.462	0.421	–0.153	0.754	0.429
JS2	0.577	0.535	0.530	–0.242	0.826	0.472
JS3	0.583	0.536	0.522	–0.221	0.875	0.456
JS4	0.629	0.521	0.482	–0.237	0.869	0.430
EC1	0.373	0.403	0.379	–0.164	0.464	0.785
EC2	0.393	0.455	0.379	–0.157	0.422	0.802
EC3	0.389	0.480	0.405	–0.161	0.428	0.814

Table IV offers the correlation matrix and discriminant validity assessment. Fornell and Larcker's (1981) measure of discriminant validity was calculated as the square root of the average variance extracted and compared to the construct correlations. All values were greater than those in corresponding rows and columns. Based on the above assessment, it

Table III Construct statistics and convergent validity

	PS	T&D	SS	JS	CCM
Arithmetic mean	3.92	4.36	4.58	4.53	4.63
Cronbach's alpha	0.78	0.89	0.93	0.85	0.72
Internal consistency	0.859	0.921	0.949	0.900	0.842
Convergent validity	0.603	0.746	0.675	0.693	0.641

Table IV Correlation matrix and discriminant validity assessment

	PS	T&D	SS	JS	CCM
PS	0.777				
T&D	0.595	0.863			
SS	0.554	0.602	0.822		
JS	0.673	0.625	0.593	0.833	
CCM	0.480	0.555	0.486	0.547	0.800

was concluded that all scales behaved very reliably, demonstrated high convergent and discriminant validity, and exhibited adequate psychometric properties.

Structural model

Bootstrapping was done to derive *t*-statistics to assess the significance level of the model's coefficients and to test the hypotheses. a total of 100 samples of 14,769 cases each were generated that is the default option of PLS Graph 03.00 (Chin, 2001). Figure 7 presents the structural model and outlines the results of hypothesis testing. As such, *H1* through *H6* were supported at the significance level of below 0.0001.

In order to investigate the predictive power of the predictors, a series of effect size tests were conducted as recommended by Chin (1998). For this, one link to a dependent construct was removed at a time, the model was re-estimated, and *R*-squares were recorded. Two tests were conducted. Tables V and VI present the *R*-squared values and the effect sizes for the employee capabilities and job satisfaction constructs.

As recommended by Cohen (1988), the effect size values of 0.02, 0.15, and 0.35 may be viewed as an estimate whether a predictor has a small, medium, or large effect at the structural level. No construct demonstrated a large effect size, job satisfaction and T&D had a small-medium effect size, and only pay satisfaction exhibited a medium effect size. The contribution of all other constructs to the predictive power of the model was relatively low.

Moderator variable

Recall *H6* pertains to the relationships among the constructs within the suggested nomological network when they are moderated by employee perceptions of HCM practices. As suggested by Sharma *et al.* (1981), the first step to identify moderator variables is to establish whether a significant interaction between the proposed moderator (i.e., HCM) and other variables (i.e., JS, T&D, PS, SS, and JI) exist. As recommended by Chin and colleagues (Chin *et al.*, 2003) a product-indicator approach was employed. This is a novel SEM method that allows testing for interactions effects of large complex models without making assumptions of multivariate normality.

Testing interactions in PLS is a new approach. Therefore, to ensure the validity of the test, two methods that should theoretically produce comparable results were employed. In the first test, indicator scores were standardized that is a required technique. For this, from each indicator score the corresponding mean was subtracted and the result was divided by the standard deviation. Product indicators were constructed through explicit multiplication. For example, for T&D × HCM interaction construct, every T&D indicator was multiplied by every HCM indicator (i.e., the T&D × HCM interaction construct consisted of the following

