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# Effectuation control: Modified management control system for sustainability in facing the uncertainty

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**A B S T R A C T**

This study fills the research gap on the existence of joint control in management control systems—the object-oriented control framework (MCS-OOC)—by focusing on the interaction between results and action control, especially in companies that employ prospector strategies that were not considered in previous studies. This study aims to investigate the functioning of joint control by introducing a novel construct known as effectuation control, which forms effectuation MCS. Effectuation control is the synergistic, complementary, and simultaneous effects of a special relationship between action control and result controls. This study will contribute to the understanding of the dynamics of MCS or the control tightness of MCS-OOC. The Effectuation MCS model modifies the MCS-OOC model to account for uncertainty factors, thereby leveraging its capabilities to ensure the long-term sustainability of the company. In terms of methodology, this research will employ two initial models and two modified models, one for each of the prospector and non-prospector manufacturing companies. By comparing these four models and investigating several hypotheses using SEM-PLS, the results demonstrate that result control is no more significant toward existing capabilities when effectuation control is included in the model. Effectuation control significantly influences existing capabilities, whereas result control significantly influences new capabilities. In times of uncertainty and unpredictability, prospectors who implement a pay-for-performance system (result control) in conjunction with the implementation of sound policies, rules, procedures, and bureaucracy (action control) can leverage the company's existing capabilities and explore new ones, thereby enhancing its performance both now and in the future. Action control, a component of effectuation control, serves as a buffer against complex and confusing situations arising from high uncertainty, as every employee responds and refers to the same guidance, policies, rules, and procedures. On the other hand, result control serves as a buffer as well as a driving force, leveraging its capabilities to discover new capabilities amidst uncertainty with the aim of achieving breakthroughs, leading the market, and maintaining sustainability. This result is relevant only to prospectors, as they possess the ability to quickly adapt to uncertainty and seize opportunities presented by these changes, a trait that non-prospectors lack.



## 1. Introduction

Empirical research on how companies manage uncertainty to improve performance is limited and the findings are still ambiguous and inconsistent (Almandoz et al., 2017; Chung & Park, 2016). Management control systems (MCS) has been used to shed light on this relationship because of the opinion that control systems change due to the various forms of uncertainty faced by companies (Abernethy & Mundy, 2014). There are many MCS concepts (Haustein et al., 2014; Lill et al., 2020). Among the existing MCS

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concepts, it turns out that the MCS - levers of control (MCS-LOC)—is the one that is the most frequently used in research, followed by the MCS—object of control (MCS-OOC) (Guenther et al., 2016; Lill et al., 2020).

MCS-LOC consists of 4 control systems, namely belief, boundary, diagnostic and interactive control. The success of MCS-LOC depends on the use of these four types of control systems that are interdependent, or the use of multiple/joint controls rather than the use of one particular type of control (Widener, 2007). On the other hand, MCS-OOC also consists of 4 types of control systems, namely result control, action control, personnel and cultural controls. The importance of these multiple / joint controls in MCS-OOC was also justified with a specific term called control tightness (Merchant & Stede, 2017). Tight control refers to high levels of confidence that employees will behave in the best way in accordance with the company's main interests. The application of one type of control out of 4 types of control in MCS-OOC can be complemented with other types of control in order to meet the company's needs appropriately (Merchant & Stede, 2017). To prove the existence of interdependence or joint control among the types of control in MCS-LOC, in subsequent research developments, a new concept emerged that was called dynamic tension (Henri, 2006). This research takes a closer look at the influence of the dynamic relationship both competition and complementary ones resulting from the balanced use of diagnostic and interactive control - on capabilities leading to strategic choices (Henri, 2006). It proves that there is synergistic, complementary and simultaneous effects of special relationships (Pérez Sigüenza et al., 2022; Sugiyanto, 1997) between both diagnostic and interactive controls. However, research using the MCS – OOC concept is still limited (Guenther et al., 2016; Moilanen, 2012), especially similar research to prove the dynamic use or interplay relationship between different types of control in MCS-OOC or control tightness (Merchant & Stede, 2017).

There is another research gap on this topic. Among the few studies that investigate the role of MCS in the relationship between uncertainty and performance (Adhikara et al., 2022; Appiah et al., 2020; Ratmono, 2020; Widener, 2007), as well as the role of capability in the relationship between MCS and performance, problems were found in selecting the target sample, since they ignore the strategy used by the sample company used in the research (Bortoluzzi et al., 2020). MCS is part of strategy implementation, not strategic formulations (Merchant & Stede, 2017). Therefore, the implementation of MCS will bring different impacts to the business depending on the strategy typology used, such as prospector, analyser, or defender. Different set control systems will be required for different strategy typologies, (Bortoluzzi et al., 2020). Different control systems will affect the company's capability and performance differently (Kartika & Ellitan, 2022; Lee et al., 2017). Because prospector companies are those that can adapt quickly to changes in the environment and seize possibilities presented by those changes (Bortoluzzi et al., 2020; Liem & Hien, 2020). This research aims to bridge these gaps by investigating the synergistic, complementary, and simultaneous effects of the unique relationship between action control and result controls. This special effect is referred to as effectuation control. Effectuation control will be introduced in this research as a new construct under investigation. Additionally, it will examine its distinct impacts on companies that adopt prospector and non-prospector strategies. This study will investigate whether the synergistic, complementary and simultaneous effects of special relationship between action control and result controls will be more applicable to the prospector company.

