NDER PEER REVIEW

Original Research Article

The Effects of Diagnostic and Interactive Performance Measurement Systems on Organisational Commitment and Job Satisfaction: The Perception of Information and Communication Technology Practitioners in Hong Kong

Abstract

The rapid and accelerating development of information and communication technology (ICT) has caused an unprecedented expansion in Hong Kong's ICT industry and a simultaneous increase in the demand for ICT practitioners. With the intention of helping ICT-related companies in Hong Kong retain valuable employees, this research identifies the effects of diagnostic and interactive use of performance measurement systems (PMS) on organisational commitment and job satisfaction. From a critical review of related literature, two research questions and twenty-five hypotheses were formulated to explore ICT practitioners' perceptions of job satisfaction, organisational commitment and PMS. An Internet-based anonymous questionnaire, using measures adopted from previous validated research, collected the research data. Six thousand invitation emails sent to randomly selected ICT practitioners in Hong Kong provided 299 responses for statistical analysis. Findings indicate that diagnostic and interactive use of PMS positively influences the job satisfaction and organisational commitment of employees and suggest that job satisfaction and organisational commitment are correlated. The study also found that employees' position in the organisation and the nature of the business influences both job satisfaction and commitment, but that their marital status only influences job satisfaction and not organisational commitment; other demographics have no influence on either satisfaction or commitment. Results from this study provide insights for managers and owners of companies in Hong Kong's ICT sector by suggesting how they can formulate appropriate strategies to reduce staff turnover. The research contributes to the literature related to the appropriate use of PMS in ICT organisations as a means of improving organisational commitment and job satisfaction.

1. Introduction

1.1 Background of the Research

An organisation's survival depends on its operational culture and performance. Performance measurement systems (PMS) enable organisations to understand how closely their internal performance adheres to organisational objectives and strategic goals (Osborn, 1998). Consequently, organisational commitment and job satisfaction are associated with effective outcomes and have a positive influence on organisational performance; organisations that adopt an optimum organisational culture with a positive attitude enhance their performance (Wiener and Vardi, 1980). Human expertise and technology have been advancing at an ever-increasing speed during the past few decades, resulting in ~~extremely~~ rapid changes in human lifestyles. This is especially true of the information and communication technology (ICT) sector, which is constantly developing new and improved advanced electronic devices and applications. Due to the rapid expansion of this particular sector, there has been a substantial increase in demand for ICT practitioners in most developed regions of the world including Hong Kong (United Nations Conference on Trade and Development [UNCTAD], 2010). The rapid and accelerating development of ICT technology has caused unprecedented changes in Hong Kong's society. The substantial adoption of ICT-related technologies, products and

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NDER PEER REVIEW

services by both the private and public sectors in Hong Kong, such as mobile phones, personal computers and the Internet, appears to be one of the major determinants for its success. Extensive use of the Internet in Hong Kong has enabled businesses and individuals to communicate, transact and transfer knowledge and data more effectively, enhancing overall efficiency, effectiveness and productiveness (Census and Statistics Department, HKSAR, 2012). So it is worth to study the importance of performance management systems to organisational commitment and job satisfaction.

1.2 The Importance of Hong Kong's ICT Sector

The increased adoption of ICT technology in Hong Kong has led to a substantial increase in spending on ICT products and services from both the private and government sectors. This may be partly due to the rapid increase in local demand for ICT products and services and partly due to the resurgence of trade following the aftermath of the 2009 tsunami (Census and Statistics Department, HKSAR, 2012). Organisations wishing to take advantage of the increasing demand for ICT products and services should deal proactively with the corresponding increase in demand for ICT professionals, who are an essential component of an organisation's effectiveness. Findings from previous studies suggest that different components of organisational commitment positively affect organisational effectiveness and therefore performance (Meyer, Stanley, Herscovitch and Topolnytsky, 2002; Angle and Perry, 1981). Previous studies have also concluded that employees with high organisational commitment have higher expectations of their performance and thus perform better (Baugh and Roberts, 1994; Meyer, Allen and Smith, 1993; Shore and Martin, 1989). Therefore, employee commitment to an organisation is a major issue for human resource professionals in maintaining organisational sustainability (UNCTAD, 2010).

2. Literature Review and Hypotheses Development

In order to identify the research gap, this section reviews the literature relating to the effect of diagnostic and interactive use of performance management systems (PMS) on organisational commitment and job satisfaction.

2.1 Performance Management Systems

Used widely throughout history to evaluate organisational performance (Kennerley and Neely, 2003), PMS are a set of metrics used to formulate strategic plans and monitor the achievement of organisational goals (Ittner and Larcker, 1998b). They help management to identify areas requiring attention and improvement, monitor project progress, improve staff communication, convey management expectations, enhance accountability and motivate employees with rewards based on individual performance (Chenhall, 2003; Ittner, Larcker and Randall, 2003; Waggoner, Neely and Kennerley, 1999; Ittner and Larcker, 1998a).

The diagnostic and interactive uses of PMS are two management tools that balance this tension within an organisation to help attain established organisational objectives (Henri, 2006a). PMS assist in the identification of areas that strengthen accountability, improve communication, motivate employees through performance-based rewards, monitor progress, and communicate expectations or areas requiring attention (Chenhall, 2003; Ittner et al., 2003; Waggoner et al., 1999; Ittner and Larcker, 1998a).

2.1.1 Diagnostic Use of PMS

The diagnostic use of PMS can be considered the traditional monitoring of progress toward organisational goals with a focus on exceptions and deviations from set standards of performance for corrective actions and tight controls over strategies and operations (Henri, 2006a; Simons, 1991). It is usually characterized by an extremely tight communication and

NDER PEER REVIEW

information flow structure, which may hinder learning and risk-taking innovative behavior (Henri, 2006a). This monitoring device, which is based on pre-set standards and procedures, constrains risk-taking innovative behavior to ensure predictable organisational objectives are being met as originally planned and designed (Simons, 1995). It serves to eliminate mistakes and negative variances (Henri, 2006a).

2.1.2 Interactive Use of PMS

In contrast to the diagnostic use of PMS, the interactive use of PMS facilitates risk-taking innovative behavior and promotes learning throughout an organisation (Henri, 2006a). When using interactive PMS, top management teams interact regularly with their subordinates and engage in debates and face-to-face challenges with them during their decision-making processes (Simons, 1991, 1994). This interactive process allows dialog throughout an organisation and strategic uncertainty to be resolved, making the development of new ideas and initiatives possible (Simons, 1991, 1994).

2.1.3 Diagnostic and Interactive Use of PMS

Widener (2007) concluded that organisational performance is improved through the appropriate diagnostic and interactive use of PMS. This view is based on the assumption that an interactive control system is interdependent with both the diagnostic use of a PMS and the boundary system. The interactive use of a PMS affects the diagnostic use of a PMS, providing the required mechanism that makes the interactive control system effective.

Henri (2006a) revealed that organisational learning, entrepreneurship, innovativeness, and market orientation can be positively enhanced by the interactive use PMS. Conversely, there is a negative effect on performance capabilities when PMS is used diagnostically. Such findings concur with those of Bisbe and Otley (2004) and Abernethy and Brownell (1999). The relationships between the diagnostic and interactive use of PMS and organisational performance are not mediated by their capabilities. However, Henri (2006a) considered that performance variables in the study were restrictive and were responsible for the non-mediating effect.

