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THE PERFORMANCE IMPLICATIONS OF MANAGEMENT CONTROL SYSTEMS AND DYNAMIC CAPABILITIES: EVIDENCE FROM VIETNAM

Huyen Mong Le and Trang Cam Hoang*

School of Accounting, University of Economics Ho Chi Minh City, 59C Nguyen Dinh Chieu Street, District 3, Ho Chi Minh City, Vietnam

*Corresponding author: tranghc@ueh.edu.vn

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ABSTRACT

Drawing on the resource-based view and dynamic-capability view, this study examines the relationship between the interactive use of management control systems, dynamic capabilities, and firm performance in the Vietnamese information and communication technology industry. The research model and hypotheses have been tested by partial least squares-structural equation modelling (PLS-SEM) with 240 survey samples obtained from managers working in Vietnamese information and communication technology firms. The results indicate that the interactive use of management control systems has a positive effect on dynamic capabilities. Additionally, both the interactive use of management control systems and dynamic capabilities have direct positive effects on firm performance. The results reveal that dynamic capabilities complementary mediate the relationships between the interactive use of management control systems and firm performance. This study provides theoretical and managerial implications for Vietnamese information and communication technology firms that are striving to develop management control systems and dynamic capabilities for enhancing firm performance.

Keywords: dynamic capabilities, dynamic-capability view, information and communication technology, management control systems, resource-based view

INTRODUCTION

In recent years, the information and communication technology (ICT) industry has led the trend of the digital transformation that has contributed to profoundly changing the economic, cultural, and social life of many countries in general and Vietnam in particular (Nhon et al., 2020; Vietnam Report, 2019). Vietnam's ICT industry is one of the fastest-growing economic sectors in the country, maintaining a double-digit growth rate over the past five years (MIC, 2019). By the end of 2018, the total number of ICT firms reached about 40,000 firms (up 36.7% compared to 2017). Total revenue of the ICT industry reached over USD102 billion (up 12.43% compared to 2017), of which the hardware industry reached USD91.5 billion, the software industry reached USD4.44 billion, IT services reached USD6.18 billion, and digital content reached USD825 million, exported over USD89 billion, contributed VND50,000 billion to the state budget (MIC, 2019). Additionally, the Covid-19 has accelerated the digital transformation across the country together with a wave of large technological corporations moving from China to Southeast Asia, including Vietnam (Chu, 2020). However, the rapid development of science and technology has caused ICT products to have a short life cycle and quickly become obsolete (Nhon et al., 2020; Wu, 2006). As a result, although customer demand for technology products remains high, technological changes are unpredictable (Chiou et al., 2002; Nhon et al., 2020). To survive and develop in such a rapidly changing and competitive environment, Vietnam's ICT firms will need to sustain and increase their efforts in dynamic capability development.

A resource-based view of the firm influences the field of strategic management (Newbert, 2007) attempting to explain performance differences among different firms in the same industry (Zott, 2003). However, since the 1990s, relentless competition has driven firms constantly to adapt, renew, reconfigure, and recreate their resources and capabilities in line with the competitive environment (Eisenhardt & Martin, 2000; Helfat et al., 2007; Teece et al., 1997). It captured this in the notion of dynamic capabilities, based on a dynamic-capability view (Teece et al., 1997) which has provided an important impulse in empirical research (Barreto, 2010; Bitencourt et al., 2020; Eriksson, 2014; Schilke et al., 2018). Many previous studies have shown that dynamic capabilities have a significant positive effect on the competitive advantage (Le & Nguyen, 2019; Li & Liu, 2014; Wu, 2010), and firm performance (Bitencourt et al., 2020; Lin & Wu, 2014; Pezeshkan et al., 2016; Wu et al., 2016). Researchers have also identified factors that moderate this relationship, such as high environmental volatility (Wu, 2010) and strategic orientation (Slater et al., 2006). However, dynamic capabilities are also seen as a mediating variable between valuable,

rare, inimitable, and non-substitutable (VRIN) resources and performance (Lin & Wu, 2014), international diversification, and innovation performance (Wu et al., 2016). Regarding the antecedents of dynamic capabilities, there have been studies indicating factors such as resources (Fallon-Byrne & Harney, 2017; Lin & Wu, 2014; Schilke et al., 2018), knowledge resources (Hidalgo-Peñate et al., 2019; Nieves & Haller, 2014; Schilke et al., 2018), intellectual capital (Nhon et al., 2020; Singh & Rao, 2016), social capital (Rodrigo-Alarcón et al., 2018), and environmental dynamism (Karna et al., 2016; Schilke et al., 2018; Wu, 2010).

Despite the interest in dynamic capabilities, there is limited work on how managers use management control systems (MCS) to create and maintain dynamic capabilities (Eriksson, 2014; Kihn, 2010). Recently, several studies have revealed that MCS has a positive impact on firm performance, and organisational capabilities mediate the relationship between MCS and firm performance (Bresciani et al., 2023; Rehman et al., 2019; Rehman et al., 2020; Rehman et al., 2021). However, these studies have not focused on dynamic organisational capability, but only on general organisational capabilities. Our study clarified the role of the use of MCS to foster dynamic capabilities, thereby improving firm performance. In addition, recent studies view MCS as a package, including planning controls, cybernetic controls, cultural controls, rewards and compensation controls, and administrative controls. They were based on MCS classification into five different categories by Malmi and Brown (2008). In our study, MCS is conceptualised in terms of Simons' (1995; 2000) levers of control framework. This framework is particularly appropriate for our study as it explicitly attends to the use of MCS information to successfully perform organisational strategy. Moreover, this framework can provide a useful lens to examine MCS in the context of overall organisational changes such as driving dynamic capabilities, innovation, and outstanding business results (Bedford, 2015; Martyn et al., 2016; Müller-Stewens et al., 2020a; Nani & Safitri, 2021). Therefore, this paper adopts the levers of control framework of Simons (1995; 2000) which has been widely used in recent MCS studies (Abernethy et al., 2010; Abernethy & Brownell, 1999; Bedford, 2015; Bisbe & Otley, 2004; Henri, 2006; Matsuo et al., 2021; Müller-Stewens et al., 2020a; Su et al., 2015). Following the framework of control levers, several studies have examined a more active role of MCS in the formulation of strategy and the implementation of strategic change. MCS can provide plenty of information from various sources, therefore facilitating comprehensive decision-making for promoting innovation (Chenhall & Moers, 2015; Henri & Wouters, 2020; Lill et al., 2021; Nani & Safitri, 2021; Santos et al., 2022). Therefore, we argue that MCS provides levers or mechanisms that managers can use to enable dynamic capabilities in this paper. Specifically,