Figure 7 The structural model – hypotheses testing

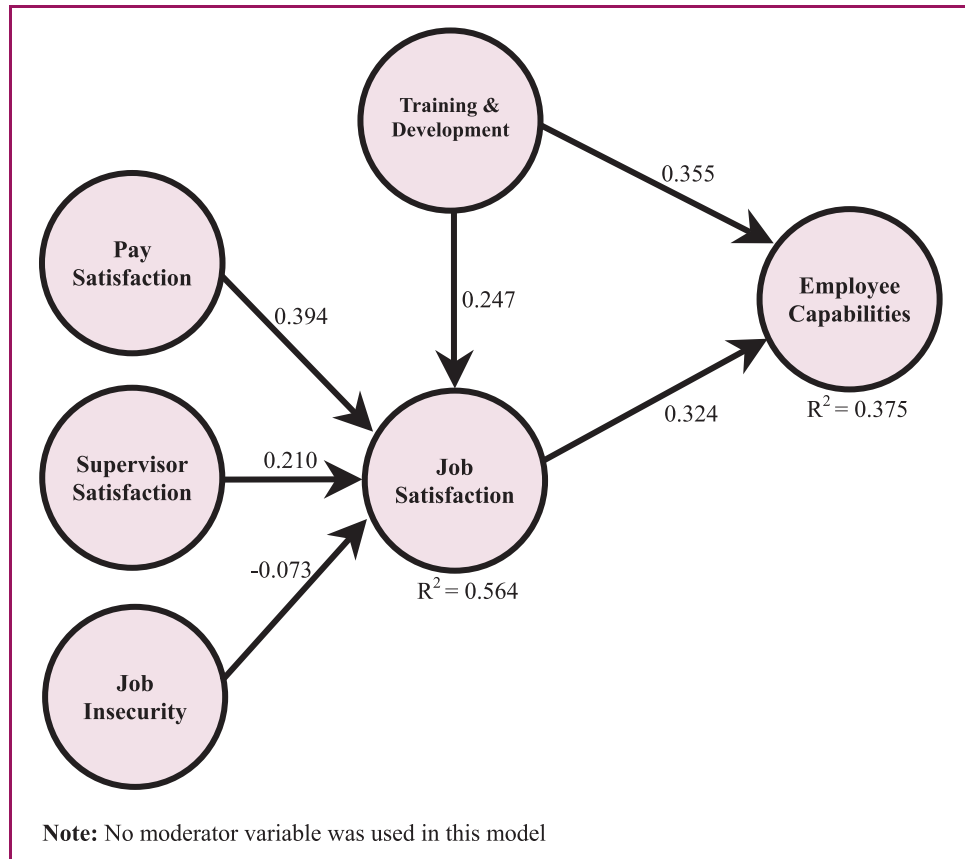


Table V The effect size – employee capabilities

$R^2_{\text{included}} = 0.375$	<i>JS</i>	<i>T&D</i>
R^2_{excluded}	0.312	0.299
f^2	0.050	0.059
Effect size	Small-medium	Small-medium

Table VI The effect size – job satisfaction

$R^2_{\text{included}} = 0.566$	<i>T&D</i>	<i>PS</i>	<i>SS</i>	<i>JI</i>
R^2_{excluded}	0.532	0.474	0.539	0.559
f^2	0.055	0.141	0.044	0.012
Effect size	Small-medium	Medium	Small-medium	Very small

indicators: T&D1 × HCM1, T&D1 × HCM2, T&D1 × HCM3, T&D1 × HCM4, T&D2 × HCM1, . . . , T&D4 × HCM4). All interaction constructs were tested twice:

1. within the suggested nomological network; and
2. individually.

For example, for an individual test of JS × HCM interaction, only four constructs were added to the model (i.e., JS, JS × HCM, HCM, and EC).

In the second test, the HCM construct was added to the PLS model with no path dependency. The non-moderated model was estimated, and latent variable scores stored in the spreadsheet[1]. No standardization or centering was done since the factor scores were already standardized. Interaction constructs were formed by multiplying latent variable scores of each construct by HCM scores to create a single-item interaction. After that, all interactions were tested within the proposed nomological network, and effect sizes were calculated. Table VII offers the beta coefficients of all interaction effects.

Based on the results, two observations are noted. First, although there were some minor discrepancies in the standardized path coefficients and significance levels, the overall findings of four independent experiments were relatively consistent. Second, all effect size values of the interaction effect constructs were very low. This provides some degree of assurance that the interaction effects between HCM and JS, T&D, PS, SS, and JL do not exist. With respect to the psychometric properties of interaction constructs, all item loadings exceeded the required threshold of 0.49 (Chin *et al.*, 2003) with the lowest value of 0.6.

