Cognitive Motivational Perspectives of Performance Measurement System and Organisational Commitment: Role Ambiguity as a Mediator

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Abstract

The use of Comprehensive Performance Measurement System (CPMS) in facilitating and influencing decisions has been predominant for such purposes. It is also a complex link of CPMS with individual performance which has been evidenced in the literature in recent years. Nonetheless, prior studies have shown inconsistent findings on CPMS informational characteristics and their behavioral implications. Therefore, by taking the cognitive motivational theory and role theory into account, the current study contends the usefulness of CPMS information in increasing role expectation and motivation. Accordingly, this study examines the influence of CPMS on the role ambiguity of managers and organizational commitment by collecting data from 120 business unit managers of manufacturing companies that are registered under the Federation of Malaysian Manufacturers (FMM). To further examine the mediating effect, the study employed Partial Least Squares and the Sobel test and found that the informational characteristics of CPMS enhance organizational commitment by reducing role ambiguity. Overall, CPMS may provide useful information or feedback to better understand the roles of managers to essentially enhance motivation and improve commitment.

Keywords: comprehensive performance measurement system, role ambiguity, organizational commitment

1. Introduction

Since the early 1990s, performance assessment has been a major concern for academics and practitioners. Although management accounting system (MAS)-based performance measurement was established early in the 20th Century (Ghalayini et al., 1997), the use of PMS is influenced by technological changes, reduced product lifecycles, and production process innovation. As traditional financial measures were claimed to be lacking comprehensiveness and precision in assessing performance as well as focusing more on short-term performance rather than long-term, they may no longer provide the necessary information for the decision-making process of managers sufficiently (Ittner & Larcker, 1998). As a result, the Balanced Scorecard (BSC) was introduced by Kaplan and Norton (1992) to explicate what the traditional accounting system is lacking, which is contingent on multiple financial and non-financial measures (Kaplan & Norton, 1996). Furthermore, many past studies have examined how SPMS such as BSC influences organizational performance (Chenhall, 2005; Davis & Albright, 2004; Hoque & James, 2000; Hyvonen, 2007; Ittner et al., 2003; Said et al., 2003; Van der Stede et al., 2006).

While SPMS and its behavioral implications remain the major focus in management accounting literature (Sharma, Sharma, & Agarwal, 2021; Appuhami, 2019; Moulang, 2015; Burney & Widener, 2007; Webb, 2004), studies have also evidenced the mediating effects of some factors on the link between PMS and individual outcomes, for instance, psychological empowerment and role clarity (Hall, 2008), role ambiguity and job-relevant information (Burney & Widener, 2007), trust and fairness (Lau & Sholihin, 2005), procedural fairness and organization commitment (Lau & Moser, 2008), as well as justice perception (Burney et al., 2009). Prior evidence shows the crucial influence of the PM system on managerial behavior, which coincides with the organizational theory that the long-term success of an organization is greatly influenced by individual actions (Sharma et al., 2021; de Haas & Kleingeld, 1999). Hence, this calls for further investigation into other possible influential factors in the relationship between PMS and

managerial behavior. To further examine how managerial behavior is influenced by the informational aspect of PMS, especially comprehensive PMS, the current study extends Hall's (2008) research by clarifying the use of PMS and focusing on managers' cognitive abilities in using the information supplied by CPMS as well as the influence of such information on the behavior of managers. According to Longenecker, Neubert, and Fink (2007), poor work relationships, ineffective communication, and failure to define goals or performance standards are among the primary causes of managerial failure in the 21st century. As a result of this managerial failure, employees experience dysfunctional stress, poor performance, and more employee turnover. Employee motivation also tends to decline without clear goals and performance standards, thereby resulting in a lack of resource allocation. As indicated by Chenhall (2003), MCS has a significant relationship with organizational outcomes; hence, it is important to highlight the influence of MCS on managerial behavior so that organizational performance can be enhanced. However, past research findings on the relationship of SPMS with organizational performance are rather ambiguous (Chenhall, 2005; Micheli & Manzoni, 2009). Although some studies have evidenced the potential role of SPMS in enhancing ROA and ROE (Ittner & Larcker, 2003), organizational performance (Hoque & James, 2000; Said et al., 2003; Van der Stede et al., 2006), and composite financial measure (Davis & Albright, 2004), other studies have also evidenced ambiguous findings or limitations to SPMS (Hyvonen, 2007; Ittner et al., 2003). For instance, according to Ittner et al. (2003), greater measurement emphasis and diversity or the BSC process are linked to higher stock market performance and increased satisfaction; however, BSC was found to have no relationship with economic performance.

The two main purposes of management accounting information, particularly performance measures, include the decision influencing role and decision facilitating role (Nguyen, Mia, Winata, & Chong, 2017; Grafton et al., 2010; Kren, 1992; Sprinkle, 2003; van Veen-Dirks, 2010). In performance evaluation functions, performance measures are used for the decision-influencing role (Kren, 1992; Sprinkle, 2003). However, for the decision-facilitating role, performance measures are used to supply information and guide the decision-making process of managers. CPMS plays a cognitive role by providing job-relevant information, reducing role conflict and role ambiguity (Burney & Widener, 2007), increasing goal commitment (Webb, 2004), and enhancing role clarity and psychological empowerment (Hall, 2008). In addition, CPMS and its behavioral implications for evaluators or superiors are another highlights of PMS research. Besides causing judgmental superior bias when evaluating performance across varying business units (Lipe & Salterio, 2000), the use of CPMS for performance evaluation may also result in fair and lenient performance evaluation (Moers, 2005) with the strategically linked measures having more impact than the non-linked measures (Banker et al., 2004). However, as managers frequently disregard certain PMS information, the use of SPMS (BSC) can be rather troublesome (Banker et al., 2004; Lipe & Salterio, 2000; Moers, 2005). A manager's inability to digest a great deal of information might be attributed to cognitive limitations; hence, these findings suggest that the association between SPMS and managerial performance is more nuanced and indirect. It is also anticipated that PMS should provide managers with feedback that will increase their motivation.