this study argues that the interactive use of MCS is a unique resource (Barney, 1991) that has a positive effect on dynamic capabilities, thereby improving firm performance.

This study contributes to the management literature in several ways. First, we extend prior literature by offering an understanding of the role using MCS plays in advancing organisational capabilities, especially dynamic capabilities – one of the important capabilities of organisations in the context of the 4th Industrial Revolution. Second, we promote existing studies in the field, which are barely based on the dynamic capabilities view, by explicitly discussing how ICT firms use MCS to leverage dynamic capabilities, thereby achieving superior performance. These contributions are necessary to help the management of Vietnam's ICT firms more clearly understand the role of MCS in providing information for decision-making and control of enterprise activities, thus they will actively build and perfect the MCS of their firm. Lastly, we contribute to the research based on both the resource-based view and dynamic-capability view by confirming for the Resources–Capabilities–Performance link as well as the mediating role of dynamic capabilities in the relationship between interactive use of MCS and firm performance. Most previous empirical studies on either the resource-based view or dynamic-capability view, this study examines these two theories simultaneously in the relationship between the interactive use of management control systems, dynamic capabilities, and firm performance to formulate a comprehensive picture of their simultaneous influence on organisational outcomes.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Resource-Based View

The resource-based view of the firm was introduced by Wernerfelt (1984) and subsequently popularised by Barney (1991). The resource-based view assumes that resources are heterogeneously distributed across firms and are imperfectly mobile, which in turn, makes this heterogeneity persist over time (Barney, 1991). Based on these assumptions, researchers theorise that firms that possess VRIN resources can achieve a sustainable competitive advantage by implementing fresh value-creating strategies that cannot be easily duplicated by competing firms (Baia et al., 2020; Barney, 1991; Fakhreddin & Foroudi, 2022; Lin & Wu, 2014; Nani & Safitri, 2021; Wernerfelt, 1984; Wu, 2010). The accumulation of unique resources for a competitive advantage has therefore become fundamental to strategic thinking for most managers and scholars around the world (Wu, 2010).

In this study, we also apply the resource-based view to argue that interactive use of MCS is viewed as a VRIN resource, thereby contributing to fostering dynamic capabilities and firm performance.

Dynamic-Capability View

Although the importance of the resource-based view cannot be denied, many researchers consider that the existence of such VRIN resources is insufficient to maintain a sustainable competitive advantage in rapidly changing and unpredictable environments (Helfat et al., 2007; Teece et al., 1997). Therefore, they argue that the resource-based view cannot adequately explain how and why certain firms have a competitive advantage in such situations. Consequently, scholars of the dynamic-capability view have extended resource-based view to a dynamic market where the customer needs and technology are unpredictable and constantly changing (Irfan et al., 2019; Wu, 2010). Accordingly, most researchers agree that dynamic capabilities are necessary for firms to gain a competitive advantage over competitors in the dynamic market (Barreto, 2010; Eisenhardt & Martin, 2000; He et al., 2019; Helfat & Peteraf, 2003; 2009; Hernández-Linares et al., 2021; Teece, 2007; Teece et al., 1997; Zollo & Winter, 2002). Based on the dynamic-capability view, this study argues that dynamic capabilities have a direct effect on firm performance and transform a partial effect of interactive use of MCS on firm performance.

Dynamic Capabilities

Dynamic capabilities have been defined as abilities (or capacities) but also as processes or routines (Barreto, 2010). The original definition of dynamic capabilities is a firm's ability to "integrate, build, and reconfigure internal and external competencies to address rapidly changing environments" (Teece et al., 1997, p. 516). From the process perspective, Eisenhardt and Martin (2000) consider dynamic capabilities as a process for integrating, re-allocating, acquiring, and abandoning resources in response to market change. From the routine perspective, Zollo and Winter (2002) define dynamic capabilities as a learned routine that directs the development and adaptation of an organisation. Following previous studies, Helfat et al. (2007) propose a simpler but more integrated definition by allowing that dynamic capabilities are the capacities to purposefully create, extend, or modify the resource base of the organisation. Additional research into dynamic capabilities has further extended the concept of dynamic capabilities. The construct has accordingly been criticised for easily misleading differences (Barreto, 2010), and for being vague, confusing, and tautological (Li & Liu, 2014).

Barreto (2010) proposed that dynamic capabilities are a company's ability to solve problems, shaped by the propensity to sense opportunities and threats, to make timely decisions, to make market-oriented decisions, and to change its resource base. Although the definition of Barreto (2010) overcomes some important limitations of current definitions, there is still room for improvement (Li & Liu, 2014). Specifically, the definition of Barreto (2010) applies most appropriately to a perfect market-oriented economy but is not fully relevant in transitional economies. In transitional economies, the market mechanism is imperfect; so making market-oriented decisions may not adapt to reality. Thus, Li and Liu (2014, p. 2794) adjusted the definition of the dynamic capabilities to suit transitional economies as follows: "a dynamic capability is the firms' potential to systematically solve problems, formed by its propensity to sense opportunities and threats, to make timely decisions, and to implement strategic decisions and changes efficiently to ensure the right direction."