These two different uses of PMS can be complementary (Henri, 2006a). The diagnostic use of PMS can be described as a single-loop learning process, which provides the basis for the interactive use of PMS and double-loop learning, which was identified by Henri (2006a). Kaplan and Norton (2001) considered that the diagnostic use of PMS is only a tool for performance measurement, while the interactive use of PMS is a powerful tool for strategies and plans development (Henri, 2006a). In view of the thorough and highly respected PMS-related work of Henri (2006a, 2006b) and Simon (1995, 1994, 1991), their relevant models were adapted for the purpose of this study.

2.2 Organisational Commitment

Organisational commitment has attracted the attention of both researchers and practitioners over the years (Somers, 2009; Brooks, 2002; Meyer et al., 2002), mostly due to the consequences, correlations, and antecedents of commitment that have implications on work behavior and employee performance, including organisational effectiveness, job performance, and organisational citizenship behavior. The extent of employees' organisational commitment has a major effect on organisational performance (Yousef, 2000; Meyer and Allen, 1997; Hackett, Bycio and Hausdorq, 1994; Mowday, Porter and Steers, 1982). Employees with strong organisational commitment tend to perform better (Gellatly, Meyer and Luchak, 2006; Meyer, Paunonefl, Gellatly, Goffin and Jackson, 1989; Steers, 1977). Conversely, low organisational commitment is often associated with problematic issues such as high absenteeism and staff turnover (Somers, 1995).

NDER PEER REVIEW

2.2.1 Western Organisational Commitment Theories

Meyer and Allen (1991) suggested that organisational commitment comprises three behavior and attitude factors. They contended that an employee's decision to leave or stay with an organisation is based on the relationship between the employee and the organisation, which is determined by the employee's psychological state and defined as normative commitment, continuance commitment, and affective commitment.

Normative commitment arises from agreements or sharing of norms that result in an employee's sense of obligation to an organisation. Employees that have a strong normative commitment tend to stay with a firm because they feel obliged to (Allen and Meyer, 1996). Continuance commitment is an accumulation of interests within an organisation. This means that an employee bonds with an organisation because of additional interests such as seniority, concerns about family, and pensions, rather than positive feelings toward an employer (Shaw, Delery and Abdulla, 2003). The commitment represents the employee's understanding of the opportunity costs related to staying or leaving an organisation; a strong commitment from employees means they stay with their employers because they have to (Allen and Meyer, 1996). Affective commitment is an employee's emotional adherence to the identification with, and involvement in, an organisation (Mowday et al., 1982). That is, employees are actively involved with employers by giving something of themselves in order to enhance the wellbeing of their employers (Mowday, Steers and Porter, 1979). Affective commitment includes three factors that connect an employee with an employer: a strong belief in, and commitment to, an organisation's values and goals, a willingness to devote a great effort to an organisation, and a strong wish to retain membership of an organisation (Mowday et al., 1979).

2.2.2 Wang's (2004) Organisational Commitment Model

Wang (2004) suggested that communist ideals in China could influence organisational commitment, and that this could be broadly compared with continuance commitment in Western research. Wang also stated the possibility of a phenomenon of organisational commitment that is unique to China, meaning that Western models may not be applicable in the Chinese context. Wang's (2004) model is based on suggestions by Ling, Fang and Zhang (2002) and comprises five components: value commitment, normative commitment, passive continuance commitment, active continuance commitment, and affective commitment.

In Wang's (2004) model, affective commitment is used to measure emotional attachment and is the same as in Meyer and Allen's model (1991); however, sub-dimensions of passive and active commitment are included, as recommended by other researchers (Iverson and Buttigieg, 1999; Somers, 1993; Allen and Meyer, 1990; McGee and Ford, 1987). In Wang's (2004) model, active continuance commitment suggests that an employee is actively motivated within the organisation because of the availability of promotion opportunities or work-related training, which encourages the employee to stay in his or her job. This contrasts with passive continuance commitment, which applies when employees stay with their employers because they are unable to find another job. Normative commitment implies that employees feel obligated to stay in their job; Value commitment applies when employees share the values of the organisation and, as a result, demonstrate greater effort in their work to support their employers (Wang, 2004).

Prior to 1997, Hong Kong had been under British administration for almost 150 years, British business practices and colonial-style administration remained unchanged in Hong Kong before 1997 (Scott, 2010; Cheng, 2007); the traditional bureaucratic approach and focus on hierarchy ensured centralized control (Scott, 2010). After the handover of Hong Kong to China in 1997, British rule ended, but Western culture was deeply rooted in Hong Kong. As

NDER PEER REVIEW

such, Meyer and Allen's (1997) measurements for organisational commitment, which have been commonly used (Wasti, 2005) in the West, were adapted for this study.

2.3 Job Satisfaction

Hoppock (1935) was one of the earliest researchers to define job satisfaction, describing it as an employee's psychological and physical response to their work environment and the nature of their work. Locke (1976) defined job satisfaction as an employee's negative or positive attitudes in relation to their employment. Other research indicated that the measure of employees' involvement and identification with their organisation could identify job satisfaction (Mowday et al., 1982) and that when an evaluation of the characteristics of a job creates positive feelings for an employee, this is defined as job satisfaction (Hodson, 1991). According to Schermerhorn (1993), job satisfaction is an affective or emotional response regarding different elements of work. However, other researchers asserted that job satisfaction is employees' feelings, including pleasurable or positive emotional states, toward their jobs following performance appraisals (Robbins, Odendaal and Roodt, 2003; Ellickson and Logsdon, 2002; Evan, 2001; Luthans, 1998; Spector, 1997). Greenberg and Baron (2003) suggested that job satisfaction encompasses employees' evaluative, cognitive, and affective reactions to their job, while Griffing and Moorhead (2007) defined job satisfaction as the extent to which workers achieve a sense of fulfillment and feel gratified from their work. Tutuncu and Kozak (2007) identified the elements of employees' expectations and characteristics of jobs and defined job satisfaction as the equity of various desired and non-desired work-related experiences. A final definition suggested that workers have a mixture of feelings and beliefs about their jobs and that job satisfaction can be measured as ranging from extreme satisfaction to extreme dissatisfaction (George and Jones, 2008).

2.4 Hypotheses Development

In order to gain a better understanding of the interplay between the constructs of the diagnostic use of PMS, the interactive use of PMS, organisational commitment, and job satisfaction, a set of hypotheses was developed to help answer the research questions identified.

2.4.1 Diagnostic Use of PMS and Organisational Commitment

Gupta and Upadhyay (2012), Bisbe and Otley (2004) and Hall (2004) asserted that organisational commitment is strongly related to the effective use of PMS, including the diagnostic use of PMS. It is expected that a similar causality may exist in Hong Kong's ICT industry. Therefore, it was hypothesized that:

Hypothesis 1: The diagnostic use of PMS positively affects employees' organisation commitment in Hong Kong's ICT industry.