Due to the limited cognitive abilities of managers to handle competing demands as a result of having multiple goals, contemporary PMS has been identified to result in detrimental effects (Cheng et al., 2007) such as not being able to provide insightful feedback with reduced mission clarity and employee trust, which may lower employee motivation (Van Rinsum & Verbeeten, 2010). Therefore, CPMS is expected to reduce the role ambiguity of managers and increase the organizational commitment level by supplying better information, thus, positively impacting organizational commitment. Besides, as evidenced in the literature, organizational commitment plays a significant role in mediating organizational information with job satisfaction (Addae & Parboteeah, 2006), and past studies have also evidenced the relationships involving organizational commitment, role ambiguity, and role constructs (Addae et al., 2008; Chong et al., 2006; Dale & Fox, 2008; Glazer & Beehr, 2005; Meyer et al., 2002; Morris & Sherman, 1981; Yousef, 2002). Drawing from this evidence, employees who perceived a lower level of role ambiguity are likely to have higher organizational commitment. Figure 1 illustrates the research model.

2. Literature Review

2.1 Comprehensive Performance Measurement System (CPMS)

Various SPMS features such as subjective performance measure (Moers, 2005; Van der Stede et al., 2006), objective performance measure (Van der Stede et al., 2006), performance measure diversity (Henri, 2006; Ittner et al., 2003; Moers, 2005), performance measure formality (Hartmann & Slapnicar, 2009), multiple performance measures (Sholihin & Pike, 2008), and comprehensive performance measure (Burney & Matherly, 2007; Hall, 2008; Scott & Tiessen, 1999) have been examined in many previous PMS studies. However, these studies have mostly focused on measurement diversity whereby the researchers characterized PMS as a comprehensive range of measures in which

both financial and non-financial measures are incorporated.

Scott and Tiessen (1999), for instance, investigated the relationship of performance measurement with team performance and measured comprehensiveness based on various performance measurements categorized into financial performance (revenue, cost, or return) and non-financial performance (innovation, personnel, productivity, service, and quality). Likewise, Burney and Matherly (2007) also used various measures to indicate comprehensive performance measure, which expresses the degree to which a performance management system includes a wide range of performance measures. With reference to the viewpoints of BSC, measures are generally categorized into eight elements: financial outcomes, customer outcomes, employee outcomes, product/service quality, operational performance, organizational procedures, innovation in processes, and information system capabilities.

According to Van der Stede et al. (2006), measurement diversity is a crucial component of comprehensive PMS, which is an extensive PMS that includes financial performance measures and non-financial performance measures (subjective and objective). Meanwhile, another feature of comprehensive PMS was proposed by Chenhall (2005), who determined the important aspects of SPMS such as BSC that might help managers create competitive strategies. According to Chenhall (2005), SPMS has unique characteristics that can provide managers access to both financial and non-financial measures, which when combined, give managers knowledge to transform strategy into a cohesive set of performance measures with a competitive advantage. Additionally, the author contended that comprehensive PMS further explains how business operations are linked to strategy (Chenhall, 2005).

As evidenced by White (2008) in a study of 1,990 organizations, SPMS supplies quality information. By examining the use of financial and non-financial performance measures in SPMS and its relationship with SPMS outcomes, information quality, and effectiveness, White (2008) found that non-financial measures are strongly correlated with information quality and effectiveness. Therefore, the system's ability to measure performance comprehensively would result in higher-quality information and this further suggests that the more measures an organization incorporates into the SPMS design, the greater the quality of information the SPMS will create. Similarly, as suggested by Nanni, Dixon, and Vollmann (1992), comprehensive PMS also entails measures that work with the strategy to deliver information about the key areas of organizations and various value chain segments. Nanni et al. (1992) presented empirical evidence of the development of PMS from conventional management accounting to strategic performance management systems. Thus, relevant information regarding the performance dimension of various organizational components can be provided via integrated PMS.

Malina and Selto (2001) asserted that BSC is deemed comprehensive since it offers organizations a wider range of performance measures than the conventional ones and that the system utilizes several items for running the organizations collectively. According to Malina and Selto (2001), BSC is a comprehensive PMS that entails important financial and non-financial measures that represent overall achievement in handling the critical factors of organizations. BSC particularly provides a larger range of success indicators than conventional financial and market share indicators. As a result, CPMS would adequately supply information for managers to effectively manage the entire organization for both present and future outcomes (Malina & Selto, 2001, p.70). While the measures tie together several factors that make them relevant to operate the organization, CPMS encourages strategic alignment since it uses a limited set of performance measures that are connected to organizational strategy.

In the current study, which is based on Hall's (2008) research, the term "comprehensive PMS" particularly refers to the large collection of measures (Burney & Matherly, 2007; Scott & Tiessen, 1999) connected to the key organizational components (Ittner et al., 2003; Malina & Selto, 2001). PMS is deemed comprehensive because the wide range of measures are not only interrelated, but they are also developed to supply information to the entire organizational performance (Henri, 2006; Nanni et al., 1992). Thus, comprehensive PMS delivers information about various value chain components and incorporates measures and strategy (Nanni et al., 1992). Additionally, Chenhall (2005) asserted that comprehensive PMS should incorporate both financial and non-financial measures that account for broader views and give insights into the connection between business operations and strategy.

2.2 Role Ambiguity

One of the components of the role theory construct is role ambiguity, which occurs when managers lack the necessary information to choose the job behaviors that will serve them best or when responsibilities, authority, and obligations become rather vague (Burney & Widener, 2007; Tubre & Collins, 2000). Role ambiguity also refers to the discrepancy between the information needed to complete a job and the information that is already accessible (Burney & Widener, 2007). In general, organizational stress and complexity, reorganization, the rapid growth of organizations, technical advancements, and increased changes in personnel and the organizational environment are among the major causes of role ambiguity (Kahn et al., 1964). Accordingly, as eloquently stated by Rogers and

Molnar (1976), these dimensions of role construct affect performance significantly.

MAS information, according to Collins (1982), plays a significant role in the control process. By exploring the link involving MAS with organizational control, Collins (1982) indicated that organizations comprise role systems in which the effectiveness of social control would be expedited if management could control the norms, values, and role expectations in organizations. In the role theory context, Collins (1982) argued that MAS is not only effective in conveying role expectations, but it also significantly influences performance. Hence, comprehensive PMS can offer more pertinent information that improves the managers' role clarity. Besides, prior research has also shown the cognitive function of conventional PMS (Chenhall & Brownell, 1988; Chong et al., 2006; Kren, 1992).