The effectuation control modifies the MCS-OOC model by incorporating it into the initial design of MCS-OOC to form Effectuation MCS. This paper will discuss the modifications to the MCS-OOC model or Effectuation MCS because researchers believe that there is a synergistic, complementary, and simultaneous effects between MCS components that has been ignored in the previous research. Drawing conclusions about the effectiveness of the entire system from the effectiveness of each component is likely to be misleading because there are effects that are not considered, the effects of special relationships between components that influence performance (Sugiyanto, 1997). The effect of a special relationship that is synergistic, complementary, and simultaneous (Pérez Sigüenza et al., 2022)between result control and action control is referred to as effectuation control, which transmits unique and irreplaceable power (resources and abilities) to achieve firm performance in accordance with RBV theory. Hence this study aimed to address the following research questions (1) how the joint controls is functioning in MCS-OOC (2) to prove that the modified model of MCS-OOC or Effectuation MCS will be more applicable in the companies adopting prospector strategy typology rather than the one with non-prospector. The urgency of this study is its contribution to the understanding of the dynamics of MCS-OOC or the control tightness in relation to uncertainty factors, while also considering the selection of company typology strategies in order to make the research findings more practically useful.

This paper's novelty lies in the introduction of effectuation control to the initial model of MCS-OOC to study the dynamic aspect of MCS. Effectuation control is a novel construct being studied in constructing the Effectuation MCS, as a modified model of MCS-OOC. To answer the research questions, this article will be written in the following sections, literature review, research methodology that will be divided into 3 phases. Phase 1 is hypothesis development. Phase 2 is the research models that consist of the initial and modified models. Phase 3 is PLS analysis. Then, it will be continued with finding and discussion, as well as conclusions.

## 2. Literature Review

To the date, the majority of SPM research has been pecuniary in nature (Otley & Soin, 2014) and has not directly addressed uncertainty problems. As a result, SPM research is typically static (Otley & Soin, 2014). Uncertainty always exists in every company to varying degrees or levels (Otley & Soin, 2014). Besides the limited amount research on the relationship between uncertainty and performance relationship, there is problem of ambiguity in various concepts and terms of uncertainty (Almandoz et al., 2017). Uncertainty is a comprehensive concept and refers to something that is not easily measured and quantified (Chung & Park, 2016). Because uncertainty will ultimately impact the company's performance (Parnell et al., 2019), efforts must be made to manage or deal with it through all of the company's aspects of control (MCS) (Otley & Soin, 2014). MCS is a daily company management system in the context of implementing company strategy (Merchant & Stede, 2017). The effectiveness of MCS helps companies achieve their performance targets (Hermawan et al., 2021). Improper handling of uncertainty, especially strategic uncertainty can drag a company into a crisis, which is a combination of elements of threat, uncertainty, and urgency (Ulybina et al., 2022). Strategic uncertainty is uncertainty in a company's strategic area, which makes the assumptions underlying the original business strategy no longer valid (Ratmono, 2020; Widener, 2007) The survival of the business greatly depends on how it handles challenges, uncertainties, and crises. Hence, the company's response is very crucial. MCS that does not run well can bring problems to reputation, financial difficulties, insolvency, and organizational failure (Goebel & Weißenberger, 2017; Merchant & Stede, 2017). Strategic uncertainty is the absence of sufficient information about environmental events and activities and the inability to predict external changes that affect strategic areas (Yap et al., 2013). Environmental uncertainty is a contingency factor of business strategy (Arieftiara et al., 2017). Environmental uncertainty is related to reactions or responses and management discretion; for example, managers can take different actions or take different discretion in situations of high uncertainty (Arieftiara et al., 2017). MCS is a strategy implementation process, and it is not a strategy itself (Hermawan et al., 2021; Merchant & Stede, 2017). This is in accordance with the notion of the process of management, which consists of three phases, namely objective setting, strategy formulation and strategy implementation, or management control / MCS (Merchant & Stede, 2017). It means, MCS includes all tool and systems that are used by manager to ensure that the employees' behavior and decision are exercised and in accordance with the company's strategy and objectives (Merchant & Stede, 2017).

There is a growing need for creative and high-caliber human resources in the business sector due to the high degree of uncertainty and fierce competition. Companies must be able to build a ship while sailing (Darmono, 2018) because the high level of uncertainty means that the company's current goals have to change or are no longer relevant (Otley & Soin, 2014). The key to success in dealing with uncertainty lies in the internal process, which means the MCS (Goebel & Weißenberger, 2017; Merchant & Stede, 2017). The appropriate MCS design will be able to encourage the emergence of capability in the form of innovation as a breakthrough that can be used to improve company performance (Kartika & Ellitan, 2022). Capability is sequential and predictable routine activities to process resources carried out by employees or company management (Huikkola & Kohtamäki, 2017; Teece, 2017) on an ongoing basis in order to maintain competitiveness or increase the company's competitiveness (Teece et al., 1997). Another term used in the research was strategic capability, although its definition is still varied and inconsistent (C.R et al., 2020). Strategic capability is a company's behavioral orientation that continuously organizes, reconfigures and renews its resources to suit or align with a competitive and ever-changing environment (Carraresi et al., 2016). This is related to the effective use of company-specific resources that provide high benefits/value to its stakeholders (Huikkola & Kohtamäki, 2017).