To test for differences in the strength of relationships in terms of the structural model, the total sample was split into three groups based on the factor score of HCM. Group S1 represents sample with low (bottom quartile), S2 with medium (quartiles 2 and 3) and S3 with high (top quartile) HCM factor scores. This approach is common in PLS moderation analysis (for example, see Igbaria *et al.*, 1994).

In their recent paper that lists nine most mistakes in the use of moderator variables, Carte and Russell (2003) warn that a PLS-specific problem may potentially occur when researchers compare different models estimated from each sub-sample. Since PLS produces new weights and factor loadings to maximize the variance of each latent variable and related relationships, different item loadings may be generated for the same item depending on the sub-model. If item loadings are significantly different, path coefficients may vary among sub-samples because of differences in the measurement models rather than because of differences on the structural levels. In this case, the interpretation of PLS results may not accurately reflect the actual moderation effect.

To address the concern above, two moderation tests were conducted: one by using PLS, and one by using moderated multiple regression (MMR). Table VIII offers the results. As such, all relationships were significant at the 0.000 level.

To compare the same path coefficient among sub-samples to answer *H7a* through *H7f* the Chow test (Chow, 1960) was conducted. This test is often referred to as a test for structural change (Davidson and MacKinnon, 1993) because allows determining whether the coefficients of a regression model are identical in two similar sub-samples. In other words, by the employment of the Chow test researchers may test whether two sets of observations can be referred to as belonging to the same regression model. Based on the results, all changes in the strengths of relationships were significant at the 0.000 level with the lowest *F*-value of 91.44. Therefore, given the statistically significant differences in the strengths of relationships among the select constructs of the sub-samples, it is concluded that human

Table VII PLS interaction effects

	JS × HCM – EC	T&D × HCM – EC	T&D × HCM – JS	PS × HCM – JS	SS × HCM – JS	JL × HCM – JS
<i>Interactions were tested within the nomological network</i>						
Beta – test 1	0.004	0.007	0.060	0.082	–0.038	–0.012
<i>t</i> -value test 2	1.636	2.456	0.020	0.280	0.189	0.131
Beta – test 2	–0.027	0.073	–0.006	0.081	–0.014	0.031
<i>t</i> -value test 2	1.480	2.045	0.027	0.518	0.420	0.227
<i>Interactions were tested individually</i>						
Beta – test 1	0.015	0.001	0.079	0.108	0.019	–0.005
<i>t</i> -value test 2	1.992	0.531	10.339	16.312	1.937	4.589
Beta – test 2	0.016	0.045	–0.078	0.008	–0.198	0.012
<i>t</i> -value test 2	0.946	1.598	0.954	0.109	2.173	0.474

Table VIII PLS and MMR moderation effects

Link	Hypothesis						R ² EC	R ² ES
	H7a JS-EC	H7b T&D-EC	H7c T&D-JS	H7d PS-JS	H7e SS-JS	H7f JL-JS		
<i>PLS</i>								
HCM – low	0.156	0.233	0.143	0.286	0.154	-0.119	0.098	0.208
HCM – medium	0.248	0.248	0.194	0.331	0.188	-0.093	0.216	0.329
HCM – high	0.287	0.324	0.251	0.349	0.202	-0.075	0.284	0.438
<i>MMR</i>								
HCM – low	0.162	0.239	0.149	0.285	0.170	-0.112	0.103	0.212
HCM – medium	0.253	0.304	0.185	0.333	0.188	-0.092	0.215	0.315
HCM – high	0.294	0.326	0.229	0.337	0.229	-0.076	0.288	0.425

capital management practices serve as a homologizer moderator (Sharma *et al.*, 1981) that supports *H7*. With respect to a set of related sub-hypotheses, support was found for *H7a* through *H7e*. Regarding *H7f*, an opposite dependency between path coefficients across sub-groups and HCM was found, so that high level of HCM practices weakens the negative relationship between job loss and job satisfaction.