In line with the definition of Li and Liu (2014), this study also decomposes dynamic capabilities into three dimensions, namely, strategic sense-making capacity, timely decision-making capacity, and change implementation capacity.

Interactive Use of MCS

MCS is defined as formalised procedures and systems that use the information to maintain organisational activities. This includes the planning, budgeting, measuring, and communication systems that managers use for decision-making and evaluation (Daniel et al., 2011; Langfield-Smith, 1997). This study adopts the framework of control levers of Simons (1995) including the approaches to using controls that have been widely used in recent MCS studies (e.g., Abernethy et al., 2010; Abernethy & Brownell, 1999; Bisbe & Otley, 2004; Curtis & Sweeney, 2017; Guenther & Heinicke, 2019; Gurd & Helliar, 2017; Janke et al., 2014; Lopez-Valeiras et al., 2016; Matsuo et al., 2021; Müller-Stewens et al., 2020a; Su et al., 2015). Simons (1995) also distinguishes between the approaches to the use of MCS as belief, boundary, diagnostic, and interactive use. However, there is very little study allocated to these four dimensions, with notable exceptions of Widener (2007) and Bedford (2015). In fact, most studies have focused on the interactive use of MCS (e.g., Abernethy et al., 2010; Abernethy & Brownell, 1999; Bisbe & Otley, 2004; Janke et al., 2014; Lopez-Valeiras et al., 2016; Matsuo et al., 2021; Osma et al., 2022). Recently, Matsuo et al. (2021) found that the interactive use of MCS has a beneficial effect on employees' psychological empowerment, proactive behaviour, and performance. Also, Osma et al. (2022) indicated that the

interactive use of the MCS empowers managers to identify, evaluate, and select real earnings management behaviour to address short-term financial stress.

The interactive use of MCS is an approach to expand opportunity-seeking and learning throughout the organisation (Henri, 2006). Under the interactive approach, top management personally and regularly involve themselves in the process of subordinates' decision-making activities (Bisbe & Otley, 2004; Simons, 1995; Widener, 2007). Moreover, the interactive use of MCS encourages face-to-face dialogue and debate across different levels, which subsequently facilitates organisational learning and innovation (Henri, 2006; Su et al., 2015). Through interactive MCS, top managers send messages to the entire organisation in order to focus attention on strategic uncertainties (Bisbe & Otley, 2004). According to Bisbe et al. (2007, p. 797), the interactive use of MCS comprises five features, including "an intensive use by top management; an intensive use by operating managers; a pervasiveness of face-to-face challenges and debates; a focus on strategic uncertainties; and a non-invasive, facilitating and inspirational involvement."

Hypothesis Development

The interactive use of MCS involves dialogue and communication among top managers as well as between top management and subordinates (Abernethy & Brownell, 1999; Simons, 1995), which stimulates opportunity-seeking and encourages the emergence of new initiatives (Gond et al., 2012; Henri, 2006; Simons, 1995). This provides the opportunity for top management to debate and challenge the underlying assumptions and action plans, guide organisational attention, and to facilitate organisational learning and the formation of strategies (Bisbe & Otley, 2004; Henri, 2006; Simons, 1995). This use manner should be applied to communicate value rather than to strictly monitor progress towards pre-defined targets (Grabner et al., 2018). Additionally, the interactive use manner supports managers in dealing with situations that are highly complicated and in which they have little experience (Widener, 2007). When managers seek information on opportunities and threats to create effective strategies, their chances of success are significantly boosted by teams that proactively act in accordance with the motivations suggested by MCS (Matsuo et al., 2021). We conclude that an interactive use of MCS is necessary to solve problems related to rapidly changing environments, to sense opportunities and threats, to make timely decisions, and to implement strategic decisions and changes efficiently to ensure the right direction. Further, the interactive use of MCS is an important and frequently analysed variable in management accounting research (Abernethy et al., 2010; Bisbe & Otley, 2004; Dekker et al., 2013; Henri, 2006; Lopez-Valeiras et al., 2016; Müller-Stewens

et al., 2020a; Sakka et al., 2013; Su et al., 2015). In these studies, the interactive use of MCS is recognised to foster organisational capabilities like market orientation, innovativeness, entrepreneurship, and organisational learning. Thus, we propose the first hypothesis as follows:

H1: Interactive use of MCS has a positive direct effect on dynamic capabilities.

The shift to digitalisation is a prolonged and far-reaching process that affects all critical business areas, demanding specialised management (Cortellazzo et al., 2019). Traditional resources fall short in supporting the firm's competitive advantage in such environments (Lee & Yoo, 2019). Lee and Yoo (2019) stated that the capability of a manager to effectively integrate, build, and reconfigure both internal and external competencies to tackle the ever-changing business environment is crucial for gaining a sustainable competitive advantage in today's highly intense competition. Because dynamic capabilities include the firm's ability to sense and shape opportunities, seize opportunities, and maintain competitiveness through enhancing, combining, protecting, and reconfiguring the firm's intangible and tangible assets, dynamic capability enables the firm to renew its competencies to meet changing market requirements (Nayal et al., 2022). Therefore, dynamic capability is essential in identifying the competitive advantage under environmental volatility. Most of the prior empirical studies have provided evidence that dynamic capabilities have a positive effect on the competitive advantage (Ferreira et al., 2021; Le & Nguyen, 2019; Li & Liu, 2014; Wu, 2010), and firm performance (Bitencourt et al., 2020; Ferreira et al., 2021; Hernández-Linares et al., 2021; Lin & Wu, 2014; Wu et al., 2016). Furthermore, Tsou and Chen (2020) proposed that the ability to adapt quickly and create innovative products is crucial for high-tech firms to remain competitive in the face of global competition and a rapidly changing industry environment. Thus, the second research hypothesis is proposed as follows:

H2: Dynamic capabilities have a positive direct effect on firm performance.