Cognitive and social psychology studies on PMS have delved into SPMS and its influence on managerial behavior (Burney & Widener, 2007; Hall, 2008) and shown that the information supplied by SPMS assists managers in focusing on their mental representations of the organizations. According to Burney and Widener (2007), SPMS is linked to job-relevant information (JRI), which reduces the degree of role ambiguity. Evidently, a lower role ambiguity level is also linked to strategy-related PMS. In contrast to the role ambiguity construct that measures the extent to which managers understand their roles and obligations, JRI, on the other hand, is a construct that measures available information for managers to carry out job-related activities (Kren, 1992).

SPMS may give managers more consistent and clear information about their work requirements as well as improved communication. According to Hall (2008), CPMS can enhance the role clarity, motivation, or empowerment of managers, thus enhancing their performance. Besides, as evidenced by Jackson and Schuler (1985), Rizzo et al. (1970), and Rogers and Molnar (1976), the formalization of goals in organizations is associated with reduced role ambiguity in that the two variables are significantly linked. While PMS entails formal goals determined in advance and in writing, employee perceptions of roles are also made clearer by the formalization of goals, such as through written rules and procedures that guide the work activities. In this regard, comprehensive PMS is likely to facilitate the formalization of goals, which can further increase the managers' role clarity.

Additionally, CPMS such as BSC has certain features that may allow organizations to reinforce strategy through management levels. Top management consensus on organizational strategy, for instance, is a component of the BSC strategy link (Epstein & Manzoni, 1998). Likewise, the Tableau de bord, the concept of a Balanced Scorecard may also be passed down to managers who utilize the four perspectives of the scorecard in organizing their own goals and linking them to the strategic plan of the bigger unit. Consequently, such a procedure is likely to not only reduce the managers' uncertainty, but also improve the role expectations for both subordinates and superiors.

2.3 Organizational Commitment

In defining commitment, Mowday et al. (1979) categorized several approaches through two major viewpoints: behavioral and attitudinal (DeCotiis & Summers, 1987). In general, organizational commitment refers to the willingness to put in substantial effort for an organization (Mowday et al., 1979; Porter et al., 1974). Commitment, according to Porter et al. (1974), also includes three elements: the internalization of organizational values, strong attachment to the organization, and the willingness to strive towards achieving the goals of the organization. While the attitudinal concept that is contingent on the cognitive state of organizational attachment was highlighted by De Cotiis and Summers (1987), organizational commitment was further conceptualized and examined by Meyer and Allen (1991) according to three components: affective, continuance, and normative components.

Affective component refers to the degree to which employees have an emotional attachment and involvement with their organizations as well as the organizational values and goals. According to Meyer and Allen (1984), the same information is provided by Porter et al.'s (1974) and Mowday et al.'s (1979) measures of organizational commitment as well as Allen and Meyer's (1990) affective commitment scale. Based on the psychology and accounting literature, MAS information can give managers internal cues for making assessments and choices. Likewise, as PMS is one of the MAS components, feedback from PMS may also give managers information and input that could improve the intrinsic motivation of individuals (Ilgen et al., 1979; Luckett & Eggleton, 1991).

As evidenced in PMS studies, the decision facilitating role of PMS was found to significantly increase creativity (Webster, 2006), enhance psychological empowerment and role clarity (process clarity and goal clarity) (Hall, 2008) as well as decrease role ambiguity (Burney & Widener, 2007). Moreover, studies on the factors of organizational commitment have also indicated the relationship between these factors and employee commitment, for instance, role characteristics (Addae et al., 2008; Chong et al., 2006), intrinsic motivation (Moon, 2000), information adequacy (Addae & Parboteeah, 2006; De Ridder, 2004), and employees' sense of competence (Allen & Meyer, 1990; Ketchand & Strawser, 2001; Morris & Sherman, 1981) and comfort (Ketchand & Strawser, 2001).

Addae and Parboteeah's (2006) study was the first to investigate the link of organizational information with organizational commitment, and the authors found that organizational information has a positive influence on affective commitment and job satisfaction, but a negative relationship with turnover intention. As employees are provided with more information, their organizational commitment level increases and this reduces the possibility of employee turnover. Since CPMS is a component of the organizational information system, a more comprehensive PMS will, therefore, provide more information for the employees and increase their commitment level. In addition, employee commitment was also found to be influenced by task-related information (De Ridder, 2004) such that high-quality task-related information will enhance employees' commitment to the organization. Furthermore, the sense of competence among individuals is also influenced (Ilgen et al., 1979) through insightful feedback. Since CPMS provides comprehensive feedback (Burney & Widener, 2007) that increases the SBU managers' intrinsic motivation or self-competence (Hall, 2008; Luckett & Eggleton, 1991), information from CPMS is, therefore, expected to increase organizational commitment and further improve job performance.

The organizational commitment of employees is likewise influenced by information adequacy. Based on the study by Trombetta and Rogers (1988), the three predictors of organizational commitment include participation in decision-making, communication openness, and information adequacy. Using the instrument proposed by Alutto, Hrebiniak and Ramon (1973), the authors examined organizational commitment and found that the three predictors, especially information adequacy, have a significant influence on organizational commitment. Therefore, with information adequacy serving as a good determinant of organizational commitment, it can be deduced that managers who prioritize job-related information are likely to increase their organizational commitment level.

Allen and Meyer (1990) explored the relationship between each commitment element and the determinants of commitment evidenced in prior studies. Personal characteristics, structural characteristics, job characteristics, and work experience are the four categories of determinants of affective attachment. Overall, their findings showed a significant correlation between work experience and affective commitment such that employees will feel more emotionally connected to the organization if they feel at ease with their abilities and roles (Allen & Meyer, 1990). Role clarity, goal clarity, personal importance, and feedback are among the variables of work experience.

