Impact Of Absorptive Capacity On Achieving Congruence Between Environmental Uncertainty And Organizational Mechanisms: A Contingency View On Japanese Manufacturing And Service Industries

by

Ylias Razafindrazaka

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Dissertation Advisory Committee'

Prof. Yoshiki MATSUI

Prof. Motonari TANABU

Prof. Daniel Arturo HELLER

Yokohama National University

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LIST OF ABREVIATIONS

Absorptive capacity	AC
Average variance extracted	AVE
Composite reliability	CR
Coordination mechanisms	CM
Cross-functional interface	CFI
Demand uncertainty	DU
Environmental uncertainty	EU
Exploitation of Knowledge	EXP
Hierarchy of Authority	HOA
Job codification	JC
Job rotation	JR
Knowledge acquisition	ACQ
Knowledge assimilation	ASM
Knowledge transformation	TRS
Knowledge exploitation	EXP
Operations management	OM
Organizational mechanisms	ORM
Participation in Decision Making	PDM
Rule observation	RO
Sequential socialization tactics	SST
Socialization mechanisms	SOM
System mechanisms	SM
Technology uncertainty	TU
Variance inflation factor	VIF

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I. Introduction

The ability to develop sustainable competitive advantage depends on a firm's ability to convert knowledge into capabilities to meet environmental demands (Tu et al., 2006). Therefore, it is a preliminary requirement to be able to identify the environmental demands. Recent practices in the evolution of manufacturing and service industries also include extensive use of information to get the best knowledge on customer preferences in a timely manner. Indeed, it could be considered a competitive advantage for an organization to have such valuable information at hand. However, considering the speed at which information technology spreads among competitors, this represents an ephemeral advantage. What might make the difference lies in the way organizations use such valuable information. Internally, that may include, but is not limited to, a continuous readjustment to the environment through constantly changing the balance between mechanistic and organistic structure.

Galbraith (1977), by adopting an information processing view, provides seminal work on organizational design by taking into account the relationships between task uncertainty and organizational mechanisms. The proposed model on such seminal work states that organizations will sequentially adopt specific mechanisms as task uncertainty increases. What is initially interesting in the Galbraith (1977) model is the cumulative aspect of the mechanisms. That means that previous mechanisms are still integrated with the new mechanisms required by the increase in task uncertainty. That could be interpreted that a pure mechanistic or pure organistic structure is not viable in the long term, where re-adjustment to the environment is required. The organizational mechanisms considered in sequential order of increasing task uncertainty in Galbraith (1977) works are: direct contact, liaison roles, task forces on temporary basis, teams on permanent basis,

integrating role, linking-managerial role, and matrix design. A second point on the model proposed by Galbraith (1977) is that the author attempts to show the generalizability of the framework by applying it to various industries from restaurants, to medical clinics, to manufacturing firms. In later research, the validity of the model was confirmed by Flynn and Flynn (1999).

The hypotheses investigating the first research question for the present research are drawn by considering alternatives to increasing the information processing capacity for decision making or by reducing the need of information processing, as suggested in Galbraith (1977). Moreover, the set of organizational mechanisms considered in this research are not necessarily exclusive and exhaustive.

Adopting the contingency view, and by exploiting the information-processing view advocated by Galbraith (1977), this paper attempts to identify the feasible set of organizational mechanisms that impact financial performance under different levels and sources of environmental uncertainty. Souza and Voss (2008) suggest integrating other perspectives and the contingency theory in order to bring clarity to the Operations Management phenomenon. Souza and Voss's (2008) technical note on contingency research in Operations Management practices investigates the shift of trends in Operations Management research. It is noticed that, as Operations Management best practices mature, relevant research has begun to shift focus from the justification of the value of those practices to the understanding of the contextual conditions under which they are effective. In other words, doubts are raised on the best practices' universal validity.

The best practices paradigm focuses on the continuous development of best practices on all areas within a company and is supported by research showing links between the adoption of best practices and improved performance. However, previous

researchers such as Dow et al. (1999) and Powell (1995) found that some practices did not have a significant impact on performance. One potential explanation is that the best practices are context-dependent. Sousa and Voss (2002) stated that one problem in implementing best practices may be the too-great a mismatch between the proposed form of best practices and the organizational context. Galbraith (1977) reinforces the necessity of the organisation to adapt to its external environment, stating that as patterns of task uncertainty, diversity, and external conditions change, the organization must change its structure for decision-making in order to remain effective. The present research intends to address congruence between organizational mechanisms and environmental uncertainty as one of the possible explanations of the mixed findings concerning the impact of best practices on performance.