2.4.2 Interactive Use of PMS and Organisational Commitment

Gupta and Upadhyay (2012), Bisbe and Otley (2004) and Hall (2004) asserted that organisational commitment is strongly related to the effective use of PMS, including the interactive use of PMS. It is expected that a similar causality may exist in Hong Kong's ICT industry. Therefore, it was hypothesized that:

Hypothesis 2: The interactive use of PMS positively affects employees' organisation commitment in Hong Kong's ICT industry.

NDER PEER REVIEW

2.4.3 Diagnostic Use of PMS and Job Satisfaction

Gupta and Upadhyay (2012), Bisbe and Otley (2004) and Hall (2004) asserted that the job satisfaction of employees is strongly related to the effective use of PMS, including the diagnostic use of PMS. It is expected that a similar causality may exist in Hong Kong's ICT industry. Therefore, it was hypothesized that:

Hypothesis 3: The diagnostic use of PMS positively affects employees' job satisfaction in Hong Kong's ICT industry.

2.4.4 Interactive Use of PMS and Job Satisfaction

Gupta and Upadhyay (2012), Bisbe and Otley (2004) and Hall (2004) asserted that the job satisfaction of employees is strongly related to the effective use of PMS, including the interactive use of PMS. It is expected that a similar causality may exist in Hong Kong's ICT industry. Therefore, it was hypothesized that:

Hypothesis 4: The interactive use of PMS positively affects employees' job satisfaction in Hong Kong's ICT industry.

2.4.5 Organisation Commitment and Job Satisfaction

Previous studies revealed a correlation between employee commitment and job satisfaction, such as the study of hospital nurses by Jernigan, Beggs and Kohut (2002), which argued that job satisfaction can predict organisational commitment. Igbaria and Guimaraes (1993) found that job satisfaction can predict whether employees intend to leave an organisation, as well as their level of organisational commitment. Organisational commitment is strongly related to job satisfaction (Morrison, 2008; Karetepe and Tekinkus, 2006; McDonald and Makin, 2000; Mael and Tetrick, 1992). The absence of job satisfaction often leads to reduced organisational commitment (Moser, 1997) and increased staff turnover (Alexander, Litchtenstein and Hellmann, 1998; Jamal, 1997).

Wong, Wong, Hui and Law (2001) revealed that organisational commitment was directly correlated with intent to leave and job satisfaction. The same research confirmed that organisational commitment predicts job satisfaction, but job satisfaction is unable to predict organisational commitment. These results differ from those of studies in the West. To gain a better understanding of the interplay between these two constructs, it was hypothesized that:

Hypothesis 5: Employees' organisation commitment and job satisfaction are positively correlated in Hong Kong's ICT industry.

2.5 Research Model

Based on the review of literature in relation to the concepts of diagnostic and interactive use of PMS, organisational commitment, and job satisfaction, five hypotheses were developed. Figure 1 shows the research model of this study.

NDER PEER REVIEW

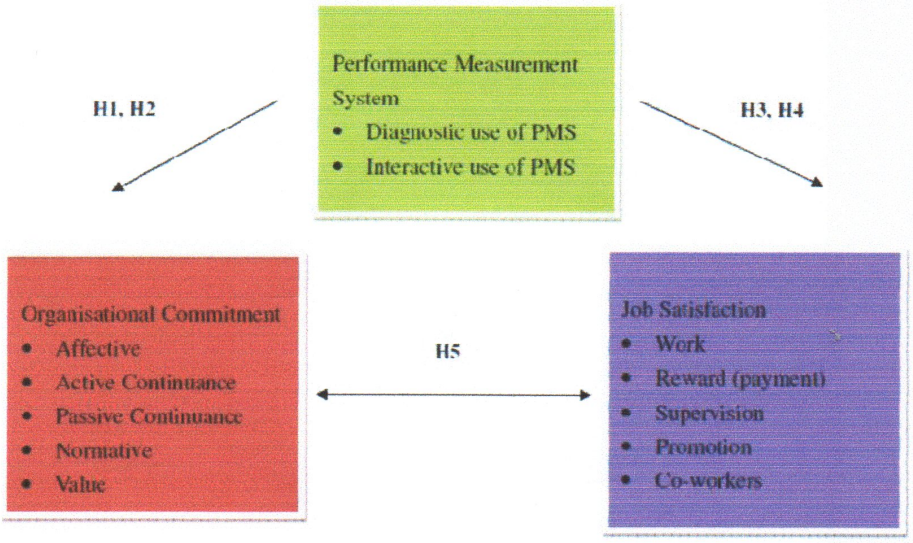


Figure 1 Conceptual Model of this Study: Effects of PMS on Organisational Commitment and Job Satisfaction

3. Methodology

3.1 Sample

The chosen population of this research was employees of all levels in Hong Kong's ICT industry. Names and email addresses of ICT practitioners—the potential participants—were randomly selected from ICT-related public domains in Hong Kong.

3.2 Data Collection

The data collection method for this research was an Internet-based, self-administered questionnaire to collect the perception of Hong Kong's ICT practitioners on the levels of diagnostic and interactive use of PMS within their organisations and their levels of organisational commitment and job satisfaction. Six thousand invitation letters along with a participant information statement were sent directly via email to the mailboxes of the randomly selected potential participants who were invited to complete the questionnaire online and submitted their data to the database server. Finally 302 responses were collected.

3.3 Research Instrument

The research instrument encompasses five sections. There were four constructs in this research, which included diagnostic use of PMS, interactive use of PMS, organisational commitment, and job satisfaction. The last section collected demographic data related to the respondents.

The diagnostic use of PMS was the independent construct in this study. The four questionnaire items for the diagnostic use of PMS were adapted from Henri (2006a). Table 1 shows these measuring items, the question ID, and the questions relating to the diagnostic use of PMS.

299? ACCORDING TO YOUR ABSTRACT!!

NDER PEER REVIEW

Table 1: Measuring Items for Diagnostic Use of PMS

Question ID	*Questionnaire Items*
A1-1	My senior management team involves me in the use of performance measurements to track progress toward goals.
A1-2	My senior management team involves me in the use of performance measurements to monitor results.
A1-3	My senior management team involves me in the use of performance measurements to compare outcomes to expectation.
A1-4	My senior management team involves me in the use of performance measurements to review key measurements.

The interactive use of PMS was the mediating construct in this study. Seven out of eight questionnaire items for the interactive use of PMS were adapted from Henri (2006a), while the last item was adapted from Simons (1991). This was because of its appropriateness in the circumstances. Table 2 shows these measuring items, the question ID, and the questions relating to the interactive use of PMS.

Table 2: Measuring Items for Interactive Use of PMS

Question ID	*Questionnaire Items*
A2-5	My senior management team involves me in the use of performance measurements to enable discussion in meetings of superiors, subordinates, and peers.
A2-6	My senior management team involves me in the use of performance measurements to enable continual challenging and debating of underlying results, assumptions, and action plans.
A2-7	My senior management team involves me in the use of performance measurements to enable continual challenging and debating of underlying results, assumptions, and action plans.
A2-8	My senior management team involves me in the use of performance measurements to unite the organisation.
A2-9	My senior management team involves me in the use of performance measurements to enable the organisation to focus on common issues.
A2-10	My senior management team involves me in the use of performance measurements to enable the organisation to focus on critical success factors.
A2-11	My senior management team involves me in the use of performance measurements to develop a common vocabulary within the organisation.
A2-12	My senior management team involves me in the use of performance measurements to enable the organisation to focus on strategic uncertainties.