Discussion, conclusion, and directions for future research

Recall the purpose of this study was to hypothesize and empirically test a model that explains employee capability and includes HCM practices as a key moderator variable. The model was based on the convergence of organizational behavior and knowledge-based (i.e., KM and IC) disciplines. Based on the results of a survey of 14,769 current employees of a major financial institution in North America, the model was supported and the importance of HCM moderator was demonstrated.

With respect to the model, it is demonstrated that it explains 37.5 percent and 56.4 percent in employee capabilities and job satisfaction levels. Both job satisfaction and T&D have a strong effect on employee capabilities. The degree of job satisfaction is determined by four factors: pay satisfaction ($\beta = 0.394$), training & development ($\beta = 0.247$), supervisor satisfaction ($\beta = 0.210$), and the probability of job loss ($\beta = -0.073$). As such, pay satisfaction is the most essential determinant of an employee's job satisfaction. *H1* through *H6* were supported.

In terms of a moderator analysis, no interaction effects of HCM policies and other constructs were discovered. There were also two previous attempts to test the effect of KM/IC interaction variables. Cabrita (in Serenko, 2005) found no substantial interaction effects among three interaction constructs: human capital \times relational capital, human capital \times structural capital, and structural capital \times relational capital and business performance. Kankanhalli *et al.* (2005) included eight KM/IC-related interactions into a model of electronic knowledge repositories usage but only two of them were significant. This suggests that KM/IC variables may potentially play a role of homologizer moderators that modify the strength of the relationships among constructs through an error term. Sharma *et al.* (1981) suggest two reasons why the strength of relationship may vary. First, the measurement error may occur because the survey instrument, such as Likert-type scales, may not be suitable for every sub-group of the entire population. In this case, an instrument should be adjusted to fit all sub-samples that exhibit different levels of moderator variable. Second, different sub-groups may exhibit lack of correlation in terms of predictor variables that is believed to hold true with respect to the present study. As such, in the sub-sample with high HCM, a stronger relationship is observed because of strong actual relationships between dependent and independent constructs. At the same time, in case of low HCM, other factors that affect independent constructs emerge that decreases both the strength of the relationship and the predictive power of the model.

This study has several important methodological, theoretical, and practical contributions. With regards to the methodological findings, it was demonstrated that the interaction

constructs created through the explicit multiplication of all standardized indicators produce results very similar to those developed through the multiplication or non-standardized latent variable scores produced by PLS. This is an important finding since very complex models with interaction effects may employ over 200 indicators that is not currently supported by PLS Graph 03.00. In this case, researchers may employ the approach described in Test 2, that will hopefully produce valid results.

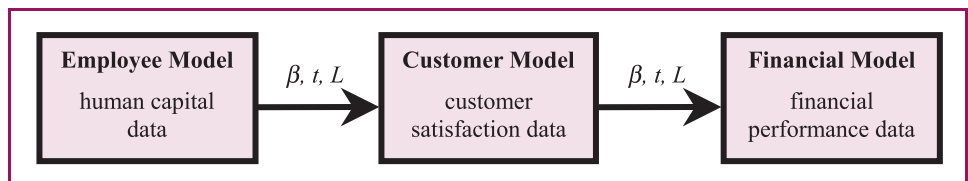
Testing the interaction effects within a proposed nomological network and in isolation produce relatively similar standardized path coefficients and different significance levels so that isolated interactions tend to generate higher *t*-values. In this study, this discrepancy did not have an effect on the findings; however, future researchers should be aware of this when employing PLS. Also, the application of the PLS moderation approach and the moderated multiple regression procedure produced very similar results. At the same time, the authors caution that the results of this finding do not disprove the potential existence of gamma differences PLS errors (Carte and Russell, 2003) that future researchers may encounter.

In terms of practice, it should be noted that KM strategies involving the development of intellectual capital must take into consideration the role that both antecedents and moderators play in the development of human capital. Too often, executives focus on the development of employee capabilities by examining traditional issues such as satisfaction, compensation and training without much emphasis on scrutinizing their HR practices that must also support these drivers. In some cases, an emphasis on human capital development is totally missing from the management analysis of annual reports (Bontis, 2003). This study highlights the importance once again of how KM practice must consider the critical role that HR policy plays in the development of employee capability.