Another possible explanation for why some practices did not have a significant impact on performance is related to the organizational routines and processes by which firms acquire, assimilate, transform, and exploit knowledge to produce a dynamic organizational capability, which relates to the organization's absorptive capacity as stated by Zahra and George (2002). With this consideration, the present research investigates absorptive capacity as another possible explanation of the mixed findings on the impact of best practices on performance.

In fact, the environment the organization faces is continuously changing; it may be at a relatively slower pace in some industries than in others, but is still perceptible by the organization. The best practices implemented to face a given environment may not be adapted when that environment changes in terms of level and sources of uncertainty. If so, the organizational mechanisms should be converted dynamically or adjusted continuously in a highly dynamic and uncertain environment. In this situation, absorptive capacity influences the effect of best practices on performance. This proposition is

supported by Tu et al. (2006) who found that absorptive capacity of an organization is perhaps the most critical factor in determining whether a planned change, such as best practices implementation, can be implemented successfully, thereby improving performance.

In this investigation, it is expected through the hypotheses that in highly uncertain environments, organisational mechanisms enhancing decision-making at lower levels and coordination between functions improve performance. However, when managers choose which organizational mechanisms should be used, they should take into consideration the actual context for short-term goal achievement or the anticipated context for long-term goal achievement. In both cases, the average product lifecycle in the industry may play a significant role, as it may relate to the degree of uncertainty associated with the environment of a particular business unit. On one hand, in business units evolving in a relatively stable market, organizational mechanisms enhancing top-down information flow and observation of rules are expected to work well. On the other hand, in business units evolving in a relatively dynamic market, mechanisms should enhance the communication of the information flow from the point of contact with customers to the point of decision-making (Galbraith, 1977). Managers designing organizational mechanisms should know when to use mechanisms enhancing bottom-up and lateral information flow to get the latest information from the point of contact with customers, and when to use mechanisms enhancing the observation of rules in order to implement the necessary changes in the organization's response to customers, as suggested by Galbraith (1977).

Concerning the implementation of such necessary changes in the structure and process of decision-making, it is expected that organizational mechanisms alone are not enough to succeed, as the environment is continuously changing. Extant research has

investigated how to deal with these changing environments. On one hand, Miles (1984) suggested vertical integration to create a more predictable environment and added that uncertainty will also affect organization structure, because as task uncertainty increases, more information must be processed among decision-makers to achieve a given level of performance; this is one option suggested by Galbraith's (1977) model, from an information processing view. On the other hand, we suggest developing absorptive capacity as the ability to achieve congruence in the changing environment, thus dealing with environmental uncertainty. First, achieving congruence is proposed to deal with the unpredictability of the environment. Second, the absorptive capacity is proposed to enhance the congruence achieved. Therefore, it is expected that absorptive capacity influences how the organizational mechanisms could improve performance, specifically, financial performance.

With such expectations from a contingency view, the first research question we address is:

RQ1: Which set of organizational mechanisms are congruent within different levels and sources of environmental uncertainty, thereby improving financial performance?

From a resource-based view, the second research question we address is:

RQ2: What is the impact of absorptive capacity on achieving congruence in such different environmental uncertainties?

To find answers to these questions, congruence is hypothesized considering one type of environmental uncertainty at a time: higher environmental uncertainty and lower environmental uncertainty. The hypothesis on a single contextual variable at a time is supported in extant research. First, the focus on one environmental uncertainty at a time is supported by Child (1975) in his study of manufacturing firms and airlines, affirming that higher-performing organizations had structures that were internally consistent, and

such consistent organizations adopted structures matched to a single contextual variable. Second, the focus on investigating alternatively higher and lower environmental uncertainty is explained by the purpose to find different congruences among such environments. This is supported by Jaworski and Kohli (1993) who found that an organization's products and services are likely to require relatively little modification in stable markets where the customer's preferences do not change very much.

Concerning such stable markets, and by adopting an information-processing view, Galbraith (1974) mentions that in periods of stability, it is cheaper to absorb uncertainty with slack than to apply more coordination effort. However, in a more volatile market condition, Jelinek (1977) mentions that under conditions of great uncertainty or great technological specificity, we may expect elaboration of structures and administrative devices (specificity in procedures or response is an administrative device) to protect the technology. Organizations that operate in the more turbulent markets are likely to have to modify their products and services continually in order to respond to customers' changing preferences (Jelinek, 1977). Technology uncertainty varies with the maturity of the project and the state-of-the-art level of design (Galbraith, 1977). Third, we expected that the considered constructs are more general; therefore, the relationship between the considered constructs is expected to be consistent in both services sector and manufacturing sector. The environments in service and manufacturing sectors are thought to differ; moreover, among manufacturing industries, we could distinguish between process industry and discrete product industry.