## 3. Methodology

### *3.1. Research Models*

To answer the research questions, this study will use two models as shown in Fig. 1 and Fig. 2 for two groups of sample companies, which are those adopting prospector strategy and non-prospector strategy. Figure 1 shows the initial model of MCS-OOC specifically for result control and action control. Fig. 2 which is the modified model of MCS-OOC or Effectuation MCS. This study will take only both the result control and action control as it needs to be more focused in exploring the synergistic, complementary and simultaneous effects of special relationships between these two types of controls. Another reason for choosing these two controls is that result and action controls have been formally and procedurally established in the organization's systems. Thus, these two controls are more objective, in contrast to personnel and cultural controls. The latter two controls are more subjective in nature since they prioritize the individual and interpersonal approaches. Both controls are system-based control created by the companies while personnel and cultural control are more on the human-based control. The basis of personnel control is found in individuals' natural tendencies to motivate or practice self-discipline (Merchant & Stede, 2017). Cultural control encourages mutual monitoring, a powerful form of group pressure on individuals who deviate from group norms and values (Merchant & Stede, 2017).

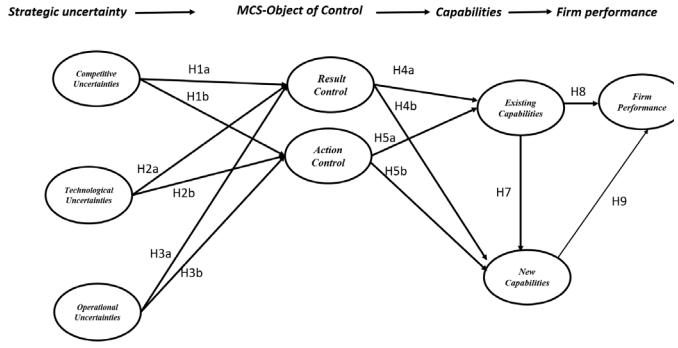


**Fig. 1.** Initial Model

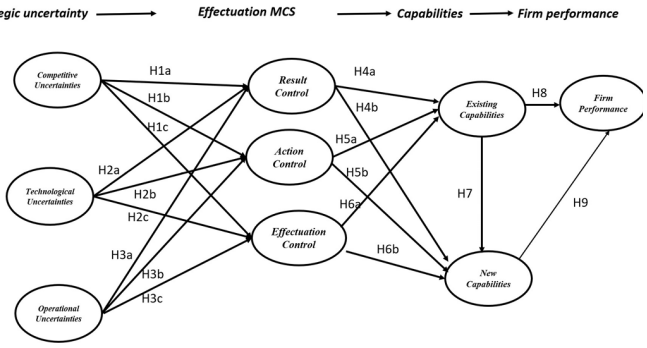


**Fig. 2.** Modified model of MCS-OOC or Effectuation MCS

Fig. 2 introduces the modified model that was created by incorporating the effectuation control into the initial model. The modified model will be called an Effectuation MCS. Effectuation control is the main construct under investigation. It is the synergistic, complementary and simultaneous interaction between result control and action control set up by the company.

### *3.2. Hypotheses Development*

Instead of the two models used, this study also formulates several hypotheses to answer the research questions. There are 18 hypotheses for both models as shown on Table 1. Here is the rationale for H1, H2 and H3 regarding the relationship between strategic uncertainty and MCS. This study follows a notion that strategic uncertainty consists of competitive uncertainty, technological uncertainty and operating uncertainty (Widener, 2007). Strategic uncertainty is the inability to forecast external changes that impact strategic areas and the lack of adequate knowledge about environmental events and activities. (Yap et al., 2013). This indicates that there is a gap between the information on hand and information which is required. Reducing information gaps can be done by increasing the acquisition of relevant external information (Bresciani et al., 2022). This can be done through employee empowerment. This employee empowerment is carried out by providing trust and opportunities for employees to have and achieve performance targets with the support of a reward system, known as result control (Merchant & Stede, 2017). With the clarity of this result control design, when employees comply with rules, procedures, policies, and other forms of action control, employees will automatically work in accordance with the goals set by the company (Merchant & Stede, 2017). The higher the uncertainty, the more MCS is needed to reduce the information gap (Widener, 2007).

**Table 1**
Lists of Hypotheses used in this study

| No | | Hypotheses |
|---|---|---|
| 1 | **H1a** | *Competitive uncertainty has a significant influence on result control.* |
| 2 | **H1b** | *Competitive uncertainty has a significant influence on action control.* |
| 3 | **H1c** | *Competitive uncertainty has a significant influence on effectuation control.* |
| 4 | **H2a** | *Technological uncertainty has a significant influence on result control* |
| 5 | **H2b** | *Technological uncertainty has a significant influence on action control* |
| 6 | **H2c** | *Technological uncertainty has a significant influence on effectuation control* |
| 7 | **H3a** | *Operational uncertainty has a significant influence on result control* |
| 8 | **H3b** | *Operational uncertainty has a significant influence on action control* |
| 9 | **H3c** | *Operational uncertainty has a significant influence on effectuation control* |
| 10 | **H4a** | *Result control has a significant positive effect on existing capability* |
| 11 | **H4b** | *Result control has a significant influence on new capability* |
| 12 | **H5a** | *Action control has a significant influence on existing capability* |
| 13 | **H5b** | *Action control has a significant influence on new capability* |
| 14 | **H6a** | *Effectuation control has a significant influence on existing capability* |
| 15 | **H6b** | *Effectuation control has a significant influence on new capability* |
| 16 | **H7** | *Existing capability has a significant influence on new capability* |
| 17 | **H8** | *Existing capability has a significant influence on firm performance* |
| 18 | **H9** | *New capability has a significant influence on firm performance* |

The hypotheses associated with H4, H5 and H6 can be explained as follows. Control and innovation per se have contradictory meaning, so MCS from a traditional perspective is considered to hinder freedom to innovate and be creative according to the company's capabilities. The management's use of bureaucracy makes this clear. Bureaucracy, one form of action control is inflexible, then it will impede employee autonomy, including their ability to be creative (Bresciani et al., 2022; Pesämaa, 2017). However, recent research recognizes the usefulness of formal MCS for innovation decision making in the context of regulating innovation and creativity (Pfister, 2014).