Organisational commitment was the dependent construct in this study. Meyer and Allen's (1997) model is described by Sparrow and Cooper (2003) as the most widely accepted definition of commitment to organisations and how this is measured. As such, the questionnaire items for organisational commitment were adapted from Meyer and Allen (1997). Table 3 shows these measuring items, the question ID, and the questions relating to organisational commitment.

NDER PEER REVIEW

340 **Table 3: Measuring Items for Organisational Commitment**

Question ID	*Questionnaire Items*
B1-13	This organisation holds a great deal of personal meaning for me.
B1-14	I owe a great deal to my organisation.
B1-15	I would feel guilty if I left my organisation now.
B1-16	I really feel as if this organisation's problems are my own.
B1-17	I would be very happy to spend the rest of my career with this organisation.
B2-18	It would be very hard for me to leave my organisation right now, even if I wanted to.
B2-19	One of the few negative consequences of leaving this organisation would be the scarcity of other job opportunities.
B2-20	I would not leave my organisation right now because I have a sense of obligation to its people.
B2-21	Even if it were to my advantage, I do not feel it would be right to leave my organisation now.
B2-22	This organisation deserves my loyalty.
B3-23	I do not feel emotionally attached to this organisation.
B3-24	I do not feel like part of the family in my organisation.
B3-25	I do not feel a strong sense of belonging to my organisation.
B3-26	I do not feel any obligation to stay with my current employer.
B3-27	If I had not already put too much of myself into this organisation, I would leave.

341

342 Job satisfaction was the dependent construct in this study. The questionnaire items for job
343 satisfaction, which comprised five dimensions of compensation, work, supervision,
344 promotion, and co-workers, were adapted from Smith, Kendall and Hulin (1969). Table 4
345 shows the measuring items, the question ID, and the job satisfaction questions.
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NDER PEER REVIEW

Table 4: Measuring Items for Job Satisfaction

Question ID	*Questionnaire Items*
C1-28	My benefit package.
C1-29	My most recent raise.
C1-30	Information about pay issues provided by the company.
C1-31	My current total salary package (base pay, benefits, and incentives).
C1-32	The company's pay structure.
C1-33	How the company administers pay.
C2-34	The job requires me to use a number of complex or high-level skills.
C2-35	The job denies me any chance to use my personal initiative or judgment when working.
C2-36	The job is quite simple and repetitive.
C2-37	The job gives me considerable opportunity for independence and freedom in how I work.
C3-38	My supervisor looks for opportunities to praise positive employee performance, both in private and in front of others.
C3-39	I feel undervalued by my supervisor.
C3-40	The supervisor almost never gives me feedback about how well I have completed my work.
C3-41	My supervisor rewards a good idea by implementing it and giving credit to the responsible employee(s).
C3-42	My supervisor seldom recognizes an employee for work well done.
C3-43	My supervisors often let me know how well they think I am performing.
C4-44	My chances of being promoted are good.
C4-45	There are enough career opportunities for me in this organisation.
C4-46	Job vacancies in this organisation are usually filled by people from outside the organisation.
C4-47	It would be easy to find a job in another department.

The demographic data section collected information related to the respondents. This information included gender, age, marital status, monthly income, education level, work experience in the ICT industry, and information on their current employer.

3.4 Data Analysis

Collected data were analyzed by using Cronbach's Alpha (α) Reliability Test and the EFA Validity Test; AMOS was used to run CFA in order to confirm the reliability and validity of the measurements used in this study. Hypotheses relating to the relationships between the tested latent variables (i.e., interactive PMS, diagnostic PMS, organisational commitment, and job satisfaction) were analyzed using Structural Equation Model (SEM).

4. Findings

The data collected from the 302 respondents were checked using descriptive analyses, reliability test and structural equation modeling.

4.1 Sample Characteristics

Table 5 shows the distribution of respondents' positions in their company whilst Table 6 shows the personal details of respondents.

NDER PEER REVIEW

370 **Table 5 Respondents' Company Details**

Position	Frequency	Percentage
Owner/CEO/Admin/Marketing/HR Director	80	26.5
General/Technical/IT/QC Manager	48	15.9
Executive/Supervisor	77	25.5
Technician/Clerical	97	32.1
Nature of Business		
Manufacturing	156	51.7
Trading and Service	81	26.8
Wholesale and Retail	35	11.6
Banking Institutes	4	1.3
Construction/Engineering	4	1.3
Government Sector	1	.3
Education/Training Institute	6	2.0
Other (please specify)	15	5.0
No. of Employees		
10 or fewer	42	13.9
11 to 50	48	15.9
51 to 100	59	19.5
101 to 200	50	16.6
over 200	103	34.1
Years of Experience in ICT		
2 or fewer	101	33.4
3 to 5	95	31.5
6 to 10	60	19.9
11 to 20	32	10.6
more than 20	13	4.3
Missing	1	.3
Years of Working Experience in Current Company		
2 or fewer	133	44.2
3 to 5	91	30.2
6 to 10	53	17.6
11 to 20	18	6.0
more than 20	6	2.0
Missing	1	.3
Total	302	100

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NDER PEER REVIEW

Table 6: Respondent Profile

Gender	Frequency	Percentage
Female	161	53.5
Male	140	46.5
Missing	1	
Age		
18–24	66	21.9
25–34	164	54.5
35–44	52	17.3
45–54	12	4.0
55 and above	7	2.3
Missing	1	
Marital Status		
Single	172	57.0
Married	130	43.0
Education Level		
Secondary/High School	35	11.7
Associate Degree/Higher Diploma	59	19.7
Bachelor/Professional Degree	167	55.7
Master Degree	33	11.0
Doctorate	6	2.0
Missing	2	
Monthly income Level (HK$)		
Less than $8,000	91	30.1
$8,000 to $15,000	89	29.5
$15,001 to $28,000	62	20.5
$28,001 to $38,000	23	7.6
$38,001 to $50,000	15	5.0
More than $50,000	22	7.3
Total	302	100

4.2 Validity Test

Exploratory factor analysis (EFA) was initially run to establish measurement assessment of latent variables. With these, EFA for PMS is as shown in Table 7. The table indicates that all but one item ("develop a common vocabulary in the organisation") of interactive use of PMS loaded highly in Component 1 (C1) and was named "interactive." All diagnostic use of PMS items loaded highly in Component 2 (C2) and was named "diagnostic." This demonstrates that the factor loading for these two components discriminates and converges in support of its theoretical underpinning.

Table 7: Rotated Component Matrix

Items for PMS	Component	
	Interactive	Diagnostic
Tie the organisation together	.811	
Provide a common view of the organisation	.807	
Enable the organisation to focus on common issues	.792	

NDER PEER REVIEW

Enable continual challenge and debate underlying results, assumptions, and action plans	.771	
Enable the organisation to focus on strategic uncertainties	.769	
Enable discussion in meetings of superiors, subordinates, and peers	.692	
Enable the organisation to focus on critical success factors	.680	
Track progress toward goals		.854
Monitor results		.846
Compare outcomes to expectation		.834
Review key measures		.811

EFA for organisational commitment, as shown in Table 8, indicates that when two items from 15 items are removed, organisational commitment items load highly into the three distinctive components of continuance, affective and normative, thus converging and discriminating, as indicated in theory.