However, we attempt to include a large variety of industries, following the examples of previous research. There are also some similarities that can be illustrated by the shop floor layout in manufacturing plants and the shop layout in convenience stores. In a manufacturing plant, the layout objective is to minimise the non-necessary movement

of material. In a convenience store, the shop layout objective is to maximise the route of the customers to expose them to as much product as possible. Such illustration also highlights the difficulty of measuring the output in the service industry. It is expected that the model could be applied for both manufacturing and services industries; the logic behind this assumption lies on the service-dominant logic as introduced by Vargo and Lusch (2004) and borrowed from the marketing field. Vargo and Lusch (2004) define services as the application of specialized competencies, including knowledge and skills, through deeds, processes, and performances for the benefit of another entity or the entity itself. This definition is consistent with Gronroos (1994). Vargo and Lusch (2004) argue that the definition captures the fundamental function of all business enterprises and added that the service-dominant logic represents a reoriented philosophy that is applicable to all marketing offerings, including those that involve tangible output in the process of service provision.

Our proposed framework considers both external and internal environmental characteristics. To some extent, the present research focuses on the environmental uncertainties as external context and organizational mechanisms as internal context. Swamidass and Newell (1987) contend that environmental uncertainty, which importance to strategy is explicitly recognized in organization theory, has received little attention in manufacturing strategy literature. Extant strategy literature mentions that strategy has three dimensions: process, content, and context. Process is a sequence of predefined prescriptive steps or stages (Voss, 1992). Content includes the areas to be focused on and objective sets such as improving quality, delivery, speed, cost, or flexibility (Slack et al. 2004). Context needs to be considered, as internal and external contextual factors can impact strategy (Pettigrew (1987).

The present research attempts to integrate both content and context in its framework. The content includes the area to be focused on, the objective set, which is congruence. The context to be considered is the external environment, characterised by its uncertainty. Knowledge is key in achieving the objectives in the context because of its implications for strategy. Mintzberg et al. (2005) note that the essence of strategy lies in developing the organisational capability to acquire, create, accumulate, and exploit knowledge. Moreover, Lane and Lubatkin (1998) indicate that the ability to develop sustainable competitive advantage depends on a firm's ability to convert knowledge into capabilities to meet environmental demands. Tu et al. (2006) added that, in the context of rapid environmental change, managers must emphasize organizational learning-absorptive capacity to helps firms assimilate new technologies and practices. However, scant research has examined absorptive capacity in the operations management literature (Tu et al., 2006).

Therefore, as suggested by Whetten et al. (2009), Patel et al. (2012) outline a theoretical approach: the horizontal borrowing of theory. The horizontal borrowing of theories is cross-contextual. Theories use concepts developed for the study of phenomena in a given social context, but are borrowed for the study of the same phenomena in another social context (Whetten et al., 2009). With this theoretical approach, Patel et al. (2012) examine absorptive capacity in the context of the operational unit instead of the R&D unit. They assume that the absorptive capacity concept will function similarly when transferred horizontally to the operations context. This supports Cohen and Levinthal (1990) who found that the development of an organization's absorptive capacity will build on prior investment in the development of its constituent, individual absorptive capacities—and, like individuals' absorptive capacities, organizational absorptive capacity will tend to develop cumulatively. In answering our second research question,

horizontal theoretical borrowing will be applied to consider absorptive capacity in the operational context of the business units, consistent with Patel et al. (2012).

The next sections of this paper will introduce the theoretical foundation, hypotheses development regarding a lower uncertainty environment and the associated research framework, followed by the hypotheses regarding a higher uncertainty environment and the associated research framework. Then, the paper will focus on the research methodology, including details about data collection, measurement validations, and hypotheses testing. Finally, the main findings are discussed. Then conclusions and limitations of the research are briefly stated.

II. Literature review, theoretical foundation

II.1. Contingency view

Seminal works on contingency theory were conducted by Burns and Stalker (1961), Lawrence and Lorsch (1967), Child (1972), Galbraith (1973) and Donaldson (1987). The main theme was that an organization's ability to cope with its environment determines, and therefore predicts, its performance.