Action control refers to the policies, rules, and processes implemented to regulate employees' behaviour and enhance business performance. Therefore, the company has intentionally designed action control to preserve and exploit its existing capacities to function efficiently and facilitate the attainment of goal congruence (Abernethy & Mundy, 2014; Adhikara et al., 2022; Barros & Ferreira, 2019) between the objectives of the organization and those of its employees.

Result control provides rewards for employees who can contribute to the output produced in accordance with the company's targets (Merchant & Stede, 2017). The company takes this action in an attempt to equip staff members to deal with the uncertain circumstances the business faces. The company does not regulate the actions and decisions of employees in working to achieve the predetermined targets. As long as they can meet the company's goals, employees are given the freedom to do their work, innovate and be creative (Faßauer, 2018) in accordance with the development of their capabilities. Employees' freedom to explore and develop to discover new innovations or new capability increases with the higher degree of result control adoption (Merchant & Stede, 2017; Faßauer, 2018). Creativity and innovation are recognized as the main capability (Ismail et al., 2019). This allows employees to receive more rewards and improves the performance of the company. As a result, there is goal congruence, or the alignment of the company's and its employees' aims.

Effectuation control is a new construct proposed in this study. Effectuation control is a special relationship effect that is synergistic, complementary and simultaneous that arises due to the use of action and result control, so it is expected that effectuation control will provide the best impact on the emergence of existing capabilities that are currently owned by the company and are ready to be used. This study follows the research result that there is an indirect relationship between MCS and performance through the capability (Grafton et al., 2010; Henri, 2006; Lee et al., 2017; Widener, 2007). The impact of MCS on existing capabilities and new capabilities varies depending on how MCS is implemented as stated in H4, H5 and H6. Existing capabilities are capabilities that enable a company to innovate and make incremental changes. Meanwhile, new capabilities are capabilities that enable exploration and radical change and development of capabilities, resources, technology, and processes. Companies pursue stability and adaptability simultaneously to respond to environmental changes (Lee et al., 2017). The higher the companies can exploit and renew their current capability, the higher their ability to pursue new capabilities to increase the firm performance (Grafton et al., 2010) as hypotheses H7, H8 and H9.

### *3.3. Statistical Analysis*

This research is a quantitative one using primary data and part least squares structural equation modeling (PLS-SEM) analysis. PLS-SEM is used to determine the relationship between constructs. Data collection techniques were carried out by distributing questionnaires in booklet format using 7-point Likert scale questions and open questions. Questionnaires were distributed to managers, directors and head of branch offices of companies in several industrial parks in Indonesia. As shown in Table 2 the return rate of the questionnaire distributed is 34%.

**Table 2**
Data collection

| Description of Questionnaire Distribution & Collection | Number of questionnaires | | |
|---|---|---|---|
| Number of questionnaires received from manufacturing companies - prospector type | 68 | | |
| Number of questionnaires received from manufacturing companies - non-prospector type | 35 | | |
| Manufacturing companies | | 103 | |
| Non-manufacturing companies | | 84 | |
| Number of questionnaires received back | | | 187 |
| Number of questionnaires distributed | | | 550 |

To answer the research questions, PLS-SEM will be applied to manufacturing-prospector and manufacturing non-prospector groups of sample data. Thus, there will be 4 models being analyzed to answer the research question. They are:
Model 1 – initial model for prospector companies. Initial model used MCS-OOC- result control & action control in the model.
Model 2 – effectuation MCS for prospector companies. Effectuation MCS is a modified initial model with additional effectuation control.
Model 3 – initial model for non-prospector companies.
Model 4 – effectuation MCS for non-prospector companies, which is the initial model with effectuation control.

Competitive uncertainty is the extent the top management monitors the following strategic uncertainties in order to ensure that the goals of the firm are achieved-(a) product introductions in adjacent industries (b) market tactics of competitor (c) new industry entrants (Widener, 2007). Technological uncertainty is measured by the extent the top management in the company monitors the changes in product technology and new technology to ensure that the firm's goals are achieved (Widener, 2007) and uncertainty level of adoption and implementation of new technology (Ghosh & Bhowmick, 2014). Operational uncertainty used the following indicators, such as the extent the top management monitor (a) diffusion of proprietary knowledge outside the organization (b) scale effect (c) scope effect (product breadth) (d) input cost and (e) internal product innovation in order to ensure that the goals of the firm are achieved (Widener, 2007).

In measuring the construct result control and action control, this study referred to research done by Bortoluzzi et al. (2020), as well as existing capabilities, new capabilities and firm performance used indicators from Grafton, 2010 (Grafton et al., 2010). While effectuation control is the interaction between result and action controls. As for prospectors, samples taken from those which have intellectual property rights and those who get awards from the external parties.

## 4. Result and Discussion

Model 1 is the initial model for prospector companies. Initial model used MCS-OOC- result control & action control in the model and amount of data for prospector companies is 68. As shown in Table 3, there are 10 indicators out of 36 indicators that must be dropped for Model 1 since they are less than 0,7. They are OU5, TU3, RC2, RC3, RC5, AC4, AC5, NC5, FP1, and FP5. Inner model or the structural model to predict causal relationship between latent variables can be seen from Table 4. This table shows that only operational uncertainty has significant impact on both result control and action control, while competitive and technological uncertainty do not have significant impact on result and action control.