Table 8: Rotated Component Matrix

Items for Organisational Commitment	Component		
	Continuance	Affective	Normative
I do not feel a strong sense of belonging to my organisation.	.869		
I do not feel like part of the family at my organisation.	.840		
I do not feel emotionally attached to this organisation.	.798		
I do not feel any obligation to remain with my current employer.	.752		
If I had not already put too much of myself into this organisation, I would leave.	.751		
This organisation has a great deal of personal meaning for me.		.815	
I owe a great deal to my organisation.		.796	
I really feel as if this organisation's problems are my own.		.641	
It would be very hard for me to leave my organisation right now, even if I wanted to.		.628	
This organisation deserves my loyalty.		.552	
Even if it were to my advantage, I do not feel it would be right to leave my organisation now.			.804
I would feel guilty if I left my organisation now.			.766
I would be very happy to spend the rest of my career with this organisation.			.765

Table 9 shows the rotated component matrix, where the 25 items that loaded highly into five distinctive components, compensation (C1), co-workers (C2), supervision (C3), promotion (C4), work (C5), are distinct. These five components explain a total of 73.80 percent variance in the items, whereby C1 explains 43.44 percent, C2 explains 16.19 percent, C3 explains 5.85 percent, C4 explains 4.72 percent, and C5 explains 3.60 percent.

NDER PEER REVIEW

411
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Table 9: Rotated Component Matrix

Items for Job Satisfaction	Component				
	Compensation	Co-workers	Supervision	Promotion	Work
My current total salary package (base pay, benefits, and incentives)	.823				
The number of benefits I receive	.790				
Size of my current financial incentive	.789				
The competitiveness of my total salary package (base pay, benefits, and incentives)	.788				
The company's pay structure	.777				
How the company administers pay	.771				
The information about pay issues provided by the company	.770				
My benefit package	.770				
Consistency of the company's pay policies	.756				
How my raises are determined	.747				
My most recent raise	.742				
The value of my benefits	.718				
Co-workers are friendly		.916			
Co-workers are honest		.912			
Co-workers are dynamic		.880			
Co-workers are intelligent		.878			
Co-workers are not enemies		.866			
Co-workers are hardworking		.853			
My supervisor praises employee performance, both privately and in front of others.			.741		
My supervisor often lets me know how well he or she thinks I am performing in the job.			.729		
My supervisor rewards a good idea by implementing it and giving the responsible employee(s) credit.			.721		
There are enough career opportunities for me in this organisation.				.793	
My chances for being promoted are good.				.783	
The job is quite simple and repetitive.					.803
The job denies me any chance to use my personal initiative or judgment in carrying out the work.					.791

413

NDER PEER REVIEW

4.3 Reliability Tests

The reliability of all constructs shows Cronbach's α as being above 0.7, showing high reliability (Table 10).

Table 10: Reliability

Constructs	No. of items	Cronbach's α	Mean	Standard Deviation
Diagnostic	4	.95	10.77	4.13
Interactive	7	.94	18.65	6.19
Affective Commitment	5	.84	13.79	3.75
Normative Commitment	3	.70	14.58	3.37
Continuance Commitment	5	.91	13.62	3.83
Compensation	12	.95	34.38	8.01
Work	2	.70	5.56	1.61
Supervision	3	.80	8.26	2.26
Promotion	2	.81	5.81	1.60
Co-workers	6	.97	15.98	6.14

4.4 Confirmatory Factor Analysis

Confirmatory factor analysis (CFA) was used to verify the measurement assessment performed above. As such, measurement models of latent variables were drawn and confirmed from the findings. The measurement model for a PMS is shown in Figure 2 below.

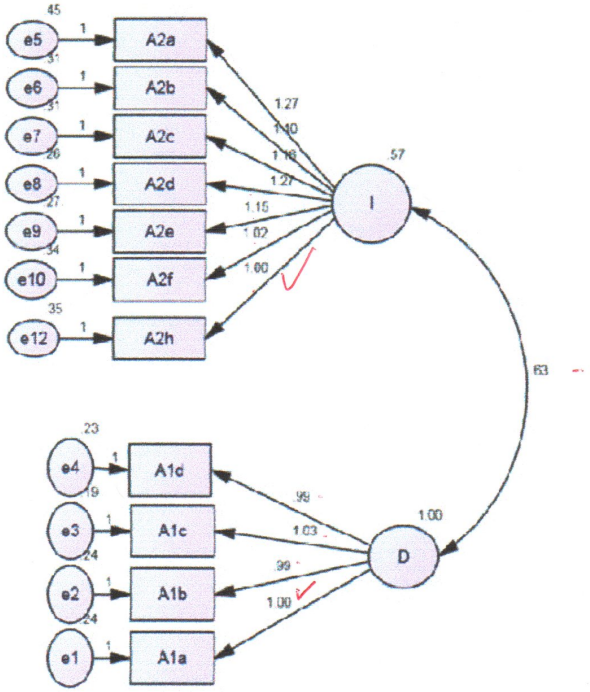


Figure 2: CFA for PMS

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Table 11: Summary of Model Fit for Measurement Model—PMS

	CMIN	DF	P	CIM/DF	GFI	AGFI	CFI	RMSEA	PCLOSE
Default Model	114.85	43	0.0001	2.67	.93	.90	.98	.08	.007
Saturated Model	.000	0			1.00		1.000		
Independence Model	3194.95	55	0.0001	58.09	.179	.014	.000	.438	.000

Table 11 indicates that CMIN = 114.85, df = 43, p-value = 0.0001, showing that the PMS model in Figure 2 does not quite fit. However, CIM/DF = 2.7 < 3 indicates the model fit (Bryne, 2001; Kline, 2005). The results GFI = 0.90, AGFI = 0.90, and CFI = 0.90 all show that the model is acceptable. The result RMSEA = 0.0075 shows a value < 0.08; hence, the model is deemed acceptable and supported by PCLOSE = 0.0007 (PCLOSE < 0.05). One item was removed as it loaded weakly in the interactive measurement, and the final measurement model items are tabled in Table 12. This further confirms that the items representing diagnostic and interactive use of PMS load distinctively into two columns.

Table 12: Standardized Total Effects for Default Model

PMS Items	Interactive	Diagnostic
Tie the organisation together	.883	.000
Enable the organisation to focus on common issues	.856	.000
Provide a common view of the organisation	.843	.000
Enable continual challenge and debate underlying results, assumptions, and action plans	.829	.000
Enable discussion in meetings of superiors, subordinates, and peers	.819	.000
Enable the organisation to focus on critical success factors	.799	.000
Enable the organisation to focus on strategic uncertainties	.787	.000
Compare outcomes to expectation	.000	.920
Review key measures	.000	.899
Track progress toward goals	.000	.899
Monitor results	.000	.898

4.4.1 CFA for Job Satisfaction

Job satisfaction was measured using five components and a total of 35 items. The final CFA measurement model corroborates with EFA, with a model including 24 items loading into distinctive components (Figure 3).