According to the resource-based view, VRIN resources can bring a competitive advantage for firms (Barney, 1991). The resource is "an asset or input to production (tangible or intangible) that an organization owns, controls, or has access to on a semi-permanent basis" (Helfat & Peteraf, 2003, p. 999). Tangible resources may include property, plants, equipment, financial assets, information technology systems, and personnel (Gruber et al., 2010). However, information technology investments can be easily duplicated by other firms and do not provide a source

of sustained competitive advantage for the adopting firms. The mechanisms through which information technology related resources are transformed into firm-specific resources and capabilities that create superior value for the firm remains an important research stream (Gligor et al., 2015). It is obvious that information technology advancement still plays a critical role in enabling the infrastructure of the MCS. Besides that, we argue that how managers use MCS affects organisational behaviour and decision-making, thereby enhancing the performance of their firm (Hofmann et al., 2012). This follows because the way in which the MCS is used depends on the knowledge, experience, and competence of the managers which cannot be easily imitated and duplicated by competitors (Barney, 1991). Therefore, MCS is a unique resource that can bring a competitive advantage for firms.

The results of existing studies on the relationship between the interactive use of MCS and firm performance are mixed (Chong & Mahama, 2014; Henri, 2006; Mir & Rezania, 2021; Sakka et al., 2013; Su et al., 2015). However, there is evidence that the interactive use of MCS has a positive effect on the firm performance in the innovation context. For example, Lopez-Valeiras et al. (2016) observed that the interactive use of MCS leads to improvements in both process and organisational innovation. In the same line, Müller-Stewens et al. (2020b) indicated that the combination of interactive and diagnostic uses has a positive impact on innovation rate and product newness. Lill et al. (2020) revealed that the use of interactive project control systems has a positive impact on innovation project performance, regardless of the degree of agility of the project. Thus, we propose the third hypothesis as follow:

H3: Interactive use of MCS has a positive direct effect on firm performance.

Hypothesis 1 proposed that the interactive use of MCS has a positive direct effect on dynamic capability. The literature also indicates that information technology resources have a direct and positive effect on firm performance as well as an indirect effect on firm performance through information sharing (Ye & Wang, 2013). Furthermore, information technology is a critical prerequisite to MCS implementation (Liew, 2019) dynamic capabilities (Chang et al., 2015). The information advantage achieved through the adoption of information technology in MCS will contribute to improving the dynamic capacity of the organisation. Furthermore, most previous researchers believe that dynamic capability contributes to the increasing competitive advantage, thereby improving the performance of firm (Bitencourt et al., 2020; Hernández-Linares et al., 2021; Li & Liu, 2014). Moreover, dynamic capabilities could mediate the relationship between resources and performance as it plays an important role in transforming resources and static

competencies into innovative products or processes (Makkonen et al., 2014). Thus, dynamic capabilities lead the firm's resources to achieve better performance (Bitencourt et al., 2020). Drawing on the dynamic capability view, existing studies have demonstrated how dynamic capabilities can transform organisational resources into improved performance (Bitencourt et al., 2020; Hidalgo-Peñate et al., 2019; Lin, 2018; Lin & Wu, 2014; Wu, 2007). For example, Lin and Wu (2014) concluded that dynamic capabilities are the mediator in the relationship between VRIN resources and firm performance. Recently, Rehman et al. (2019) also provided empirical evidence that organisational capabilities enhance the relationship between resources (MCS) and organisational performance. Therefore, the fourth hypothesis is proposed as follows:

H4: Interactive use of MCS has a positive indirect effect on firm performance via dynamic capabilities.

The research model and corresponding hypotheses are shown in Figure 1.

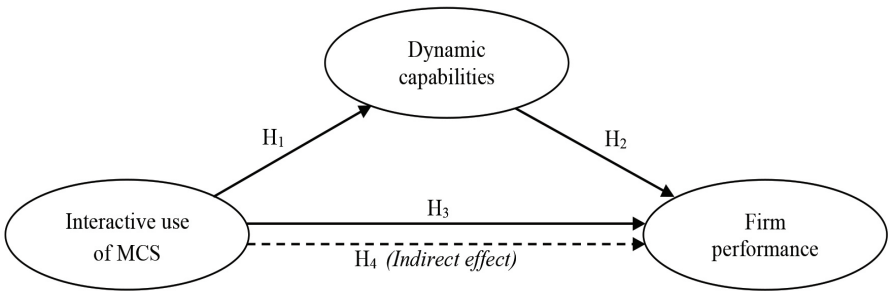

Figure 1. Research model

RESEARCH METHODS

Measurement Scales

This study used well-established scales from previous literature to measure the latent constructs. First, interactive use was based on the formative measurement model defined by Bisbe et al. (2007) and subsequently used in other studies (Bedford, 2015; Bedford & Malmi, 2015; Sakka et al., 2013). These dimensions are each measured using a single indicator. The wording of indicators is made with reference to studies by Bisbe and Otley (2004), Henri (2006), and Widener (2007). Respondents were asked to indicate the extent to which managers use budgets and performance measures systems based on a five-point Likert scale rating from

1 = "very low extent" to 5 = "very high extent." Second, the dynamic capabilities scale was adapted from Li and Liu (2014) and subsequently used by Le and Nguyen (2019). This is an aggregated scale and adjusted from the scales of Judge and Miller (1991), Neill et al. (2007), and Sharfman and Dean (1997). Items were measured on a five-point Likert scale ranging from 1 to 5, where 1 represents "strongly disagree" and 5 represents "strongly agree." Finally, we note that in the majority of the studies relying on subjective measures, the respondents evaluated their firm performance in relation to their competitors, which apparently works well in dynamic capabilities research (Eriksson, 2014). Therefore, in this study, we adapted the scale developed by Govindarajan (1984), which was adopted by subsequent studies (e.g., Baines & Langfield-Smith, 2003; Govindarajan, 1988; Govindarajan & Fisher, 1990; Hoque, 2011) to measure firm performance. Thus, the respondents were asked to indicate the firm performance of their firms relative to that of their competitors over the last three years in each of the five items on a scale ranging from 1 = "very unsatisfactory" to 5 = "outstanding."