**Table 3**
Loading factors for Model-1 (Initial Model for Prospector Companies)

| CU | | TU | | AC | | NC | |
|---|---|---|---|---|---|---|---|
| **CU1** | **0.838** | **TU1** | **0.889** | **AC1** | **0.794** | **NC1** | **0.734** |
| **CU2** | **0.873** | **TU2** | **0.828** | **AC2** | **0.736** | **NC2** | **0.839** |
| **CU3** | **0.746** | TU3[X] | 0,391[X] | **AC3** | **0.728** | **NC3** | **0.812** |
| | | | | AC4[X] | 0,559[X] | **NC4** | **0.787** |
| | | | | AC5[X] | 0,601[X] | NC5[X] | 0,389[X] |
| OU | | RC | | EC | | FP | |
| **OU1** | **0.832** | **RC1** | **0.73** | **EC1** | **0.826** | FP1[X] | 0,176[X] |
| **OU2** | **0.807** | RC2[X] | 0,601[X] | **EC2** | **0.826** | **FP2** | **0.831** |
| **OU3** | **0.811** | RC3[X] | 0,631[X] | **EC3** | **0.793** | **FP3** | **0.748** |
| **OU4** | **0.825** | **RC4** | **0.704** | **EC4** | **0.828** | **FP4** | **0.76** |
| OU5[X] | 0,693[X] | RC5[X] | 0[X] | **EC5** | **0.832** | FP5[X] | 0,629[X] |

Source: Smart PLS Data Processing

However, only result control brings impact to both existing and new capability. It indicates that for prospectors, the company's capacity is growing, both now and even in the future, when employees are given specific targets and allowed to figure out how to reach them on their own ways with the support of their superiors who provide feedback on how well they are doing. As a result, the company's performance will improve.

Table 4
Path Coefficient for Model 1

| | | Original Sample | Sample Mean | Standard Deviation | T Statistics | P Values | |
|---|---|---|---|---|---|---|---|
| H1a | CU → RC | - 0.433 | - 0.411 | 0.251 | 1.725 | 0.852 | |
| H1b | CU → AC | - 0.013 | 0.021 | 0.229 | 0.058 | 0.953 | |
| H2a | TU → RC | 0.042 | 0.038 | 0.152 | 0.278 | 0.781 | |
| H2b | TU → AC | 0.031 | 0.027 | 0.167 | 0.184 | 0.854 | |
| **H3a** | **OU → RC** | **0.902** | **0.902** | **0.185** | **4.881** | **0.000** | **(**)** |
| **H3b** | **OU → AC** | **0.461** | **0.450** | **0.206** | **2.231** | **0.026** | **(**)** |
| **H4a** | **RC → EC** | **0.311** | **0.318** | **0.126** | **2.478** | **0.014** | **(**)** |
| **H4b** | **RC → NC** | **0.191** | **0.193** | **0.081** | **2.368** | **0.018** | **(**)** |
| H5a | AC → EC | 0.190 | 0.214 | 0.162 | 1.174 | 0.241 | |
| H5b | AC → NC | - 0.021 | - 0.010 | 0.074 | 0.286 | 0.775 | |
| **H7** | **EC → FP** | **0.466** | **0.483** | **0.141** | **3.297** | **0.001** | **(**)** |
| **H8** | **NC → FP** | **0.356** | **0.342** | **0.145** | **2.454** | **0.014** | **(**)** |
| **H9** | **EC → NC** | **0.738** | **0.730** | **0.072** | **10.271** | **0.000** | **(**)** |

Source: Smart PLS Data Processing

Validity and reliability criteria can be seen in the reliability value and average variance extracted (AVE) value of each construct. Table 5 shows the composite reliability values are above 0,70 and AVE above 0,5 as recommended criteria (Lubis et al., 2024). Based on the result, the CS/df is 3,371 which means that model fit can be accepted.

**Table 5**
Construct Reliability and Validity-Model 1

| | Cornbach's Alpha | Composite Reliabilty (rho A) | Composite Reliabilty (rho C) | Average Variance Extracted |
|---|---|---|---|---|
| AC | 0.819 | 0.823 | 0.917 | 0.846 |
| CU | 0.713 | 0.721 | 0.838 | 0.635 |
| EC | 0.894 | 0.896 | 0.922 | 0.702 |
| FP | 0.703 | 0.741 | 0.868 | 0.768 |
| NC | 0.796 | 0.794 | 0.868 | 0.624 |
| OU | 0.830 | 0.858 | 0.885 | 0.660 |
| RC | 0.832 | 0.900 | 0.896 | 0.741 |
| TU | 0.672 | 0.659 | 0.818 | 0.601 |

Source: Smart PLS Data Processing

Model 2 is a modified model for prospector companies. This model uses model 1 for the basis which include construct under study, effectuation control, EfC. As shown in Table 6, in this model, there are 12 out of 41indicators below 0,7 that must be dropped from the model.