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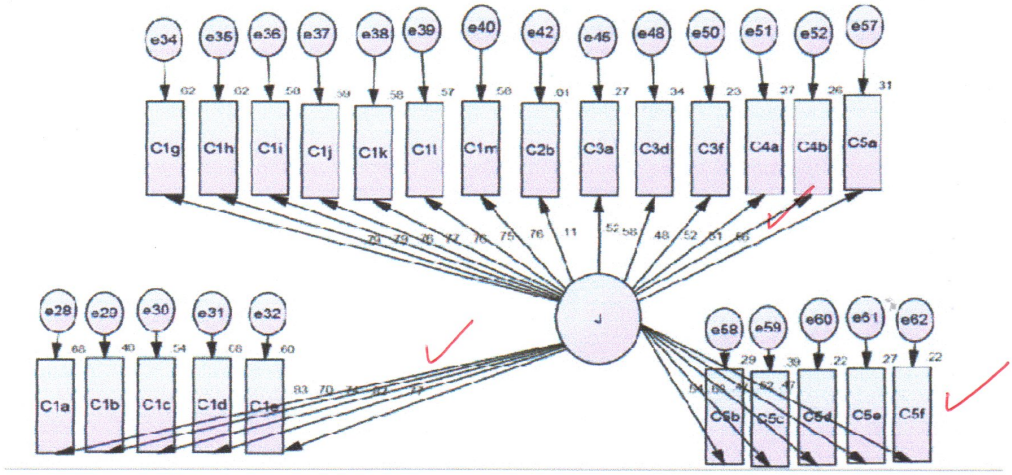


Figure 3: Final Measurement Model of Job Satisfaction

Table 13: Summary of Model Fit for Measurement Model—Job Satisfaction

Model	CMIN	DF	P	CMIN/ DF	GFI	AGFI	CFI	RMSEA	PCLOSE
Default Model	2864.23	252	.000	11.37	.425	.316	.563	.19	.000
Saturated Model	.000	0			1.000		1.000		
Independence Model	6250.47	276	.000	22.65	.172	.100	.000	.27	.000

Table 13 indicates that CMIN = 2864.23, df = 252, p-value = 0.0001, showing that the job satisfaction model in Figure 3 does not quite fit. This is supported by the result CIM/DF = 11.34, which is > 3, indicating the lack of model fit (Bryne, 2001; Kline, 2005). The results GFI = 0.42, AGFI = 0.32, and CFI = 0.56 all show the unacceptable model. RMSEA = 0.19 shows a value > 0.08; hence, the model is deemed not acceptable. Eleven items were removed as they were loading weakly in the job satisfaction measurement, and the final measurement model items are shown in Table 14, where all critical ratio (CR) values show > 1.96 (Kline, 2005; Byrne, 2001). This further confirms that the items representing job satisfaction are valid and reliable.

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Table 14: Regression Weights—Default Model

	Estimate	SE	CR	P
C1a <--- J	1.000			
C1b <--- J	.893	.066	13.613	***
C1c <--- J	.877	.060	14.727	***
C1d <--- J	1.070	.062	17.336	***
C1g <--- J	.924	.057	16.189	***
C1h <--- J	.983	.061	16.160	***
C1i <--- J	.966	.063	15.340	***
C1j <--- J	.957	.062	15.559	***
C1k <--- J	.950	.062	15.397	***
C1l <--- J	.870	.057	15.193	***
C1m <--- J	.974	.063	15.502	***
C2b <--- J	.152	.083	1.992	.057
C3a <--- J	.702	.075	9.386	***
C3d <--- J	.804	.074	10.795	***
C3f <--- J	.618	.071	8.673	***
C4a <--- J	.659	.070	9.392	***
C4b <--- J	.686	.074	9.282	***
C5a <--- J	.921	.089	10.334	***
C5b <--- J	.856	.087	9.851	***
C5c <--- J	1.057	.089	11.894	***
C5d <--- J	.813	.096	8.498	***
C5e <--- J	.853	.091	9.376	***
C5f <--- J	.790	.095	8.348	***
C1e <--- J	.971	.062	15.716	***

4.4.2 CFA for Organisational Commitment

Organisational commitment was measured using three components and 15 items. The final CFA indicates three distinct components with 13 items (Figure 4).

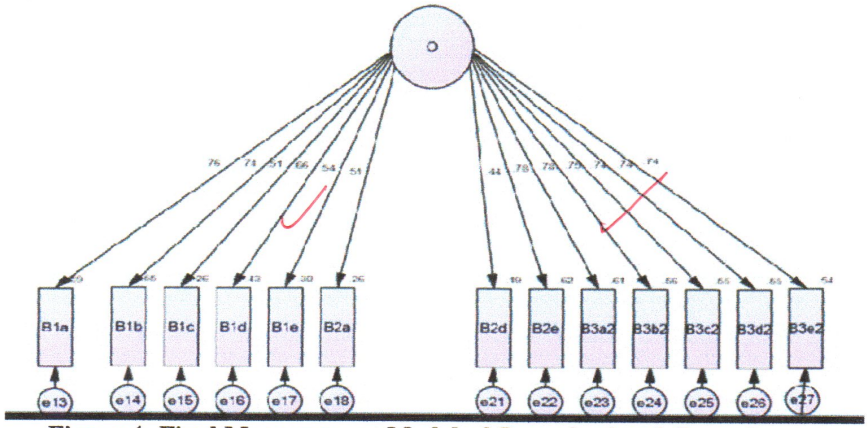


Figure 4: Final Measurement Model of Organisational Commitment

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Round them off please.

Table 15: Summary of Model Fit for Measurement Model—Organisational Commitment

Model	CMIN	DF	P	CMIN/DF	GFI	AGFI	CFI	RMSEA	PCLOSE
Default Model	745.247	65	.000	11.465	.415	.346	.719	.187	.000
Saturated Model	.000	0			1.000		1.000		
Independence Model	2496.59	78	.000	32.008	.141	.093	.000	.323	.000

Table 15 indicates that CMIN = 745.25, df = 65, p-value = 0.0001, showing that the organisational commitment model in Figure 4 does not quite fit. This is supported by the result CIM/DF = 11.47, which is > 3, indicating the lack of model fit (Bryne, 2001; Kline, 2005). The results GFI = 0.42, AGFI = 0.35, and CFI = 0.72 all show the unacceptable model. The result RMSEA = 0.19 shows a value > 0.08; hence, the model is deemed not acceptable. Two items were removed as they loaded weakly in the organisational commitment measurement, and the final measurement model items are shown in Table 16, where all CR values show > 1.96 (Kline, 2005; Byrne, 2001). This further confirms that the items representing organisational commitment are valid and reliable.

Table 16: Regression Weights—Default Model for Organisational Commitment

			Estimate	SE	CR	P	Label
B3e2	<---	O	1.000				
B3d2	<---	O	.912	.072	12.738	***	par_1
B3c2	<---	O	.930	.073	12.783	***	par_2
B3b2	<---	O	.890	.069	12.905	***	par_3
B3a2	<---	O	.912	.067	13.525	***	par_4
B2e	<---	O	1.040	.077	13.588	***	par_5
B2d	<---	O	.580	.079	7.326	***	par_6
B2a	<---	O	.702	.082	8.599	***	par_7
B1e	<---	O	.745	.081	9.216	***	par_8
B1d	<---	O	.836	.074	11.276	***	par_9
B1c	<---	O	.656	.076	8.693	***	par_10
B1b	<---	O	1.017	.079	12.812	***	par_11
B1a	<---	O	1.057	.080	13.223	***	par_12

4.4.3 CFA for Endogenous Variable (Job Satisfaction—Organisational Commitment)

Theoretically, the endogenous variables of job satisfaction and organisational commitment are correlated. Hence, these were further tested for correlation using CFA (Figure 5).