Sampling and Data Collection

Since our respondents are native Vietnamese speakers, the questionnaire was translated into Vietnamese to provide participants with the option to complete the questionnaire in Vietnamese or English. To ensure data equivalence, the questionnaire was translated from English into Vietnamese and then backward translated into English (Brislin, 1970). First, the content validity of the questionnaire in the English version was established through the adoption of the relevant constructs in the previous studies. Then, two independent translators rendered the English version of the questionnaire into Vietnamese, and two other translators subsequently back-translated the Vietnamese version of the questionnaire into English to ensure instrument equivalence. Next, the clarity of the wording and concepts was tested using a pilot test to avoid vagueness that could negatively affect the responses and therefore the reliability of the questionnaire data. More specifically, before sending the survey questionnaires to the respondents, we pilot-tested the questionnaire by discussing it with eight managers from eight different ICT firms and with two faculty members. Based on their feedback, minor changes were made in the questionnaire and the wording of some items to reflect the research settings.

The final version of the questionnaire was sent to managers selected from the list of members of nine information technology associations of Vietnam, namely: Vietnam Internet Association (VIA), Vietnam E-Commerce Association (VECOM), Vietnam Software and IT Services Association (VINASA), Vietnam Electronic Industries Association (VEIA), Radio-Electronics Association of

Vietnam (REV), Vietnam Digital Communications Association (VDCA), Vietnam Automation Association (VAA), Vietnam Information Security Association (VNISA), and Vietnam Association for Information Processing (VAIP). A senior or mid-level manager (CEO, CFO, head or vice head of department) was identified as a potential respondent for each firm. We keep only the responses of managers who have been working in the same firm for more than three years to ensure a full understanding of the firm, helping to enhance data quality. After connecting and getting the acceptance of 500 respondents, we sent the questionnaires to their email address. Respondents were assured that their answers would be maintained confidential and be used for academic research purposes only. In return for their cooperation, they were promised a summary of the survey results. To improve the response rate, we adopted the follow-up procedure of Dillman et al. (2014). After three weeks, we sent a reminder email to those who did not respond and after a further reminder email and the last call, the authors obtained 103 responses (20.6%).

Because the number of responses is still low, we continue to contact the Ho Chi Minh City Computer Association (HCA) to directly send the questionnaire to the responders at the meeting of the IT community in the southern provinces. As a result, we have collected 149 responses. Thus, through two surveys, we have 252 responses. After eliminating missing responses and responses at the same level for all statements, we have 240 complete responses.

RESULTS

Descriptive Statistics

Table 1 shows the firms in the sample operate in the fields of IT distribution (40.0%), IT services (29.5%), software production (18.8%), hardware production (7.5%), and digital content (4.2%). Regarding the type of company, 50% of firms participating in the survey are joint-stock companies, 33.7% are limited companies, and 16.3% are private companies. We have 84.6% of firms with less than 10 years of operating life and 15.4% with more than 10 years of operating life. Firms with under 200 employees participating in social insurance payments covered 79.6% of responses with those with less than 200 such employees covering 20.4%. These ratios are relatively consistent with the report of the Ministry of Information and Communications 2020 on the characteristics of Vietnamese ICT firms.

The statistical results on respondents in Table 1 reveal that 88.3% of respondents are middle managers, the remainder (11.7%) being top managers. In terms of education, all the respondents have bachelor's degrees, with 27.1% of respondents having either a master or doctor qualification. Finally, most respondents had more than 2 years of experience, of which 21.7% had 6–10 years of experience. The above statistical results confirm that the respondents have enough knowledge about the research problem to be able to answer our questionnaire.

Table 1
Descriptive statistics of the research samples

Demographics	Frequency	Percent	Demographics	Frequency	Percent
Sector			Work position		
Hardware	18	7.5	Top managers	28	11.7
Software	45	18.8	Middle managers	212	88.3
Digital content	10	4.2	Education		
IT services	71	29.5	Bachelor	175	72.9
IT distribution	96	40.0	Master or doctor	65	27.1
Firm age			Number of employees		
≤ 5 years	122	50.8	50–100 people	63	26.3
6–10 years	81	33.8	100–200 people	128	53.3
> 10 years	37	15.4	> 200 people	49	20.4
Type of company			Work experience		
Join stock	120	50.0	2–5 years	173	72.1
Limited	81	33.7	6–10 years	52	21.7
Private	39	16.3	> 10 years	15	6.2

Measurement Model

In this study, we use SmartPLS3 software to analyse structural equation modelling. Partial least squares-structural equation modelling (PLS-SEM) was used for two main reasons. First, PLS-SEM has higher levels of statistical power in situations with complex model structures or smaller sample sizes (Hair et al., 2017; Reinartz et al., 2009). Second, PLS-SEM can easily handle reflective and formative measurement models simultaneously (Hair et al., 2017). Two analysis stages – the evaluation of measurement models and the structural model – are conducted using the SmartPLS software.

As presented above, the interactive use of MCS is measured through the formative measurement model. The conventional assessments of construct validity and reliability are considered inappropriate for formative measurement models (Jarvis et al., 2003). High correlations are not expected between items in formative measurement models. Nevertheless, the weights and multicollinearity of formative construct items should be examined. "Examine each indicator's outer weight (relative importance) and outer loading (absolute importance) and use bootstrapping to assess their significance" (Hair et al., 2017, p. 151). The analysis results reveal that the indicator's outer weights are significant ($p < 0.05$, $t > 1.96$). Moreover, the outer loading of items is greater than the minimum threshold of 0.50 (see Table 2). In addition, multicollinearity was tested through the calculation of variance inflation factors (VIF). The VIF of indicators range between 1.20 and 1.75, which are well below the minimum threshold of 5. Thus, all five items should be retained for the next analysis steps (Hair et al., 2017).