**Table 6**
Loading factors for Model-2 (Modified Model for Prospector Companies)

| | **CU** | | **TU** | | **AC** | | **NC** | | **EfC** |
|---|---|---|---|---|---|---|---|---|---|
| **CU1** | **0.837** | **TU1** | **0.883** | **AC1** | **0.794** | **NC1** | **0.735** | **EfC1** | **0.807** |
| **CU2** | **0.872** | **TU2** | **0.828** | **AC2** | **0.736** | **NC2** | **0.839** | **EfC2** | **0.796** |
| **CU3** | **0.749** | TU3[X] | 0,404[X] | **AC3** | **0.729** | **NC3** | **0.812** | **EfC3** | **0.746** |
| | | | | AC4[X] | 0.559[X] | **NC4** | **0.787** | EfC4[X] | 0.697[X] |
| | | | | AC5[X] | 0.601[X] | NC5[X] | 0,39[X] | EfC5[X] | 0.105[X] |
| | **OU** | | **RC** | | **EC** | | **FP** | | |
| **OU1** | **0.832** | **RC1** | **0.729** | **EC1** | **0.828** | FP1[X] | 0.176[X] | | |
| **OU2** | **0.805** | RC2[X] | 0.601[X] | **EC2** | **0.827** | **FP2** | **0.831** | | |
| **OU3** | **0.809** | RC3[X] | 0.631[X] | **EC3** | **0.792** | **FP3** | **0.748** | | |
| **OU4** | **0.826** | **RC4** | **0.704** | **EC4** | **0.828** | **FP4** | **0.76** | | |
| OU5[X] | 0,697[X] | RC5[X] | 0.001[X] | **EC5** | **0.83** | FP5[X] | 0.629 | | |

Source: Smart PLS Data Processing

They are OU5, TU3, RC2, RC3, RC5, AC4, AC5, NC5, EfC4, EfC5, FP1 and FP5. Table 7 presents the path coefficient generated by PLS Software after these indicators were removed from the model. Initial and modified model shows consistency in proving the significant relationship between operational uncertainty to both result and action control.

**Table 7**
Path Coefficient for Model 2

| Original Sample (O) | Sample Mean (M) | Standard Deviation (STDEV) | T Statistics (\|O/STDEV\|) | P Values | |
|---|---|---|---|---|---|
| -0.427 | -0.376 | 0.275 | 1.553 | 0.121 | |
| -0.023 | 0.025 | 0.236 | 0.097 | 0.923 | |
| -0.209 | -0.165 | 0.219 | 0.953 | 0.341 | |
| 0.044 | 0.032 | 0.151 | 0.293 | 0.770 | |
| 0.030 | 0.019 | 0.156 | 0.195 | 0.845 | |
| 0.038 | 0.025 | 0.168 | 0.224 | 0.823 | |
| **0.892** | **0.877** | **0.202** | **4.417** | **0.000** | **(**)** |
| **0.472** | **0.460** | **0.212** | **2.227** | **0.026** | **(**)** |
| **0.658** | **0.643** | **0.193** | **3.410** | **0.001** | **(**)** |
| 0.139 | 0.163 | 0.167 | 0.834 | 0.405 | |
| **0.146** | **0.149** | **0.084** | **1.740** | **0.082** | **(**)** |
| -0.371 | -0.252 | 0.396 | 0.936 | 0.350 | |
| -0.188 | -0.166 | 0.182 | 1.037 | 0.300 | |
| **0.705** | **0.598** | **0.424** | **1.664** | **0.097** | **(**)** |
| 0.217 | 0.199 | 0.207 | 1.048 | 0.295 | |
| **0.714** | **0.715** | **0.074** | **9.690** | **0.000** | **(**)** |
| **0.466** | **0.483** | **0.146** | **3.189** | **0.002** | **(**)** |
| **0.356** | **0.344** | **0.150** | **2.375** | **0.018** | **(**)** |

Source: Smart PLS Data Processing

Both also in line in revealing that operational uncertainty is the main strategic uncertainty that relate to the MCS of manufacturing companies. It can be inferred that that result control has a significant impact to the formulation of new capabilities, while the effectuation control, the interaction between result and action control is very important to the existing capability of the company. Existing capability is very important for the creation of new capability and it also brings significant influence to the firm performance (Grafton et al., 2010). Thus, effectuation control is very crucial, since management will be more focused on short-term performance and capability development amid uncertainty and environment unpredictability (Bourne, 2014). Uncertainty makes previously established performance measurements and targets prone to change because they are no longer relevant to current conditions (Bourne, 2014). Based on the result of construct reliability and validity as shown in Table 8 all constructs fulfil the criteria. Model 2 is fit and can be accepted as the CS/df is equal to 3,25 or less than 5.

**Table 8**
Construct Reliability and Validity

| | Cornbach's Alpha | Composite Reliability (rho | Composite Reliability (rho C) | Average Variance Extracted |
|---|---|---|---|---|
| AC | 0.819 | 0.824 | 0.917 | 0.846 |
| CU | 0.713 | 0.719 | 0.839 | 0.635 |
| EC | 0.894 | 0.896 | 0.922 | 0.702 |
| EfC | 0.879 | 0.935 | 0.917 | 0.735 |
| FP | 0.703 | 0.741 | 0.868 | 0.768 |
| NC | 0.796 | 0.795 | 0.868 | 0.624 |
| OU | 0.830 | 0.858 | 0.885 | 0.659 |
| RC | 0.832 | 0.900 | 0.896 | 0.741 |
| TU | 0.672 | 0.662 | 0.815 | 0.595 |

Model 3 is the initial model applied to 35 non-prospector sample companies. Loading factor for model 3 is similar to the one for model 1. Both initial models drop 10 similar indicators, except OU5, RC2 and TU3 which are dropped in model 1 are replaced with dropping of indicator AC3, FP4 and O2 in model 3. The rest that are under 0.7 are AC4, AC5, FP1, FP5, NC5, RC3 and RC5. Table 9 shows the comparison of p-value found in the path coefficient table resulting from the output of PLS-SEM for model 1 until model 4.