Given the positive association between CPMS and goal clarity (Hall, 2008), CPMS is assumed to be connected to affective commitment. Furthermore, according to Hall (2008), CPMS also has a positive relationship with goal clarity whereby goal clarity or subunit objectives are brought forth by the informational characteristics of CPMS, thereby enhancing employee commitment level. In an early study by Morris and Sherman (1981), the determinants of organizational commitment advocated by Steer (1977) such as personal characteristics, role-related characteristics, and work experiences were examined. Based on their results, a sense of competence from the personal characteristics determinant significantly influences commitment, suggesting that work conditions that support individual development and individual needs for achievement may result in favorable employee attitudes in the organization and increased engagement levels in the organization (Morris & Sherman, 1981).

Additionally, organizational commitment has also been found to be associated with intrinsic motivation (Moon, 2000). Moon (2000) in their study investigated how the dimensions of motivation (intrinsic and extrinsic motivation) influence organizational commitment in public and private organizations. They found that organizational commitment has a positive relationship with the sense of work importance and sense of achievement, which are the variables of perceived intrinsic motivation. According to the expectancy theory, which is consistent with the traditional theories of motivation, both subjective and extrinsic expectations are positively correlated with organizational performance and commitment (Moon, 2000). Besides demonstrating the significant relations in both private and public organizations, the findings also suggest that the factors of intrinsic motivation play a significant role in increasing perceived organizational commitment. Organizational commitment was also evidenced to have a significant positive relationship with other factors such as empowerment and goal clarity.

3. Theoretical Framework and Hypothesis Development

The development of the theoretical framework in this study is contingent on the cognitive and motivational psychology theory, which is relevant to the management accounting context. Besides explaining how individual behavior is influenced by the individual cognitive processing of management accounting information (Birnberg et al., 2006), the theory may also explain how feedback can impact performance (Renn, 2003), for instance, through facilitating error correction (cognitive perspective) and internal work motivation (motivational perspective). Furthermore, the relationships among constructs in the study are also supported by the role theory.

In the context of managers in particular, the information that an individual is provided with may result in some behavioral implications that may have an influence on individual performance. These foundations serve as the basis

for the current study's integrative model of the relationship between CPMS and organizational commitment, which will focus on the links that involve CPMS, role ambiguity, and organizational commitment. Therefore, as illustrated by the theoretical framework in Figure 1, the hypotheses for supporting the research model are developed in this study to propose both the direct and indirect relationships among constructs.

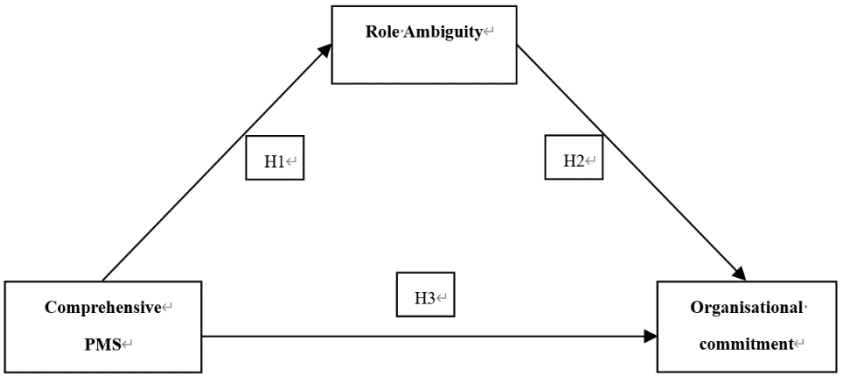

Figure 1. Conceptual framework of the relationships among CPMS, role ambiguity, and organizational commitment

3.1 CPMS and Role Ambiguity

Based on Figure 1, the proposed model suggests the association between CPMS and reduced role ambiguity. In general, role ambiguity occurs when an individual feels that the behavioral requirements of their employment are unclear (Rizzo et al., 1970). Meanwhile, comprehensive PMS essentially coordinates, monitors, and diagnoses organizational information (Atkinson, Waterhouse, & Wells, 1997). Particularly, the comprehensive PMS monitoring function can offer information on the evaluation of the progress being made towards reaching organizational goals. Besides, according to Ilgen et al. (1979), comprehensive information from MAS (internal source) also helps clarify managers' roles. Since PMS is a component of MAS, comprehensive PMS is more likely to include comprehensive information to describe the managers' expected roles. Therefore, to lessen role ambiguity, the current study predicts that comprehensive PMS would give managers more pertinent information.

As contended by Ilgen et al. (1979), feedback or information is necessary for effective role performance; hence, it would not only influence individual behavior, but it may also assist individuals in learning and completing their tasks more efficiently. Based on Colin's (1982) psychology research in the role theory setting, MAS provides information about an individual's role expectations and has a motivating impact on performance. Additionally, Burney and Widener's (2007) PMS-related research has shown a connection that involves SPMS with job relevant information (JRI), particularly a positive direct and indirect relationship between SPMS and role ambiguity as well as a direct negative relationship between SPMS and role ambiguity. Furthermore, their findings pointed to a connection between SPMS and role ambiguity through enhanced JRI, which consequently reduces role ambiguity (Burney & Widener, 2007). Two performance measure functions, namely decision influencing role and decision facilitating role, were also emphasized by Sprinkle (2003) whereby the latter particularly provides pertinent information to assist managers in the decision-making process (Nguyen et al., 2017; Kren, 1992; Sprinkle, 2003).

In another PMS study by Hall (2008), comprehensive PMS and its importance to role clarity were highlighted such that comprehensive PMS is significantly linked to managerial performance through goal clarity and process clarity. Likewise, a recent study by Frare and Beuren (2021) has also shown similar findings on comprehensive PMS and how its application increases role clarity. While PMS positively influences the creativity of managers by stimulating the development of practical and beneficial novel ideas, role clarity, on the other hand, helps transform foster PMS objectives into creativity. Caker and Siverbo (2018) highlighted the crucial role of PMS in enhancing role clarity since the system helps ensure that the goals of the organizations are clear amid more complicated and ambiguous objectives. However, Rizzo et al. (1970) in their empirical study demonstrated a negative relationship between the formalization of goals and role ambiguity, which was further corroborated by Roger and Molnar (1976) on the negative link that involves formalization measures (goal clarity and formalization index) with role ambiguity. As comprehensive PMS offers specific goals that are defined both in advance and in writing, the current study, therefore, suggests that comprehensive PMS would reduce role ambiguity in general and that the cognitive role of comprehensive PMS may particularly reduce the role ambiguity of employees and enhance their organizational commitment. In this regard, the current study proposes the following hypothesis:

H1: CPMS has a negative relationship with role ambiguity

3.2 Role Ambiguity and Organizational Commitment

Role ambiguity and organizational commitment have been linked directly and negatively in many past studies employing Rizzo's scale (Addae et al., 2008; Yousef, 2002). For instance, Addae and Parboteeah (2008) as well as Yousef (2002) found a negative relationship between role ambiguity and the two components of organizational commitment, namely affective and normative commitment. Similarly, based on a meta-analysis literature review of prior studies, role ambiguity was also found to have a negative relationship with commitment (Fisher & Gitelson, 1983; Jackson & Schuler, 1985) and prior meta-analysis of organizational commitment has likewise demonstrated similar findings (Meyer et al., 2002). Furthermore, as evidenced by Rizzo et al. (1970) and Van Sell et al. (1981), role ambiguity shows a stronger negative relationship with commitment compared to other role constructs. Morris and Sherman (1981) also indicated that role ambiguity is not a key predictor of organizational commitment because the variable did not significantly contribute to the variation explained in organizational commitment in their study. Besides, based on Chong et al.'s (2006) budgeting study, role ambiguity was found to have a negative relationship with organizational commitment such that low ambiguity will result in higher organizational commitment from subordinates. Ketchand and Strawser (2001) in their analysis of the determinants of organizational commitment also evidenced the influence of role ambiguity or clarity on organizational commitment. Therefore, drawing from the findings of the abovementioned past studies, the current study proposes the following hypothesis:

H2: Role ambiguity has a negative relationship with organizational commitment

3.3 CPMS and Organizational Commitment

The implementation of comprehensive PMS is aimed at encouraging managers' involvement with actions that are in line with the organizational strategy (Kaplan & Norton, 1996). According to Porter et al. (1974) and Mowday et al. (1979), organizational commitment refers to the degree to which a person identifies with and participates in an organization. However, it has been explored and argued that organizational commitment consists of three elements, namely continuance commitment, normative commitment, and affective commitment (Allen & Meyer, 1990). While continuance commitment indicates that employees stay with their organization because they have no choice, normative commitment suggests that employees remain in the organization out of their sense of duty, while affective commitment implies that employees stay in the organization because it is their choice. Overall, affective commitment is the most frequently used concept, hence, will be employed in the present study.

Comprehensive PMS has positive implications according to PMS-related studies. Burney and Widener (2007), for instance, suggested that managers can benefit from the JRI provided in SPMS. In general, JRI refers to information that facilitates the decision-making process of managers (Kren, 1992). Studies have also demonstrated the implications of cognitive influence on the organizational commitment level of employees, for instance, through task-relevant information. Based on Addae and Parboteeah's (2006) study on organizational commitment as a mediator between organizational information and job satisfaction, the provision of task-relevant information was found to increase employees' organizational commitment. When employees are well-informed about their position and working circumstances, they can associate with the organization, deal with its challenges, and adapt to it more effectively (Addae & Parboteeah, 2006; De Ridder, 2004; Trombetta & Rogers, 1988).

Additionally, SPMS provides feedback to managers about the achievement of their goals (Atkinson et al., 1997; Kaplan & Norton, 1996). While Ilgen et al. (1979) as well as Luckett and Eggleton (1991) asserted that feedback from MAS can increase intrinsic motivation by providing a sense of competence-related capability; Meyer, Allen, and Topolnytsky (1998, pg. 3) further stated that affective commitment is enhanced by work experience that increases the sense of competence among employees, including role clarity through comfort in the workplace and self-worth through feedback. Besides, Hall's (2008) research on PMS similarly found that CPMS leads to positive behavioral implications such that comprehensive PMS will provide managers with appropriate performance information, thus increasing their intrinsic motivation and fostering the growth of psychological empowerment.

Generally, individuals with high organizational commitment often have high intrinsic motivation (Moon, 2000). According to Gist and Mitchell (1992), information may help managers better understand not only their roles, but also the workplace and other factors, which will increase their sense of competence. Likewise, CPMS was also proven to improve managers' sense of competence because it provides them with greater information about their work environment and responsibilities (Hall, 2008). With the sense of competence being a key predictor of organizational commitment (Morris & Sherman, 1981), the current study proposes the following hypothesis:

H3: CPMS has a positive relationship with organizational commitment

4. Research Methodology

4.1 Sample Selection and Data Collection

The data in this study were collected using questionnaires, which were distributed to business unit managers within manufacturing companies in Malaysia. To present some extent of control in the industry, the samples of this study were solely focused on manufacturing companies (Lau & Moser, 2008). Furthermore, as the manufacturing industry is more open to contemporary PMS, it is connected to comprehensive PMS development (Ong & the, 2008). As such, many past studies on strategic PMS have concentrated on manufacturing companies (Hall, 2008; Burney & Widener, 2007). For instance, in Malaysia, larger organizations tend to adopt contemporary PMS compared to SMEs because they have greater resources to cater to the demand for a more profound body of knowledge and skills to put the more progress contemporary PMS into practice (Ong & Teh, 2008).

In this study, the researcher distributed 600 surveys to 600 managers, who were selected through random sampling from organizations under the Federation of Malaysian Manufacturers (FMM). Although the number forms the sampling frame of the current study, the sample only included organizations with more than 150 employees. Of 600 surveys, only 134 were returned; however, only 120 surveys were usable as the remaining 14 were incomplete, thus yielding a 20% response rate. To examine non-response bias issues in the data, the sample was dichotomized per the response dates and further categorized into early and late respondents. Overall, the study recorded 67 early responses (those who responded within a month) and 53 late responses (those who responded after one month). Based on the outcome of the independent t-test, there was no significant difference in the responses provided by the two groups; hence, non-response bias was not an issue in the current study and could be disregarded.

4.2 Measurement of Variables

All the constructs in this study were measured using instruments that have been validated in previous studies.

In this study, Hall's (2008) instrument was used to measure the comprehensiveness of PMS. Although Hoque and James's (2000) instruments have been commonly used in past studies, the instruments have several limitations in which they reflect the specific measures employed by the organization in the sample (Hall, 2008). While it is typical for organizations to employ the same financial measures, they may still differ in terms of non-financial measures when managers prefer to focus on specific information in PMS; thus, organizations tend to rely more on common measures than specific measures for the business unit (Banker et al., 2004; Lipe & Salterio, 2000).