For reflective measurement models, Table 2 shows that the composite reliabilities (CR) of all reflective constructs were higher than 0.7 (ranging from 0.85 to 0.92), Cronbach's alpha was greater than 0.7 (ranging from 0.77 to 0.91) (Hair et al., 2017). In addition, the outer loadings of all observed variables ranged from 0.54 to 0.84, which was higher than the cut-off value of 0.50 (Hulland, 1999). The t-values of all items were well above 1.96 to be statistically significant (ranging from 9.43 to 44.82). The average variance extracted (AVE) values of all latent variables were accepted because they were higher than 0.50 (ranging from 0.58 to 0.64) (Hair et al., 2017). This implies that the measurement scales used in our model are highly reliable.

Table 2
Scale items and latent variable evaluation

Construct and items	Loading	t-value
Interactive use of MCS (AVE = NA; CR = NA; CA = NA)		
Provide a recurring and frequent agenda for top management activities.	0.80	21.24
Provide a recurring and frequent agenda for subordinate activities.	0.77	21.70
Enable continual challenge and debate of underlying data, assumptions and action plans with subordinates and peers.	0.75	18.28
Focus attention on strategic uncertainties (i.e., factors that may invalidate the current strategy or provide opportunities for new strategic initiatives).	0.54	9.43
Encourage and facilitate dialogue and information sharing with subordinates.	0.74	21.08

(*Continued on next page*)

Table 2: (*Continued*)

Construct and items	Loading	t-value
Strategic sense-making capacity (AVE = 0.64; CR = 0.92; CA = 0.89)		
We can perceive environmental change before competitors.	0.76	22.88
We often have meetings to discuss the market demand.	0.79	27.26
We can fully understand the impact of the internal and external environment.	0.82	37.61
We can feel the major potential opportunities and threats.	0.79	23.74
We have a perfect information management system.	0.80	27.47
We have good observation and judgment ability.	0.84	44.36
Timely decision-making capacity (AVE = 0.59; CR = 0.85; CA = 0.77)		
We can quickly deal with conflicts in the strategic decision-making process.	0.76	23.06
Under many circumstances, we can make timely decisions to deal with strategic problems.	0.82	31.65
We can remedy quickly to unsatisfactory customers.	0.78	28.47
We can reconfigure resources in time to address environmental change.	0.70	14.26
Change implementation capacity (AVE = 0.62; CR = 0.89; CA = 0.85)		
Our strategic changes can be efficiently carried out.	0.76	22.67
Good cooperation exist among different functions.	0.86	44.82
We help each other in strategic change implementation.	0.81	31.17
We have a proper awarding and controlling system.	0.74	21.11
We can efficiently improve strategic change implementation.	0.78	19.01
Firm performance (AVE = 0.58; CR = 0.87; CA = 0.82)		
Operating profit	0.83	44.64
Return on investment	0.72	17.08
Sales growth rate	0.70	19.96
Market share	0.75	20.23
Cash flow from operation	0.82	32.41

Note: AVE = average variance extracted; CR = composite reliability; CA = Cronbach's alpha

Table 3 shows the square roots of AVE of all reflective constructs range from 0.76 to 0.80, which were well above the corresponding correlations between these constructs (from 0.51 to 0.62). Further, the correlation coefficient between variables is smaller than the composite reliability (CR) (shown in Table 2 with values ranging from 0.87 to 0.92), implying that the scales ensure discriminant validity (Fornell & Larcker, 1981). In addition, the correlation coefficients among

the variables are lower than the cut-off value of 0.7, thereby indicating satisfactory discriminant validity (Tabachnick & Fidell, 2012). Finally, Table 3 shows that the heterotrait-monotrait (HTMT) values range between 0.62 and 0.75 (significantly below 0.90), providing clear evidence for discriminant validity (Henseler et al., 2015).

Table 3
Fornell-Larcker criterions and HTMT ratio

Construct	1	2	3	4
1. Strategic sense-making capacity	**0.80**			
2. Timely decision-making capacity	0.54** (0.65)	**0.77**		
3. Change implementation capacity	0.57** (0.66)	0.51** (0.62)	**0.79**	
4. Firm performance	0.54** (0.64)	0.51** (0.64)	0.62** (0.75)	**0.76**

Note: The numbers on the diagonal (bold) are the square root of AVE; in each cell, the first value is the correlation coefficient, and the second value is the HTMT (in parentheses); ** correlation is significant at 0.01 levels

Structural Model

The results indicate that the adjusted R^2 values for endogenous constructs (dynamic capabilities = 0.48; firm performance = 0.49) were greater than the recommended level of 0.10 (Hair et al., 2019). Next, the diagnostic test of multicollinearity – based on the VIF for the regression coefficients – reveals that the largest VIF in the model is 1.96, substantially less than the critical threshold of 5 (Hair et al., 2017). Therefore, multicollinearity is not a concern for the conclusions derived from the parameter estimates. In addition, the full-collinearity followed to assess common method bias. All VIFs resulting are lower than 3.3, implying that the model can be considered free of common method bias (Kock, 2015).

Table 4 reports the indices used to test direct and indirect hypotheses, including β coefficients, p-values, and t-values. The first hypothesis predicts that the interactive use of MCS has positive direct effects on dynamic capabilities. The results in Table 4 support hypothesis H1 ($\beta = 0.69$, $p < 0.001$, $t = 19.20$). Table 4 also reveals that dynamic capabilities are positively directly associated with firm performance ($\beta = 0.46$, $p < 0.001$, $t = 6.88$), in support of H2. In addition, Table 4 also reveals that interactive use of MCS positively directly affects firm performance ($\beta = 0.31$, $p < 0.001$, $t = 4.79$), thereby supporting H3.