Schoonhoven (1981) stated that contingency theory relies on a few explicitly stated assumptions. The first explicit assumption is that there is no one best way to organize. The second is that any way of organizing is not equally effective under all conditions. Donaldson (2006) gives a more precise view of contingency theory: that organizations adapt their structures to maintain congruence with changing contextual factors in order to attain higher performance. Pagell and Krause (1999) noted that structural contingency theorists suggest that when there is a congruence between the internal aspects of an organization and the external environment, firm performance should increase. Cntingency theory asserts that when the relationship between two variables (dimensions of technology and structure), predicts a third variable (organizational effectiveness), there is an interaction between the first two variables. In our framework, contingency theory suggests that when organizational mechanisms are congruent with environmental uncertainty, this congruence should predict increasing financial performance.

However, Donaldson (2006), in defending contingency theory, noted that Galunic and Eisenhardt (1994) stated that contingency theory was static and fails to deal with organizational change and adaptation. In his earlier work, Donaldson (1987) proposed structural adaptation to regain the fit (SARFIT) model, stating that an organizational structure should adapt to new contingencies for survival. A second criticism about

contingency theory is that it does not have all the components required to be considered as a theory. According to Wacker (1998), a theory should contain at least four components: definitions of variables, a domain where the theory applies, a relationship of the variables, and predictions. Wacker (1998) contended that contingency theory lacks the fourth property, prediction. With respect to those differing views, and with the expected relevance of the potential insight from the theory adopted, the present research could not afford to use the term "contingency theory." The term "contingency approach" will be used throughout the paper.

II.2. Conceptualizing congruence

Doty et al. (1993) suggest that when conducting contingency research, different forms of congruence can be employed. Specifically, two prominent classifications of forms of congruence in contingency theory are proposed by Drazin and Van de Ven (1985) and Venkatraman (1989). Drazin and Van de Ven (1985) distinguished three forms of congruence based on the configuration of the relationship between contextual, response, and performance variables. Those conceptual approaches are the selection approach, the interaction approach, and the system approach. Venkatraman (1989) distinguished six forms of congruence based on the degree of precision of the functional form of congruence and based on the number of variables considered in the congruence equation. Those conceptual approaches are the moderation approach, the mediation approach, the matching approach, the gestalts approach, the profile-deviation approach, and the co-variation approach. Information on the analytical approach for such analyse is provided in the next section.

II.2.1. Analytical test of congruence

In order to identify the organizational mechanisms that impact financial performance in a specific environmental uncertainty, two analytical approaches are available in the

existing literature. The first approach is about disaggregating the organization's environment into its different components, such as the components of the environmental uncertainty. Then for each component of the organizational environment, the relationship with a response variable and the impact of such relationship on performance is analyzed. This is the reductionistic approach. The second analytical approach is the holistic approach. The organizational environment is considered as a whole. The relationship between a whole organizational environment and multiple response variables is addressed simultaneously, as well as the impact of such relationships on performance.

II.2.1.1. The reductionistic approach

The reductionistic approach presumes that any individual bivariate interaction between contextual variable and response variable will be strong enough to emerge as a statistically significant effect on performance variable. Venkatraman and Prescott (1990) stated that the reductionistic approach is based on a central assumption that the congruence between two constructs can be understood in terms of pairwise congruence among the individual dimensions that represent the two constructs. However, Drazin and Van de Ven (1985) and Venkatraman and Prescott (1990) discuss the limitations of the reductionistic approach and argued that even an array of independent interactions may fail to capture the complex nature of congruence. They emphasized that a bivariate interaction may be either suppressed by or amplified by other interactions. Souza and Voss (2008) support this idea and emphasized that context variables, response variables, and performance variable must be considered holistically to understand the organizational design. Moreover, Tosi and Slocum (1984), providing guidelines for contingency view, suggested that in situations involving the congruence between only two concepts, the reductionistic approach could be considered—but when multiple variables are involved, the holistic approach could be complement the approach.

II.2.1.2. The holistic approach

The holistic approach states that characteristics of environment and organizational forms must be joined together in a particular configuration to achieve a complete description of a social system (Venkatraman & Prescott, 1990). A holistic approach considers the internal consistency of multiple contextual variables and multiple response variables which affect performance. With this consideration, the present research initially adopts a reductionistic approach. Next, to gain insight on the compatibility between the organizational mechanisms, the holistic approach is adopted for investigating the impact of congruence between a single contextual variable and a bundle of response variables at a time, which is consistent with Koufteros et al. (2002, 2005). In order to conduct such analysis, Souza and Voss (2008) recommend the method proposed by Venkatraman's (1989) and detailed in Venkatraman and Prescott (1990)—the profile deviation analysis.