With respect to future research, a longitudinal study may be conducted. An “ideal” longitudinal study is a long-term project in which the same individuals, organizations, financial coefficients, etc. are measured on the same variables. To achieve this, the survey instrument utilized in the present investigation should be administered to employees of ABC institution on a yearly basis. Mathematical and statistical models may be applied to understand patterns and trends in collected data. These methods may be borrowed from reference disciplines such as physical, biological, and social sciences (Collins and Horn, 1991; Singer and Willett, 2003). Several approaches may be utilized. One way would be to analyze longitudinal data by the employment of latent growth models (LGM) (McArdle, 1998). LGM may be used to show trends in around groups and individual differences in growth functions. Second avenue would be to utilize configural models for longitudinal categorical data (Wood, 1998). Configural frequency analysis looks at patterns of response across categorical variables over time. The last, but not least, approach would be to combine the study’s model with two other modes: a customer satisfaction model and financial model based on the data of ABC Institution. Figure 8 outlines the nomological network of the proposed investigation.

Based on this network, it can be presumed that employee capabilities, which are positioned as the endogenous construct of the study’s model, may have a strong positive relationship with one of more customer satisfaction constructs. Customer satisfaction constructs may, in turn, positively influence financial performance of ABC Institution. Assuming that longitudinal data for these three models are available, it may be possible to identify three key coefficients:

Figure 8 The nomological network for future longitudinal investigations



“Too often, executives focus on the development of employee capabilities by examining traditional issues such as satisfaction, compensation and training without much emphasis on scrutinizing their HR practices that must also support these drivers.”

1. beta, which represents the strength of the relationship;
2. *t*-value, which shows statistical significance of this relationship; and
3. optimal time lapse (L) between the increase in an exogenous construct and the highest increase in an endogenous construct.

The structural statistical modeling techniques and contemporary software packages such as PLS and LISREL may be applied to test these models.

The major limitation of this study is that the findings may be generalized to the North American financial sector only. Researchers who will attempt to replicate this investigation in other parts of the world may obtain different results. This may be due to diverse business practices, cultural issues, and values in other regions. In addition, human management practices may dramatically differ among North American companies and those operating in the former centrally planned economies, such as Russia or China, as well as businesses in the Muslim countries. The strengths of relationships among the model's constructs may also depend on the current economic conditions. For example, during high unemployment periods, some people may be highly satisfied with their jobs regardless of their level of satisfaction with a supervisor. At the same time, when many alternative or even better jobs are available, the threat of a job loss may not have a noticeable impact on an employee's level of job satisfaction.

The fields of KM and IC are relatively young. This investigation demonstrates that the application of scientific principles from reference disciplines may potentially improve the state of the field and foster the discovery of new phenomena. The authors hope that the present investigation will inspire academics to initiate similar studies aimed to develop new theories and to test existing ones. However, despite the relative success of the present project, the authors caution that the nature of the knowledge-based constructs and the role they play in moderating the effects of other variables are not completely understood. More research is needed to further explore these phenomena.

Note

1. This procedure is appropriate according to a personal communication with Dr Wynne W. Chin.

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About the authors

Nick Bontis is Associate Professor of Strategy at the DeGroote Business School, McMaster University. He received his PhD from the Ivey Business School, University of Western Ontario. His doctoral dissertation is recognized as the first thesis to integrate the fields of intellectual capital, organizational learning and knowledge management and is the number one selling thesis in Canada. He has published extensively in a variety of academic journals and has completed three books. He is recognized the world over as a leading professional speaker and consultant in the field of knowledge management. Nick Bontis is the corresponding author and can be contacted at: nbontis@mcmaster.ca

Alexander Serenko is Assistant Professor of Management Information Systems at the Faculty of Business Administration, Lakehead University. Dr Serenko holds a MSc. in computer science, an MBA in electronic business, and a PhD in Management Science/Systems from McMaster University. Dr Serenko's research interests pertain to user technology adoption, knowledge management, and innovation. His articles have appeared in various refereed journals, and he has received awards at numerous Canadian, American, and international conferences.

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