**Table 9**
P-Value for Model 1 until Model 4

| Hypothesis | | P-value | | | | | |
|---|---|---|---|---|---|---|---|
| No | Description | model 1 | | model 2 | | model 3 | | model 4 | |
| H1a | CU → RC | 0.852 | | 0.121 | | 0.350 | | 0.357 | |
| H1b | CU → AC | 0.953 | | 0.923 | | 0.958 | | 0.944 | |
| H1c | CU → EfC | | | 0.341 | | | | 0.347 | |
| H2a | TU → RC | 0.781 | | 0.770 | | 0.160 | | 0.156 | |
| H2b | TU → AC | 0.854 | | 0.845 | | 0.975 | | 0.994 | |
| H2c | TU → EfC | | | 0.823 | | | | 0.114 | |
| H3a | OU → RC | **0.000** | ** | **0.000** | ** | **0.090** | ** | **0.098** | ** |
| H3b | OU → AC | **0.026** | ** | **0.026** | ** | **0.000** | ** | **0.001** | ** |
| H3c | OU → EfC | | | **0.001** | ** | | | **0.009** | ** |
| H4a | RC → EC | **0.014** | ** | 0.405 | | 0.790 | | 0.628 | |
| H4b | RC → NC | **0.018** | ** | **0.082** | ** | 0.876 | | 0.478 | |
| H5a | AC → EC | 0.241 | | 0.350 | | 0.140 | | 0.339 | |
| H5b | AC → NC | 0.775 | | 0.300 | | 0.527 | | 0.404 | |
| H6a | EfC → EC | | | **0.097** | ** | | | 0.729 | |
| H6b | EfC → NC | | | 0.295 | | | | 0.488 | |
| H7 | EC → NC | **0.000** | ** | **0.000** | ** | **0.000** | ** | **0.000** | ** |
| H8 | EC → FP | **0.001** | ** | **0.002** | ** | 0.205 | | 0.201 | |
| H9 | NC → FP | **0.014** | ** | **0.018** | ** | **0.026** | ** | **0.029** | ** |

Table 9 reveals that operational strategic uncertainty is the only type of strategic uncertainty that has significant impact to result control and action control for both initial model and modified model (H3a, H3b- all model) regardless of the strategy typology used by the manufacturing company. Differ from result control, action control does not have influence on existing and new capability for initial and modified models regardless of the strategy typology too (H5a, H5b – all models). Comparing model 1 and 2, for prospectors, the existence of effectuation control can distinguish the effect of result control on capability, especially distinguishing its effect on existing capabilities. It can be seen that the effect of result control on existing capability (H4a in model 2) is no longer significant after including the effectuation control in the model, while its relationship with new capability is still significant (H4b-model 2). However, the complementary effect between result and action control (effectuation control) is significant toward existing capability (H6a-model 2). Hence, synergistic, complementary and simultaneous effect - the effectuation control - makes the relationship between result control and capabilities more clearly identified.

For prospector companies, model 2 indicates that operational uncertainty has a significant relationship toward effectuation control (H3c). Effectuation control influences existing capability significantly (H6a), while result control is no more significant toward existing capability (H4a), when effectuation control is included in the model. It indicates that in time of uncertainty and unpredictability, prospectors which implement pay for performance system (result control) in conjunction with sound policies, rules, procedures and bureaucracy (action control), they can exploit the existing capability (H6a) and can explore the new capabilities (H4b) of the company that they will stay better now and in the future. Although action control does not bring significant influence to capabilities, its contribution in effectuation control with result control is very important and significant toward existing capability. It can be inferred that policies, rules, and procedural norms (action control) will provide temporary stability to the firm in facing uncertainty since employees will be subject to the same guidelines to avoid perplexing situations, allowing the business to continue using its existing capability to survive. However, the presence of result control—which is first applied in combination with action control and developing effectuation control—as well as result control itself will ultimately encourage the growth of new capabilities for the long-term sustainability of the company. In other words, effectuation control or action control and result control are a shock absorber, while result control itself is the thrust power of a company to utilize its capabilities amid uncertainty in its effort to keep its sustainability. Prospectors tend to exploit its existing capability more that they can use it as a breakthrough to lead the market or industry This is because prospectors can adapt quickly to changes, even the continuously changing target due to the high uncertainty situation, and seize possibilities presented by those changes (Bortoluzzi et al., 2020; Liem & Hien, 2020).

Result control, such as pay for performance will motivate employees to the creation of new capability, since this type of control drives innovation and creativity. Employees are free to do their job in their own ways as long as they achieve the target given. This will continue to encourage the achievement of company performance, even boosting it, by new capability found in order to support company sustainability. This also conforms with the statistical result that the existing capabilities brings significant influence to new capability and firm performance, as stated in H7, H8 and H9. Management tends to use both result and action control to focus on exploiting the existing capability for performance achievement (Bourne, 2014). It means that action control cannot be functioning well without result control as well, and vice versa. It proves that these joint controls must be applied together rather than single control for the success of MCS design (Merchant & Stede, 2017; Widener, 2007) in improving the firm performance. In supporting that statement, Table 9 also shows that the relationship between effectuation control on the existing capability is significant only in prospector companies (H6a – model 2) and not for non-prospectors (H6a- model 4). Comparing initial model 1 and model 3 shows that result control is a MCS control type that is crucial in the prospector company or model 1, as the relationship between result control to both existing (H4a model 1) and new capabilities (H4b – model 1) are significant. Those relationships are insignificant for non-prospector company companies (H4a, H4b model 3). It means that for manufacturing companies which adopt prospector strategy, the result control type of MCS is very important. When effectuation control is inserted into the model only for the model for prospectors shows that this type of control has a significant relationship to existing capability, but not for non-prospectors.