Venkatraman and Prescott (1990) stated that the holistic approach is based on a central assumption that it is important to retain the holistic or systemic nature of environment-strategy congruence in order to examine its overall effectiveness on performance. Souza and Voss (2008) noted that a number of studies found evidence of strong interactions between several Operations Management practices, suggesting that their mutual interactions significantly affect performance more than their individual effects. However, Souza and Voss (2008) added that the holistic approach has been used by few studies in Operations Management practice contingency research. Souza (2003) and Souza and Voss (2001) consider bundles of both practices and contextual variables. However, Koufteros et al. (2002) and Koufteros et al. (2005) consider bundles of practices and examine contextual variables individually. Souza and Voss (2008) suggested that future research in the field of Operations Management Practice contingency draw on work of Venkatraman (1989), which provides an overview of analytical methods that can be used to test congruence. Such methods include profile deviation analysis, which is

described in Venkatraman and Prescott (1990). This method is also used by Ahmad and Schroeder (2003), Das et al. (2006), and da Silveira (2005). Alternatives to the profile deviation approach are proposed by Vorhies and Morgan (2003), and will be discussed in the next section.

II.2.2. Method for testing congruence independently from performance

Let's consider the case where we identify the congruence between contextual variables and response variables independently from any performance variables. In doing so, the concept of congruence as matching is adopted. This is in line with Drazin and Van de Ven (1985), who define congruence as a theoretically defined match between contextual variables and response variables, and congruence is specified without reference to a performance variable. The analytical method to measure congruence conceptualized as matching uses regression analysis. To find if a contextual variable is congruent with a given response variable, the regression coefficients of contextual variables on response variable should be significant. Repeated regression analyses for the same context allows us to find a set of congruent response variables under a single contextual variable.

II.2.3. Method for testing congruence considering its impact on performance

We then consider the case where the congruence will be identified between contextual variables, response variables, and performance variables. The procedure described by Drazin and Van de Ven (1985) could be considered in investigating the effect of congruence on performance; they mentioned that whatever the conceptual approach of congruence adopted, it should correspond to a particular analytical approach consistent with such conceptualization.

Concepts and findings from existing literature are borrowed to operationalize the measure of congruence. The method proposed by Venkatraman and Prescott (1990) assumes that if an ideal profile is specified for an environment, a business unit's degree

of adherence to such an ideal profile will be positively related to performance. Deviation from the ideal profile implies a weakness in context-response congruence, resulting in a negative effect on performance. For each contextual variable, Venkatraman and Prescott (1990) suggest conceptualizing such deviation as MISALIGN and to operationalize it as a weighted distance between the ideal profile and the significant response variables as shown in Equation (1) derived from Venkatraman and Prescott (1990). To find evidence of the impact of congruence between a given contextual variable and a set of response variables on performance, the correlations of the MISALIGN and performance variable should be negative and significant. In other words, the greater the deviation, the lower the performance.

$$\text{MISALIGN} = \sum_{j=1} \left(b_j \left(x_{Sj} - \bar{x}_{Cj} \right) \right)^2 \quad (1)$$

x_{Sj} = the score for the business unit in the study sample for the j^{th} organizational mechanisms variable;

$\bar{x}_{Cj}$ = the means score for the calibration sample along the j^{th} organizational mechanisms variable;

b_j = standardized beta weight of the OLS regression equation for the j_c^{th} organizational mechanisms variable in the environment;

$j = 1,n$ where n is the number of organizational mechanisms variables that are significantly related to profitability in a given environmental uncertainty.

Alternative approaches for specifying the ideal profile are proposed in Vorhies and Morgan (2003). We notice three differences in this later approach compared to the initial one proposed by Venkatraman and Prescott (1990):

- The first difference concerns the cutoff point to separate the higher-level performer from the lower-level performer. Vorhies and Morgan (2003) use a simple scatter plot diagram for the performance distribution. They graphically identify the drop-off point to isolate the higher-performer group from the lower-performer group. The rules that applies for building the higher-performer group is "the top-third limit" suggested by Olson et al. (1995). Venkatraman and Prescott (1990) suggested picking up the top 10- to 15-percent of higher-level performers to build the higher-performer group.
- The second difference concerns the determination of the Euclidian distance to measure deviation from the ideal profile. Venkatraman and Prescott (1990) suggest a weighted Euclidian distance. The weighted distance aims to emphasize the importance of different practices in the computation of the deviation from the ideal profile. It assumes that different practices are unequally important in different contexts. However, Vorhies and Morgan (2003) use an unweighted Euclidian distance, shown in Equation (2) consistent with Drazin and Van de Ven (1985).