Table 4
Results of hypotheses testing

Hypotheses	β	Std.	p-value	t-value	95% CI	Outcome
Indirect effects						
Interactive use of MCS → Dynamic capabilities	0.69	0.04	0.000	19.20	[0.61 : 0.76]	H1 accepted
Dynamic capabilities → Firm performance	0.46	0.07	0.000	6.88	[0.32 : 0.58]	H2 accepted
Interactive use of MCS → Firm performance	0.31	0.06	0.000	4.79	[0.18 : 0.43]	H3 accepted
Indirect effects						
Interactive use of MCS → Dynamic capabilities → Firm performance	0.32	0.05	0.000	6.56	[0.21 : 0.41]	H4 accepted

Regarding the indirect hypothesis, Table 4 also reveals that interactive use of MCS has indirect effects on firm performance via dynamic capabilities ($\beta = 0.32$, $p < 0.001$, $t = 6.56$), implying that H4 is supported. In addition, the indirect effects of interactive use of MCS on firm performance via dynamic capabilities were estimated through simple mediation analyses using SPSS macros for bootstrapping indirect effects (Hayes, 2018; Preacher & Hayes, 2008). The macro utilises an ordinary least squares regression to assess the path. The point estimate of the indirect effect and the bias-corrected confidence interval (CI) are based on 5,000 samples (Hayes, 2018). Dynamic capabilities mediate the relationship between the interactive use of MCS and firm performance (95% CI: 0.21 to 0.41). According to Preacher and Hayes (2008), a CI that does not contain zero demonstrates a statistically significant indirect effect, and thus, dynamic capabilities are demonstrated as the mediator.

Regarding the types of mediation, both the indirect and direct effects are statistically significant and indicate the same direction of impact, suggesting that dynamic capabilities provide complementary mediation for the relationship between interactive use of MCS and firm performance (Hair et al., 2017).

According to prior research in management accounting (Bedford et al., 2019) and dynamic capabilities (Li & Zhou, 2010; Ngo et al., 2019; Wu et al., 2016), we used two control variables (firm size and firm age) in our research model to test the validity of the results. The results (not tabulated) are similar to the main findings.

DISCUSSION

The results of direct paths show that the interactive use of MCS has a positive effect on the dynamic capabilities of Vietnamese ICT firms. The results are consistent with the prior works (Bisbe & Otley, 2004; Henri, 2006; Lopez-Valeiras et al., 2016; Müller-Stewens et al., 2020a; Nani & Safitri, 2021) which reveal that the interactive use of MCS promotes organisational capabilities such as market orientation, innovation capacity, entrepreneurship, and organisational learning. This finding highlights and explains the role of the interactive use of MCS in enabling dynamic capabilities, which are viewed as important capabilities for ICT firms (Deeds et al., 2000; Nhon et al., 2020; Tsou & Chen, 2020; Wang et al., 2021).

Consistent with prior studies (Bedford, 2015; Chong & Mahama, 2014; Lill et al., 2021; Lill et al., 2020; Martyn et al., 2016; Müller-Stewens et al., 2020a; Nani & Safitri, 2021; Su et al., 2015; Widener, 2007), this study has revealed that the interactive use of MCS has a direct positive effect on firm performance. The study has thereby consolidated our argument based on the resource-based view that the interactive use of MCS is a unique resource satisfying the VRIN attributes. Accordingly, we may regard MCS as the formal systems that managers use for control, evaluation, and decision-making. They are tools for leveraging the organisational behaviours and outcomes necessary for dynamic capabilities.

Also, the findings demonstrate that dynamic capabilities play an important role in promoting the firm performance of Vietnamese ICT firms. This is consistent with the results of previous studies based on the dynamic-capability view, such as Bitencourt et al. (2020), Ferreira et al. (2021), Hernández-Linares et al. (2021), Li and Liu (2014), Lin and Wu (2014), and Wu et al. (2016). Dynamic capabilities play a crucial role in creating a competitive advantage by introducing new routines and practices, leading firms to surpass those lacking such capacities. Environmental dynamism, characterised by shorter product life cycles, increased competition among market players, and fickle consumer behaviour, heightens risk and uncertainty for firms. As discussed earlier, firms equipped with dynamic capabilities navigate these challenges with their expertise, allowing them to better and more quickly identify opportunities, adjust to new conditions, and capitalise on opportunities that arise. Thereby, this study indicates how managers might overcome the challenge of creating and managing the ambidextrous organisational form that is central to a dynamic capability. We conclude that ICT firms operating in emerging and dynamic economies (such as Vietnam) should quickly integrate,

learn, and reconfigure their internal and external resources to adapt to rapid environmental changes, thus enhancing their competitive advantages as well as improving the firm performance (Efrat et al., 2018; Li & Liu, 2014; Wu, 2010).

Finally, the study reveals a partial mediating role of dynamic capabilities in the relationship between the interactive use of MCS and firm performance. As previously stated, MCS represents a distinctive resource for ICT firms, and dynamic capabilities play a critical role in utilising these resources to achieve enhanced performance (Bitencourt et al., 2020; Henri, 2006; Hidalgo-Peñate et al., 2019; Lin, 2018; Lin & Wu, 2014; Rehman et al., 2019; Wu, 2007). This result, with other studies, implied management implications of this link are crucial for strategic managers of firms in general and Vietnamese ICT firms in particular. Thus, to achieve outstanding performance, firms must leverage the unique resources and capabilities of the organisation.