In addition, since the instruments were incapable of accurately reflecting the conditions of BSC usage, they are unable to detect the strategic linkages of a BSC in real-time (Hall, 2008; Hoque & James, 2000). Hall's (2008) instrument could, therefore, represent PMS comprehensiveness more effectively. Hall's (2008) instrument comprises nine items, specifically five items that represent the degree to which PMS delivers performance information for significant SBU activities and four other items adapted from Chenhall (2005) to examine the extent of the measures' integration with strategy and value chain. Accordingly, the degree to which each attribute occurs in the business unit PMS was indicated using a Likert scale that ranges from 1 (not at all) to 7 (a significant extent).

Similar to the measurement used in many past studies, the current study also adopted Rizzo et al.'s (1970) scale to measure role ambiguity. The eight-item scale developed by Rizzo et al. (1970) was adopted in this study owing to its high reliability, especially in measuring role ambiguity (Jackson & Schuler, 1985; Van Sell, Brief & Schuler, 1981). However, it should be noted that the current study only used six items to measure role ambiguity and that the items were negatively written and scored in reverse to lessen the impact of response bias (Dale & Fox, 2008). In fact, the Rizzo scale has also been employed to analyze role ambiguity in many accounting-related studies, especially in budgeting and PMS (Burney & Widener, 2007; Chenhall & Brownell, 1988; Chong, et al., 2006). Despite criticism of the Rizzo scale (Sawyer, 1992), past psychometric analysis of this instrument indicates that its ongoing application seems to be justified (Schuler et al., 1977). Accordingly, a seven-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree) was used to measure the role ambiguity construct in this study.

The current study measured organizational commitment based on Mowday et al.'s (1979) Organisational Commitment Questionnaire (OCQ), a nine-item scale that is most frequently used for unidimensionally measuring organizational commitment (Meyer et al., 2002). Besides using a seven-point Likert scale that ranges from 1 (strongly disagree) to 7 (strongly agree), the OCQ instrument has also been used in many accounting studies (Chong et al., 2006; Lau & Moser, 2008; Nouri & Parker, 1998). Besides, in measuring affective commitment, Mowday et al.'s (1979) nine-item scale also appears to be more suitable (Dale & Fox, 2008; Reichers, 1985).

4.3 Structural Equation Modelling (SEM) – Partial Least Squares (PLS)

Partial Least Squares (PLS) was used to test the hypotheses proposed in this study (Ringle et al., 2005). PLS, which is one of the SEM techniques, is universal and adaptable for evaluating causal predictions (Hulland, 1999), which explain why it has been employed in numerous studies for path coefficient estimation in the structural model (Chin et al., 2003). Besides, the current study used PLS regression analysis through SmartPLS because it is not only suitable for small sample size, but it also requires no explicit data distribution assumption and can conform to non-normal data (Chin, 2000; Hulland, 1999; Vandenbosch, 1999). Furthermore, numerous accounting researchers have likewise used PLS in their studies (Chenhall, 2004, 2005; Hartmann, 2005; Hartmann & Slapnicar, 2009; Webster, 2006). Although both measurement and structural models are estimated in PLS, the analysis of the models is conducted in two steps, particularly by examining the measurement model's reliability and validity, as well as by assessing the structural model (Fornell & Larcker, 1981; Vandenbosch, 1999).

5. Results

5.1 Descriptive Analysis

The descriptive statistics for the research constructs are presented in Table 1. Overall, the mean values for CPMS, organizational commitment, and role ambiguity are greater than the theoretical ones. However, the results are especially anticipated for CPMS because the current study includes large manufacturing companies as the research sample. This is because, according to Lau and Moser (2008), large organizations are more likely to require more advanced accounting and control procedures that are particularly designed for them.

Table 1. Descriptive Statistics of Main Variables (n = 120)

Variable	Mean	Median	Standard Deviation	Actual Range		Theoretical Range	
				Min	Max	Min	Max
CPMS	5.120	5.111	0.912	1.78	7.00	1.00	7.00
RA	2.743	2.833	0.856	1.00	5.67	1.00	7.00
OC	5.143	5.056	0.875	2.89	7.00	1.00	7.00

CPMS = Comprehensive PMS; OC = Organisational Commitment; RA = Role Ambiguity

5.2 Data Analysis

Before assessing the structural model, the reliability and validity of the multi-item scales in the measurement model were assessed in this study, particularly in terms of item reliability, construct reliability, as well as the convergent and discriminant validity of the research constructs. First, the study examined the factor loading of each variable and found eight items loading on their respective constructs; however, two items recorded a factor loading below 0.5 (RA1 = 0.477 and JP8 = 0.409) (Hulland, 1999). Hence, they were removed from the measurement and not used in the following analysis to avoid any possible bias in estimating the parameters associated with the constructs (Hulland, 1999). Next, the study conducted PLS analysis and the results demonstrated satisfactory reliability, including convergent and discriminant validity. The analysis results are depicted in Table 5, Table 6, and Table 7.

5.3 Measurement Model

Table 2 presents the properties of the measurement model. Evidently, all factor loadings exceeded 0.6, suggesting satisfactory item reliability in that the constructs shared more than 50% of the variance observed in the variables (Chin, 1998). In terms of measuring internal consistency or construct reliability in PLS, Tenenhaus, Esposito Vinzi, Chatelin and Lauro (2005) asserted that Dillon-Goldstein ρ (Werts et al., 1974) is more favorable than Cronbach's α (Henseler, Ringle, & Sinkovics, 2009; Hartmann & Slapnicar, 2009) because Cronbach's α tends to severely underestimate the internal consistency of latent variables in PLS path models. Therefore, it is more reasonable to use an alternative measure such as composite reliability since PLS prioritizes indicators based on their dependability, thus producing a more reliable composite (Henseler et al., 2009; Werts et al., 1974). Overall, the results showed satisfactory construct reliability because all composite reliability indicators were more than 0.7.