$$MISALIGN = \sqrt{\sum_{j=1}^{N}\left(x_{Sj} - \bar{x}_{Cj}\right)^2} \quad (2)$$

x_{Sj} = the score for the business unit in the study sample for the j^{th} organizational mechanisms variable;

$\bar{x}_{Cj}$ = the means score for the calibration sample along the j^{th} organizational mechanisms variable;

$j = 1,n$ where n is the number of profile dimension.

- The third difference concerns the method used to test the relationship between the profile deviation and performance. Venkatraman and Prescott (1990) mentioned

that the correlation coefficient between performance and practices should be negative and significant to prove the congruence between the practices and the context. However, Vorhies and Morgan (2003) propose that the regression coefficient of the profile deviation score on the performance should be negative and significant.

II.3. Variables involved in the concept of congruence

Sousa and Voss (2008) mention that studies grounded in the contingency view involve three types of variables: contextual variables, response variables, and performance variables. Moreover, to ensure theoretical and practical contributions, such contingency-based studies should identify important contingency variables, group different contexts based on these contingency variables, and the most effective internal organization designs in each major group. Moreover, Sousa and Voss (2008) noted that the comparability of different contingency studies and their contribution to a cumulative knowledge-building process depend on the existence of established measures—widely accepted and regularly re-utilized—for the three sets of variables: contextual variables, response variables, and performance variables. The use of different measures for the same concept is advocated as one of the causes of conflicting findings. This is the case for contingency research in Operations Management. The diversity of measurements affects practice-context-performance relationships and thus may be an explanation for the conflicting findings observed across contingency studies, as explained by Souza and Voss (2008) citing GeSila (2007), Voss and Blackmon (1998). With all those considerations, the next sections introduce key theoretical constructs, their conceptualizations and measures adopted from existing literature.

II.3.1. Contextual variables

As mentioned,, research adopting a contingency view examines the relationship between contextual variables, the use of practices and the associated performance outcomes. Souza and Voss (2008) asserted that contextual variables represent situational characteristics usually exogenous to the focal organization or manager. They specified two characteristics of contextual variables. One characteristic of the contextual variables is that controlling the external context require enormous investment in time and effort. For this reason, context is rarely under control of the manager. Although Galbraith (1977) suggests mechanisms for controlling the external environment to some extent, we assume the external environment is not controlled by managers. A second characteristic is that the opportunity to control or manipulate contextual variables is limited or indirect.

Sousa and Voss (2008) classify contextual variables in contingency research into four categories, including a first group of studies investigating national context and cultural effects. Several studies investigating whether best practices found in one country could be transplanted to other countries and cultures found contingency effects. However, Sila (2007) did not find this contingency effect in cross-country or cross-cultural research. A second group of studies examined the use of practices across firms of different sizes (e.g., Cagliano et al., 2001); Shah & Ward, 2003) and found support for firm size effects on their investigation of lean manufacturing practices. However, Ahire et al.'s (1996) investigation on quality management practice did not find evidence of firm size effects. A third group of studies addresses factors associated with the general context of organizations: industry, plant age. A fourth group of studies examined the use of Operations Management practices across different strategic contexts. Among such strategic context of the firm, Sitkin et al. (1994) and Reed et al. (1996) include organizational uncertainty as one of their main contingency variables. We reiterate that contextual variables are not controlled by managers, and the opportunity to control or

manipulate contextual variables is not only indirect but also requires enormous investment in time and effort. Therefore, environmental uncertainty is among the contextual variables studied in extant literature.

The focus on environmental uncertainty could be explained as a response to Souza and Voss (2008). First, it is relevant to adopt contextual variables which are validated and used in extant literature. Second, it was suggested for future research in Operations Management to identify a limited set of contextual variables which are defined as relevant for the Operations Management. The reason is that, although different categories of contextual variables exist, considering too many contextual variables at a time may limit generalizability and hamper the comparison of results between different studies (Souza & Voss, 2008). With these considerations, the present research considers environmental uncertainty as a contextual variable.