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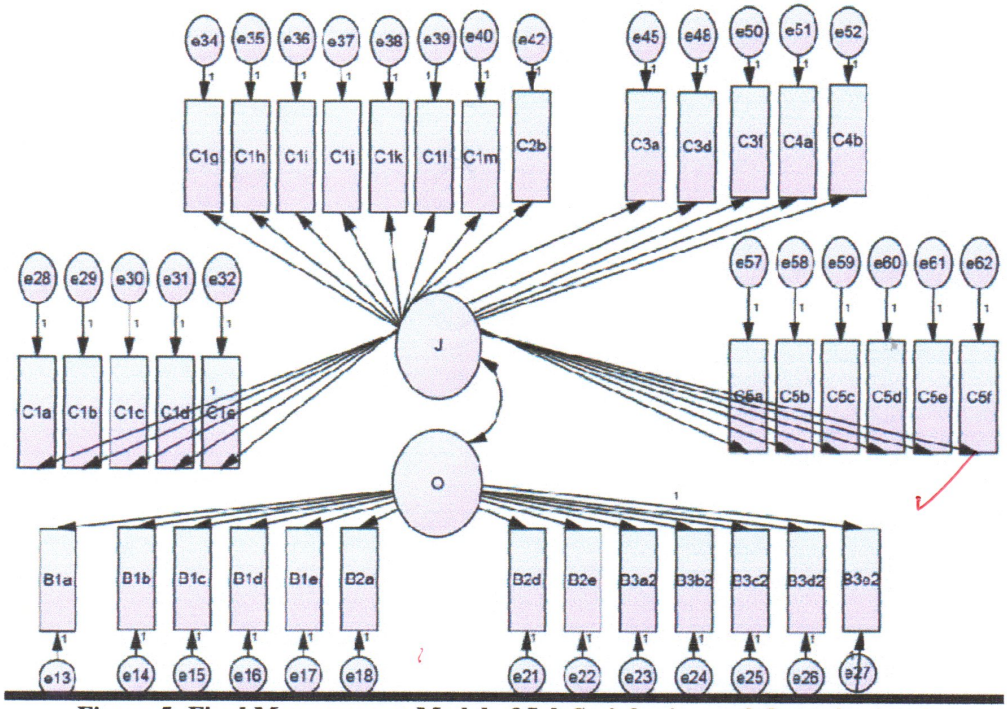


Figure 5: Final Measurement Model of Job Satisfaction and Organisational Commitment

Table 17: Summary of Model Fit for Measurement Model—Organisational Commitment

Model	CMIN	DF	P	CMIN/ DF	GFI	AG FI	CFI	RMSE A	PCLOS E
Default Model	4237.4 60	62 8	.00 0	6.748	.655	.517	.594	.139	.000
Saturated Model	.000	0			1.00 0		1.00 0		
Independence Model	9545.5 29	66 6	.00 0	14.333	.270	.148	.000	.212	.000

Table 17 indicates the model fit of the correlated job satisfaction and organisational commitment measurement model. The results CMIN = 4237.46, df = 628, p-value = 0.0001 show that this model (see Figure 5) does not quite fit. This is supported by CIM/DF = 6.75, which is > 3, indicating the lack of model fit (Bryne, 2001; Kline, 2005). The results GFI = 0.66, AGFI = 0.52, and CFI = 0.59 all show the unacceptable model. The results RMSEA = 0.14 show a value > 0.08; hence, the model is deemed not acceptable. However, as this is a measurement model, the CR value in regression weights (Table 19) shows > 1.96 (Kline, 2005; Byrne, 2001). This further confirms that the items representing job satisfaction and organisational commitment are valid and reliable and are correlated (r = 0.71), as indicated in Table 18 below.

NDER PEER REVIEW

Table 18: Covariance and Correlations—Default Model

			Covariances					Correlation
			Estimate	SE	CR	P	Label	Estimate
O	<->	J	.328	.041	8.014	***	par_36	.708

Table 19: Regression Weights (Group 1—Default Model)

			Estimate	SE	CR	P	Label
B3e2	<---	O	1.000				
B3d2		O	.906	.076	11.973	***	par_1
B3c2	<---	O	.925	.077	12.034	***	par_2
B3b2	<---	O	.893	.073	12.249	***	par_3
B3a2	<---	O	.908	.071	12.699	***	par_4
B2e	<---	O	1.087	.081	13.415	***	par_5
B2d	<---	O	.626	.082	7.637	***	par_6
B2a	<---	O	.738	.085	8.688	***	par_7
B1e	<---	O	.803	.084	9.539	***	par_8
B1d	<---	O	.885	.078	11.387	***	par_9
B1c	<---	O	.701	.078	8.931	***	par_10
B1b	<---	O	1.064	.084	12.685	***	par_11
B1a	<---	O	1.119	.085	13.235	***	par_12
C1a	<---	J	1.000				
C1b	<---	J	.880	.066	13.326	***	par_13
C1c	<---	J	.875	.060	14.643	***	par_14
C1d	<---	J	1.065	.062	17.149	***	par_15
C1e	<---	J	.967	.062	15.580	***	par_16
C1g	<---	J	.918	.057	15.990	***	par_17
C1h	<---	J	.983	.061	16.113	***	par_18
C1i	<---	J	.959	.063	15.146	***	par_19
C1j	<---	J	.943	.062	15.189	***	par_20
C1k	<---	J	.938	.062	15.086	***	par_21
C1l	<---	J	.863	.058	14.984	***	par_22
C1m	<---	J	.969	.063	15.339	***	par_23
C2b	<---	J	.173	.083	2.096	.036	par_24
C3a	<---	J	.720	.075	9.647	***	par_25
C3d	<---	J	.819	.074	11.028	***	par_26
C3f	<---	J	.628	.071	8.825	***	par_27
C4a	<---	J	.654	.070	9.309	***	par_28
C4b	<---	J	.683	.074	9.218	***	par_29
C5a	<---	J	.958	.089	10.824	***	par_30
C5b	<---	J	.893	.086	10.338	***	par_31
C5c	<---	J	1.090	.088	12.338	***	par_32
C5d	<---	J	.857	.095	9.006	***	par_33
C5e	<---	J	.892	.090	9.863	***	par_34
C5f	<---	J	.825	.094	8.758	***	par_35

The above EFA and CFA tests confirm the validity and reliability of the data, so the data is deemed suitable for significance tests.

NDER PEER REVIEW

4.5 Significance Tests

The postulated hypotheses were tested using an SEM. The data collected were tested for normality and homogeneity of variances, as test assumptions require the data to meet these assumptions. The model postulated for latent variables relating to Hypotheses 1 to 5 is shown in Figure 6 below.