Validity assessment includes two validity subtypes, namely convergent validity and discriminant validity. In general, all the reflective constructs showed satisfactory convergent validity. Based on the results in Table 2, as the average variance extracted (AVE) is not less than 0.598, more variance was explained in the variables linked to a particular construct, on average (Fornell & Larcker, 1981).

Table 2. Properties of Measurement Model

Construct	Indicators	Factor Loadings	Composite Reliability	Average Variance Extracted	Cronbach's Alpha
Comprehensive PMS	CPMS1	0.822	0.945	0.658	0.934
	CPMS2	0.645			
	CPMS3	0.841			
	CPMS4	0.848			
	CPMS5	0.823			
	CPMS6	0.892			
	CPMS7	0.846			
	CPMS8	0.804			
	CPMS9	0.752			
Role Ambiguity	RA2	0.798	0.927	0.719	0.901
	RA3	0.800			
	RA4	0.837			
	RA5	0.911			
	RA6	0.886			
Organisational Commitment	OC1	0.698	0.935	0.617	0.921
	OC2	0.823			
	OC3	0.632			
	OC4	0.757			
	OC5	0.885			
	OC6	0.840			
	OC7	0.875			
	OC8	0.778			
	OC9	0.744			

CPMS = Comprehensive PMS; OC = Organisational Commitment; RA = Role Ambiguity.

Meanwhile, in terms of discriminant validity, the two ways for determining its complementary concept include the Fornell-Larcker criterion and cross-loadings. While the Fornell-Larcker criterion examines discriminant validity per each construct, cross-loadings, on the other hand, evaluates the level of each indicator (Henseler et al., 2009). The Fornell-Larcker criterion outlines that a latent variable has more variance with the indicators assigned to it than with any latent variable (Henseler et al., 2009). Thus, in a statistical manner, the correlation between a construct and its indicators (the square root of the AVE) should be higher than the correlation of the construct with any construct (Fornell & Larcker, 1981). Based on Table 3, the discriminant validity of the constructs is deemed sufficient because the entire diagonal elements (the square root of the AVE; 0.811, 0.785 & 0.848) are more than the off-diagonal elements, as can be seen in the matching rows and columns.

Table 3. Construct Means, Standard Deviations, and Intercorrelations from the Measurement Model

Variable	Mean	SD	Correlations		
			CPMS	OC	RA
CPMS	5.120	0.912	0.811		
OC	5.143	0.875	0.509	0.785	
RA	2.743	0.856	-0.592	-0.535	0.848

CPMS = Comprehensive PMS; OC = Organisational Commitment; RA = Role Ambiguity.

Meanwhile, the second discriminant validity criterion is deemed fulfilled when each indicator's loading is greater than the entire cross-loadings of the indicator (Chin, 1998; Henseler et al., 2009). As can be seen in Table 4, another discriminant validity criterion is fulfilled as the entire indicators are above the intended construct in comparison to other constructs (Chin, 1998; Henseler et al., 2009). In general, the assessment of the measurement model yields a positive outcome, thus suggesting the validity and reliability of the constructs and confirming that the subsequent analysis could proceed with assessing the structural model.

Table 4. Cross-loading (Full Sample, n = 120)

	CPMS	OC	RA
CPMS1	0.822	0.413	-0.493
CPMS2	0.645	0.481	-0.468
CPMS3	0.841	0.406	-0.471
CPMS4	0.848	0.464	-0.448
CPMS5	0.823	0.309	-0.410
CPMS6	0.892	0.478	-0.564
CPMS7	0.846	0.373	-0.473
CPMS8	0.804	0.376	-0.475
CPMS9	0.752	0.362	-0.488
OC1	0.461	0.698	-0.569
OC2	0.358	0.823	-0.378
OC3	0.325	0.632	-0.323
OC4	0.449	0.757	-0.374
OC5	0.336	0.885	-0.397
OC6	0.411	0.840	-0.468
OC7	0.338	0.875	-0.455
OC8	0.491	0.778	-0.357
OC9	0.390	0.744	-0.401
RA2	-0.461	-0.503	0.798
RA3	-0.432	-0.465	0.800
RA4	-0.503	-0.409	0.837
RA5	-0.568	-0.469	0.911
RA6	-0.536	-0.428	0.886

CPMS = Comprehensive PMS; OC = Organisational Commitment; RA = Role Ambiguity.

5.4 Structural Model and Hypothesis Testing

The assessment of the structural model is the second stage of PLS analysis in which the hypotheses were analyzed in terms of the path coefficients (β), t-values, and the variance explained (R^2). Generally, the path coefficients determine the direction and strength of relationships among latent variables with explanations similar to the Ordinary Least Squares (OLS) regression. Nonetheless, since PLS has no explicit distribution assumption, the parameter's statistical significance was evaluated using a bootstrap procedure with 500 replacements (Chin, 1998). Besides, since PLS considers that all measured variances can be explained (Chin et al., 2003), PLS structural models could also be examined using a measure that focuses more on predictions such as R^2 (Hall, 2008).

Based on the structural model results in Table 5, the significance of the three hypotheses H1 (β = -0.593), H2 (β = -0.365), and H3 (β = 0.296) has been confirmed. Evidently, role ambiguity has a negative relationship with both CPMS (t = 13.150, p<0.01) (H1) and organizational commitment (t = 6.757, p<0.01) (H2); therefore, the first and second research hypotheses are supported. Meanwhile, based on the path of CPMS with organizational commitment, a positive relationship could be observed between the two variables (t = 5.037, p<0.05) (H3).

Table 5. Path Coefficient and PLS Structural Model Results

Hypothesis	Path	Path Coefficient	t-value	Result
H1	CPMS -> RA	-0.593	13.150***	Supported
H2	RA -> OC	-0.365	6.757***	Supported
H3	CPMS -> OC	0.296	5.037***	Supported

CPMS = Comprehensive PMS; OC = Organisational Commitment; RA = Role Ambiguity.
* p<0.10, ** p<0.05, ***p<0.01 (one-tailed)

Table 6 presents the variance explained (R^2) of the key endogenous constructs, namely organizational commitment (0.349) and role ambiguity (0.352), which reflects predictive power in the structural model. Overall, the results have shown that the model adequately describes most of the endogenous constructs based on each R^2 value. As advocated by Baron and Kenny (1986), a mediation effect takes place when the independent variable significantly predicts the mediator, when the mediator significantly predicts the dependent variable, and when the link between the independent and dependent variables is significant (partial mediation) or insignificant (full mediation). The mediating effect of role ambiguity in the model is presented in Table 6.