II.3.1.1. Relationship between environmental dynamism, velocity, risk, and uncertainty

After identifying environmental uncertainty as the contextual variable in this research, we attempt to clarify the environmental uncertainty construct, and the relationship between the concept of environmental uncertainty used in this research and the concepts of dynamism, velocity, and risk. Clarifying the relationship between those concepts would allow us to exploit relevant literature for our research.

Dess and Beard (1984) mentioned that dynamism is "change that is hard to predict and that heightens uncertainty" (p. 56). Wholey and Brittain (1989) state that environmental dynamism has four dimensions: amplitude, predictability, frequency, and instability. What is relevant to our research is that both studies relate the concept of dynamism and uncertainty through the predictability of the environment.

Regarding a higher-velocity environment, Eisenhardt and Bourgeois (1988) note that in a higher-velocity environment, change in demand, competition, and technology are so

rapid and discontinuous that information is often inaccurate, unavailable, or obsolete. What is relevant to our research is how a higher-velocity environment relates to environmental uncertainty, as the lack of accurate information is perceived in both contexts.

Considering this, we go back to the definition of environmental uncertainty used in this research and adopted from Ganbold and Matsui (2017); uncertainty is defined as the difficulty to accurately predict the outcomes of decisions due to incomplete information or changing conditions, a definition consistent with Germain et al. (2008). Considering this definition of environmental uncertainty, Dess and Beard (1984) and Wholey and Brittain (1989) suggest a relationship between environmental dynamism and environmental uncertainty. Eisenhardt and Bourgeois (1988) suggest a relationship between higher-velocity environment and environmental uncertainty.

Concerning the relationship between risk and uncertainty, Nakano (2018) relates that risk is calculable from past data, whereas uncertainty has contingencies that are not calculable using historical data sets. Therefore, this research considers environmental uncertainty as differentiated from the concept of risk.

II.3.1.2. Sources and types of environmental uncertainty

Let us provide now more clarification about environmental uncertainty itself. In extant research, various definitions of environmental uncertainty are used. Those definitions referred to either the sources or the types of environmental uncertainty.

On one hand, Milliken (1987) define uncertainty as "… an individual's inability to predict something accurately. An individual experiences uncertainty because he/she perceives himself/herself to be lacking sufficient information to predict accurately or because he/she feels unable to discriminate between relevant data and irrelevant data" (p. 136). Milliken (1987) then defines environmental uncertainty by considering the

uncertainty types: perceived uncertainty, effect uncertainty, and response uncertainty. Perceived environmental uncertainty describes a perceptual experience of uncertainty. Effect uncertainty relates to the inability to predict the impact of a future state or an environmental change on the organization. Response uncertainty relates to the inability to predict the consequences of a response choice when faced with the environmental change.

On the other hand, other definitions refer to the sources of environmental uncertainty that we think are relevant to us. Uncertainty is defined as the inability to assign probabilities to future events (Duncan, 1972) or the difficulties to accurately predict the outcomes of decisions (Downey et al., 1975) due to incomplete information or changing conditions (Germain et al., 2008). Galbraith (1977) uses the term "task uncertainty" instead of "environmental uncertainty" and defines task uncertainty as the difference between the amount of information required to coordinate cooperative action and the amount of information possessed by the organisation. Similarly, Patel et al. (2012) define environmental uncertainty by considering the uncertainty sources. They define it as the rate of unpredictability in a firm's external environment related to demand, technology, and competition.

In this study, environmental uncertainty drawing from three different sources will be considered as the contextual variable. The two sources of uncertainty are demand uncertainty and technology uncertainty, consistent with Patel et al. (2012). Demand uncertainty reflects variations in sales due to changing preferences, price sensitivity, and forecasting problems. Technology uncertainty refers to the difficulty in predicting and responding to technological changes. The third source of uncertainty is supply uncertainty, consistent with Ganbold and Matsui (2017), and defined as the extent of

change and unpredictability of the supplier's product quality and delivery performance (Li & Lin, 2006).