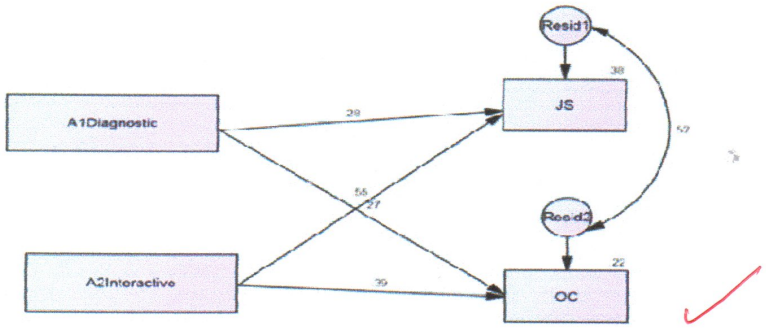


Figure 6: Model for Latent Variables Relating to Hypotheses 1–5

4.5.1 Multivariate Normal Distribution

This assumption is important because violation of this assumption can inflate or deflate Chi-square value, which determines model fit. However, as this study does not aim to find a fit model but to test theories, the normality assessment presented in Table 20 is observed.

Table 20: Assessment of Normality

Variable	Min	Max	Skew	CR	Kurtosis	CR
A2 Interactive	7.000	34.000	.339	2.392	-.630	-2.224
A1 Diagnostic	4.000	20.000	.461	3.256	-.543	-1.916
OC	13.000	64.000	-.140	-.989	.141	.497
JS	25.000	108.000	.129	.913	-.139	-.491
Multivariate					2.520	3.394

The CR for multivariate skewness (CR = 2.52) falls within ± 2.5, indicating normality, while CR for multivariate kurtosis (CR = 3.4) falls within ± 5, which indicates normality (Kline, 2005).

NDER PEER REVIEW

Table 21: Regression Weights (Group 1—Default model)

Relationship	Estimate	SE	CR	P	STD Estimate
JS<---A1 Diagnostic	.885	.144	6.152	***	.280
JS<---A2 Interactive	1.166	.096	12.155	***	.553
OC<---A1 Diagnostic	.522	.100	5.237	***	.268
OC<---A2 Interactive	.504	.066	7.581	***	.387
Co-variances					
Resid1 <--> Resid2	37.446	4.729	7.919	***	
Variances					
A1 Diagnostic	16.972	1.390	12.207	***	
A2 Interactive	38.175	3.127	12.207	***	
Resid1	104.646	8.573	12.207	***	
Resid2	50.278	4.119	12.207	***	

With the normality assumption met, the regression weights in Table 21 indicate that all relationships are significant (C.R > 1.96; P = *** or P < 0.05), with strong standardized estimates. Moreover, the co-variances (i.e., relationship between job satisfaction and organisational commitment) are also significant (C.R = 7.92, p < 0.05). This shows that Hypotheses 1 to 4 are supported, as all standard estimate values are positive, indicating positive relationships. Table 18 and Table 21 indicate a strong positive correlation (r = 0.701) between job satisfaction and organisational commitment and strong positive relationships between the residuals of job satisfaction and organisational commitment, respectively; hence, Hypothesis 5 is supported.

5. Discussion

The accelerating development of ICT technology has caused a rapid expansion in Hong Kong's ICT industry and a simultaneous increase in demand for ICT practitioners. The literature review revealed that there has been no previous study addressing the different use of PMS and its effect on individual employee behavior (Henri, 2006a; Nixon and Burns, 2005; Simons, 1995, 1994, 1991, 1990). This research sought to fill the gap by examining the effects of diagnostic and interactive use of PMS on organisational commitment and job satisfaction. The research findings help decision makers in Hong Kong's ICT sector by providing in-depth knowledge on how organisational commitment and job satisfaction of ICT practitioners can be enhanced through strategic planning of PMS within their organisations. This will ultimaley lead to the retention of valuable employees and lower staff turnover.The aim of this research was to uncover the effects of the diagnostic use of PMS on organisational commitment, the interactive use of PMS on organisational commitment, the diagnostic use of PMS on job satisfaction, the interactive use of PMS on job satisfaction, and the correlations between organisational commitment and job satisfaction in the ICT industry in Hong Kong.

In addressing the five hypotheses, it is clear that Hypotheses 1 and 2 indicate that there is a positive relationship between diagnostic and interactive use of PMS and organisational commitment. Similarly, this positive relationship is significantly seen between the diagnostic and interactive use of PMS and job satisfaction, as postulated in Hypotheses 3 and 4. Thus, contrary to arguments between Chinese scholars, the competitive ICT industry seems to show applicability of a model developed in the Western setting (Wang, 2004; Ling et al., 2002). This relationship further strengthens the notion that both the diagnostic and interactive measures of PMS provide an organisation with a better view of its performance. These findings further show the use of interactive measures as part of a PMS. This integration with diagnostic measures strengthens the evaluation of the organisation's performance.

NDER PEER REVIEW

In a competitive environment such as the ICT industry, diagnostic measures alone may not suffice, as this industry is advancing at a fast pace. This means that employees need to be on their toes and keep abreast with changes. Moreover, with a massive movement of human capital around the globe, especially in the ICT sector, organisations tend to lose their intellectual capital to higher bidders. As advocated by Henri (2006a), diagnostic measures may dampen innovativeness among employees when, in this industry, innovation is a necessity to achieve a competitive edge, setting a difference in terms of company performance. The positive relationship between PMS measures and organisational commitment could be because of the ICT industry employees who are bound by all three types of commitment: normative, continuance, and affective.

As organisational commitment and job satisfaction were proven to be highly positive in relationship, job satisfaction of employees will lead to their commitment to the organisation and may transcend to their organisational citizenship behavior. In the ICT industry, which may be lacking in terms of emotional effect and soft skills, maintaining employees with high technical ability is important, as committed, efficient ICT employees are difficult and costly to recruit (Meyer, Becker and Vandenberghe, 2004).

6. Limitations and Future Research

While this research contributes to human resource knowledge related to organisational commitment and job satisfaction, it has been conducted with limitations because of various reasons, including but not limited to time and resource constraints. First, this study was conducted under a cross-sectional design with weak internal validity because of time and resource constraints, a longitudinal research study that collects data on the same construct over time will enable researchers to uncover possible trends of the underlying variables (Tharenou, Donohue and Cooper, 2007). Second, a quantitative approach was used in this study, however, however, it did not identify other possible antecedents that may affect the relationships between the constructs under investigation. Further research on the same topic comprising both quantitative and qualitative approaches is recommended. Third, an online anonymous questionnaire was conducted to collect the research data for this investigation because of the extreme time and resource limitations, however, considering that this is the sole data collection method used in the study and despite the fact that every precautionary measure has been put in place, common method bias and variance may exist. Further research on the same topic comprising of both quantitative and qualitative approaches is recommended. This suggested action will certainly help to enrich research findings, identify factors and reasons behind this study's results, and further enhance the quality of the relevant research. Fourth, all data in this research were collected from Hong Kong's ICT practitioners and represent the perceptions of this particular group of people. This specific geographical, cultural, and industrial setting may limit the generalizability of the research findings. Therefore, it is recommended that further research be conducted under different geographical, cultural, and industrial settings to strengthen the generalizability of this research's results.

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