Table 6 shows the mediating variable and its effect on the direct relationship between CPMS and organizational commitment. First, the path coefficient of CPMS with organizational commitment demonstrates a positive and significant effect on organizational commitment (β = 0 .522, p<0.01, t = 15.203); however, upon introducing role ambiguity as a mediator, the relationship between CPMS and role ambiguity (β = -0.593, p<0.01, t = 13.150) and the relationship between role ambiguity and organizational commitment (β = -0.365, p<0.01, t = 6.757) remain significant. Nonetheless, when role ambiguity was introduced into the model, the direct relationship of CPMS with organizational commitment became less significant as the path coefficient recorded a lower significance value (β = 0.296, p<0.01, t = 5.037). Overall, these results show partial mediation in which role ambiguity partially mediates the relationship between CPMS and organizational commitment (Baron & Kenny, 1986). Therefore, it can be deduced that CPMS has an indirect effect on organizational commitment when mediated by role ambiguity.

Table 6. Direct and Indirect Effects

Path	Direct Relationship	Partial Mediated Relationship	R^2
n = 120 Mediator		RA	
Effect on Role Ambiguity CPMS > RA		-0.593 (13.150)***	0.352
Effect on Organisational Commitment CPMS > OC RA > OC	0.522 (15.203)***	0.296 (5.038)*** -0.365 (6.757)***	0.349

CPMS = Comprehensive PMS; OC = Organisational Commitment; RA = Role Ambiguity.
Each cell reports the path coefficient (t-value); * p<0.10, ** p<0.05, ***p<0.01 (one-tailed)

Next, the Sobel test (Sobel, 1982) was used to analyze the significance of the indirect effects and to estimate the standard deviation. The following path depicts the indirect effect of CPMS on organizational commitment:

CPMS – RA – OC

The path outlined above exclusively indicates the indirect effect through role ambiguity. Evidently, as shown in Table 7, the t-values associated with the indirect impact were statistically significant at the 1% significance level based on the assessment of standard deviation using the Sobel method. Therefore, from the results, it can be deduced that job ambiguity mediates the relationship between CPMS and organizational commitment.

Table 7. Analysis of Indirect Effects (n = 120)

Indirect Effect of CPMS on OC	Indirect Effect Coefficient	Standard Deviation of Coefficient	t-value
OC	0.32604	0.05743	5.1618

CPMS = Comprehensive PMS; RA = Role Ambiguity; OC = Organisational Commitment.

All t-values are statistically significant at the 1% level (one-tail test). The formula for the standard deviation of the coefficient is presented in Appendix A. Indirect effect coefficients were calculated using unstandardized path coefficients.

6. Discussion, Limitations, and Suggestions for Future Research

The current study has both theoretical and practical implications. In terms of theoretical implications, this study adds to the body of knowledge on MAS, especially the design of PMS. As the study incorporates the role theory and the cognitive motivational theory, the findings can enlighten management accounting information such as CPMS and its behavioral implications for organizational commitment. Besides, since CPMS provides managers with information pertinent to their tasks, the managers' organizational commitment can, therefore, be enhanced as their role ambiguity level decreases. While the findings coincide with prior studies on the positive effects of CPMS information on managerial behaviour (Burney & Widener, 2007; Hall, 2008; Webb, 2004), the current study is ultimately the first to evidence CPMS and how it influences role ambiguity and organizational commitment.

In terms of practical implications, the findings of the study may highlight PMS implementation in manufacturing companies in Malaysia, which can be put into practice in the future. Besides exploring the implementation and design of PMS in Malaysian companies, the study has also looked into the implementation of comprehensive PMS as well as its behavioural implications in the Malaysian context. Additionally, as the study has examined the factors influencing PMS implementation, the findings may assist companies in devising related policies and procedures and consequently promote organizational commitment through reduced role ambiguity.

Nonetheless, as with other quantitative studies, the current study is also not without limitations. First, considering that the data for this study were collected using questionnaires mailed to the target respondents, it is likely that the questionnaires might not have reached some of the respondents; thus, it is suggested that future research comes up with other means for ensuring that all questionnaires have been completely distributed. Besides, a mixed method may also allow for more interpretations of the research findings; hence, future research should consider expanding this study by employing a qualitative approach such as in-depth case studies to obtain more information regarding the relationship between CPMS and organizational commitment. Considering the cross-sectional nature of the current research design, the study could only examine relationships at a certain period (Zikmund, 2003) and this decreases the possibility to examine the development or causality of the relationships. Therefore, it is suggested that future research employs longitudinal data for examining PMS implementation and its behavioral implications in the long run. Finally, despite the use of random sampling in this study, the research sample only includes the manufacturing industry (single firm type) and the findings may not be generalized to other firm types. As such, future studies should also include other firms such as the service sector to diversify the research outcome.

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Appendix A

Coefficients[a]

Model		Unstandardised Coefficients		Standardised Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	5.546	.376		14.748	.000
	CPMS	-.569	.072	-.586	-7.865	.000

a. Dependent Variable: ROLEAMB

Coefficients[a]

Model		Unstandardised Coefficients		Standardised Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	6.519	.215		30.271	.000
	ROLEAMB	-.521	.078	-.526	-6.714	.000

a. Dependent Variable: ORGCOM

Path a		Path b	
CPMS →ROLEAMB		ROLEAMB → ORGCOM	
β_a	-0.569	β_b	-0.521
S_a	0.072	S_b	0.078

$S_{\beta a \beta b} = \sqrt{\beta^2_a S^2_a + \beta^2_b S^2_b - S^2_a S^2_b}$

$= \sqrt{(-0.569)^2 (0.072)^2 + (-0.521)^2 (0.078)^2 - (0.072^2)(0.078^2)}$

$= 0.057430693$

$t = \beta_a\beta_b / S_{\beta a \beta b} = (-0.569)(-0.521) /0.05743$

$= 0.296/0.0574$

$= 5.162 > 2.33$ (one-tail) at $\alpha = 0.01$

There is a strong mediating role of role ambiguity in the relationship between CPMS and organisational commitment