Implications for Theory

This study is one of the few management accounting studies that apply both the resource-based view and the dynamic-capability view. These two theories posited that firms could achieve better performance by concentrating on developing their resources and capabilities (Barney, 1991; Barreto, 2010; Fakhreddin & Foroudi, 2022; Hernández-Linares et al., 2021; Teece et al., 1997). The findings in this study support the view that no single theory can explain the nexus of MCS, dynamic capabilities, and firm performance. By integrating the resource-based and dynamic-capability views, this study's analytical findings illustrate a comprehensive assessment of both MCS and dynamic capabilities. The study reveals that firm performance is influenced by both MCS and the development of dynamic capabilities. Based on these two underpinning theories, the relationship between all constructs that have not been addressed previously contributed to extending the literature on MCS, dynamic capabilities, and firm performance.

There were few studies that investigated the MCS–dynamic capability–firm performance link. However, these studies based on the view of MCS as a package (Rehman et al., 2019; Rehman et al., 2021), our study is a pioneer study that is based on the levers of control framework of Simons (1995; 2000) to determine the effect of the interactive use of MCS on dynamic capability and firm performance. In a comparison of existing MCS conceptualisations, Strauß and Zecher (2013) reveal that Simons (1995) levers-of-control-concept (LOC) is the most appropriate for innovation activities because it incorporates a feedback mechanism between goals, actions, and business strategy. Thereby, this study provides a clearer explanation

of why firms gain a competitive advantage by leveraging organisational dynamic capability (including strategic sense-making capacity, timely decision-making capacity, and change implementation capacity).

Although previous studies have demonstrated a positive correlation between the interactive use of MCS and firm performance (Bisbe & Otley, 2004; Lill et al., 2020; Osma et al., 2018; Sakka et al., 2013), our study delves further into the underlying reasons why ICT firms employ MCS interactively to achieve superior outcomes through promoting dynamic capabilities. As such, our findings confirm that dynamic capabilities play a mediating role in the relationship between the interactive use of MCS and firm performance in ICT firms.

Implications for Practice

In addition to the theoretical implications, the findings of this research hold practical significance for managers of Vietnamese ICT firms. First, this study reveals that the interactive use of MCS as a VRIN resource can foster dynamic capabilities, ultimately enhancing the performance of ICT firms. As such, this finding suggests that managers use MCS information as a resource to support dynamic capabilities, including strategic sense-making capacity, timely decision-making capacity, and change implementation capacity. The role of information systems in firm performance has been confirmed in a developed economy context (Ainin et al., 2016; Yoshikuni et al., 2021). Therefore, the improvement of management information systems for Vietnamese IT enterprises is essential. As the 4th Industrial Revolution approaches, marked by significant developments in science and technology and heightened international competition, Vietnamese ICT firms are forced to design and/or perfect their MCS to provide information for decision-making and control.

Second, findings suggest that the more MCS information is used by managers, the more alert and prepared they are to make the right decisions. To improve performance, managers not only use MCS to monitor, compare, and evaluate actual performance from preset performance targets, but also need to use MCS as a useful tool to exchange, discuss, and plan together. MCS information needs to be used regularly at all levels of management and it must be used by managers in meetings to challenge and debate action plans and strategies. Vietnamese ICT firms should also have monthly interdepartmental meetings and share the acquired information about market factors, such as customers' preferences and competitors' prices. This type of inter-functional collaboration provides the basis upon which

important decisions can be made. Especially strategic issues such as a new product/service development plan, new market expansion, or investment in new production technology.

Third, to thrive and achieve long-term sustainability in today's turbulent and highly competitive business environment, ICT firms need to improve their dynamic capabilities (Bitencourt et al., 2020; Efrat et al., 2018; Li & Liu, 2014; Wu, 2010). The research results also reveal that dynamic capabilities have a greater positive impact on firm performance. Dynamic competencies come into play when Vietnamese ICT firms orient their core business units to pursue current products and markets (ambidexterity) (Raisch & Birkinshaw, 2008; Tushman & O'Reilly III, 1996). Typically, the unit responsible for exploitation is the manufacturing and sales department. While they primarily focus on repetitive, efficiency-oriented work, they must also be vigilant in seeking process improvements and staying up to date with advancements that could render their products or services obsolete (Birkinshaw & Gupta, 2013). On the other hand, an R&D department and business development teams are established to explore new markets and technologies, closely following emerging market trends (Peng & Lin, 2019). The unit devotes the majority of its time to identifying new opportunities but need also leverage the existing resources of the rest of the organisation and connect its ideas back to the activities taking place elsewhere in the organisation (Hill & Birkinshaw, 2014).

CONCLUSION

Investigating the relationship between the interactive use of MCS, dynamic capabilities, and firm performance based on the survey of 240 managers working in Vietnamese information and communication technology firms, our results support all four proposed hypotheses, specifically the interactive use of MCS has a direct positive effect on both dynamic capabilities and the performance of Vietnamese ICT firms. Further, dynamic capabilities have a direct positive effect on the performance of Vietnamese ICT firms. In addition, the research results also reveal the partial mediating role of dynamic capabilities in the relationship between interactive use of MCS and firm performance.

However, there are limitations to this study that need to be acknowledged. Firstly, while the sample size is larger than the minimum required for PLS-SEM analysis, it is still relatively small (n = 240) and was chosen using a convenient method within the ICT firms in Vietnam. Therefore, future studies should aim to expand the sample size, test the research model in firms of different sizes, other industries, and in different national contexts with unique characteristics to ensure generalisability

in this field of research. Secondly, the use of cross-sectional data in this study means that it is not possible to establish causality between the hypothesised relationships. To overcome this limitation, a longitudinal design and the inclusion of additional secondary data sources could be considered in future studies. Thirdly, future research should examine the tensions and balances between different modes of MCS use (such as diagnostic vs interactive), to enhance our understanding of interactive use MCS in the broader context of control packages and to explore the potential complementary and substitution effects. Furthermore, this study only focused on the interactive use of MCS using the framework of control levers of Simons (1995), and future studies could explore the roles of enterprise information systems in relation to dynamic capabilities and firm performance.

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