**Table 10**
R-Square for all model

| **MCS-OOC** | | | **Effectuation MCS** | | |
|---|---|---|---|---|---|
| A - model 3 - initial model for non prospector companies | | | B. model 2 - modified model for non prospector companies | | |
| | R Square | R Square Adjusted | | R Square | R Square Adjusted |
| AC | 0.408 | 0.351 | AC | 0.411 | 0.354 |
| EC | 0.178 | 0.127 | EC | 0.185 | 0.106 |
| | | | EfC | 0.373 | 0.312 |
| FP | 0.589 | 0.563 | FP | 0.589 | 0.563 |
| NC | 0.590 | 0.550 | NC | 0.603 | 0.550 |
| RC | 0.271 | 0.200 | RC | 0.271 | 0.200 |
| **MCS-OOC** | | | **Effectuation MCS** | | |
| C. model 1 - initial model for prospector companies | | | D. model 2 - modified model for prospector companies | | |
| | R Square | R Square Adjusted | | R Square | R Square Adjusted |
| AC | 0.221 | 0.184 | AC | 0.224 | 0.187 |
| EC | 0.188 | 0.163 | EC | 0.252 | 0.217 |
| | | | EfC | 0.268 | 0.233 |
| FP | 0.611 | 0.600 | FP | 0.611 | 0.599 |
| NC | 0.679 | 0.664 | NC | 0.685 | 0.665 |
| RC | 0.367 | 0.337 | RC | 0.362 | 0.332 |

It means effectuation control is more applicable in the prospector-type companies. This also aligned with the comparison of R-square for the 4 models that can be seen from Table 10. It is very interesting that the R-squares for most all constructs on the initial model (Panel C) are increasing after effectuation control was included in the system or modified model for prospectors (Panel D). Hence, the effectuation control makes the contribution of each construct to the model higher. However, R-Square for most

constructs on the initial and modified model of non-prospector company are relatively constant, as shown in Table 10 Panel A and B. Besides increasing the R-square for most of / all the constructs, effectuation control also increases the number of hypotheses accepted. As shown from Table 9, for prospectors, the number of the hypotheses proven is increasing, from 7 to 8; while for non-prospector companies it increased from 4 to 5 hypotheses. However, since the modified model for prospector companies have the highest number of hypotheses proven, then the modified model of MCS-OOC or effectuation MCS will be more applicable in the companies adopting prospector strategy typology rather than the one with non-prospectors. Further research needs to be done by exploring synergistic, complementary and simultaneous effects of other control components, such as personnel and cultural controls or result and cultural control as well.

| **MCS-OOC** | | | **Effectuation MCS** | | |
|---|---|---|---|---|---|
| A - model 3 - initial model for non prospector companies | | | B. model 2 - modified model for non prospector companies | | |
| | R Square | R Square Adjusted | | R Square | R Square Adjusted |
| AC | 0.408 | 0.351 | AC | 0.411 | 0.354 |
| EC | 0.178 | 0.127 | EC | 0.185 | 0.106 |
| | | | EfC | 0.373 | 0.312 |
| FP | 0.589 | 0.563 | FP | 0.589 | 0.563 |
| NC | 0.590 | 0.550 | NC | 0.603 | 0.550 |
| RC | 0.271 | 0.200 | RC | 0.271 | 0.200 |
| **MCS-OOC** | | | **Effectuation MCS** | | |
| C. model 1 - initial model for prospector companies | | | D. model 2 - modified model for prospector companies | | |
| | R Square | R Square Adjusted | | R Square | R Square Adjusted |
| AC | 0.221 | 0.184 | AC | 0.224 | 0.187 |
| EC | 0.188 | 0.163 | EC | 0.252 | 0.217 |
| | | | EfC | 0.268 | 0.233 |
| FP | 0.611 | 0.600 | FP | 0.611 | 0.599 |
| NC | 0.679 | 0.664 | NC | 0.685 | 0.665 |
| RC | 0.367 | 0.337 | RC | 0.362 | 0.332 |

## 5. Conclusion

This research highlights the significance of joint controls in MCS-OOC, also known as the control tightness concept, by incorporating effectuation control into the formulation of Effectuation MCS, a modified model of MCS-OOC. When a manufacturing company adopts a prospector strategy that operates under uncertainty, result control plays a crucial role in exploring new capabilities. Although action control alone does not significantly impact capability, its inclusion in the MCS design is crucial. This is because its simultaneous influence with result control creates effectuation control, which in turn significantly impacts the existing capability. As part of effectuation control, action control serves as a shock absorber, providing temporary stability in coping with the uncertainty. This is because only effectuation control, not action control, significantly influences the existing capability. Result control signifies action control, as reflected in effectuation control. Action control enables employees to refer to the same procedures, rules, and policies in confusing situations caused by uncertainty, as evidenced by the significant relationship between effectuation control and existing capability. Prospector characteristics, capable of quickly adapting to changes and constantly shifting targets under high levels of uncertainty, provide a driving force for prospector companies to achieve breakthroughs, maintain market leadership, and seize opportunities.

Non-prospector companies do not have these characteristics. Hence, in uncertain situations, non-prospector companies are unable to effectively utilize and develop their existing and new capabilities. This is in line with the statistical results, which state that results, actions, and effectuation control do not have a significant influence on existing or new capabilities. Therefore, the modified model of MCS-OOC, or Effectuation MCS, will be more applicable to companies adopting prospector strategy typology, rather than those with non-prospector strategy typology. This is supported by the increase in the number of hypotheses, which is highest in the modified model for prospector companies, as the model incorporates the construct under investigation.

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