This research in a way extends the investigation of Jansen et al. (2005) by including the concept of congruence linking contextual variables with the organizational mechanisms. This is done to further address the congruence investigated in this study. Moreover, Dess and Beard (1984) state that uncertainty may also affect organization structure, because more information must be processed among decision-makers to achieve a given level of performance as uncertainty increases.

a) Supply uncertainty

Supply uncertainty is defined as the extent of change and unpredictability of the supplier's product quality and delivery performance (Li & Lin, 2006). Although this research considers both lower and higher supply uncertainty, it is expected that companies listed on the first section of the Tokyo Stock Exchange probably make investments required to reduce the risk of unexpected events on the supply side. Moreover, those are mature companies with long-term relationships with suppliers. Therefore, the remaining risks that cannot be controlled are those related to prices of materials and quality of the input from suppliers. The first risk is clearly out of the control of both the focal company and its suppliers.

b) Demand uncertainty

Demand uncertainty is defined as the extent of change and unpredictability of the customers' demands and tastes (Li & Lin, 2006). High-demand uncertainty is more present in a dynamic market than in a stable one. However, achieving more or less control over the demand is among the strength of those companies listed on the Tokyo Stock Exchange. It is thus expected that the targeted companies, even though operating in a highly dynamic market, have adopted their own ways to control to some extent the

demand uncertainty, therefore perceiving demand as less uncertain. Concerning lower-demand uncertainty, there are industries in somewhat stable markets, as the demand volume will not decrease or increase dramatically in a short period. For such cases, forecasting is more suitable than investing in a long-term process to control demand. Therefore, to some extent, those companies are expected to perceive lower demand uncertainty.

Galbraith (1977) mentions that the fluctuation of the demand itself could be addressed by considering the variations of demand type, e.g., "The commercial airlines have modified their production equipment to deal with their daily fluctuation" (p. 239). This example could illustrate that one way to face demand uncertainty is modifying production equipment to allow varying demand types in order to face demand uncertainty, whereas from the contingency view this is not the only way.

c) Technology uncertainty

Technology uncertainty is defined as the extent of change and unpredictability of technology development in an organization's industry (Ganbold & Matsui, 2017). Germain et al. (2001) define technology as the subset of knowledge that is applied, implying that the terms "applied knowledge" and "technology" are interchangeable in their studies. What is relevant to us is that such terminology clarifies the difference from demand uncertainty. In fact, product technology itself may be considered as a part of demand uncertainty. Therefore, it is worth mentioning that the focus on technology uncertainty here is on uncertainty regarding the subset of knowledge that is applied. In other words, technology uncertainty is related to the uncertainty in terms of production technology. The present research attempts to clarify the difference between the uncertainty perceived in terms of demand and the uncertainty perceived in terms of

technology. However, some extant research provides some insight on the relationship between them.

In the extant literature, another terminology that may be used for technology is the means by which connections are created between organisational members. In that sense, technology uncertainty refers to the unpredictability of technical obsolescence affecting the means by which organizational members are connected. If we consider that internal mean of communication is among the internal processes, such terminology would also define technology uncertainty as referring to the uncertainty in terms of production technology. This is so only if we presume that internal processes are included in what we call the production process.

However, as Galbraith (1977) mentioned, connection does not necessarily lead to communication. Communication between organisational members is expected to be enhanced through organisational mechanisms. This brings us to one of the relevant aspects of technology uncertainty and organisational mechanisms—the task of managers. The task of managers when designing organisational mechanisms is to make sure that relationships are created at key workflow interfaces where coordination is required. With all these considerations, the present research focuses on the extent of change and unpredictability of production technology. The significance of the production technology is highlighted by Ganbold and Matsui (2017): "Despite its enormous impacts and benefits that information and production technologies bring to business process, there are some threats these technologies bring to individual organisations. Therefore, organisations need to invest in new technologies which result in increased cost for the company" (p. 40). The present research supposes that such a threat may be assimilated as uncertainty associated with the production technology. More discussion on the relationship between the rate and

unpredictability of production technology and the organizational mechanisms will be provided in the hypotheses development section.

II.3.1.3. Measures of environmental uncertainty

Concerning the measures of environmental uncertainty as a contextual variable, a trade-off exists between using established measures in order to contribute to a cumulative knowledge-building process (Souza & Voss, 2008), and developing our measures for the purpose of our particular objectives—to achieve better data by carefully crafting measures for specific situations (Boyer & Pagell, 2000).

The present research answers the call of Souza and Voss (2008) for using existing and widely accepted measures. Therefore, in order to contribute to a cumulative knowledge-building process, the measures used in this research for measuring environmental uncertainty have been widely used and validated by Ganbold and Matsui (2017), Chen and Paulraj (2004) and Qi et al. (2011). Ganbold and Matsui (2017) define uncertainty as the difficulty to accurately predict the outcomes of decisions due to incomplete information or changing conditions, consistent with the definition from Germain et al. (2008). The corresponding dimensions of environmental uncertainty are consistent with Patel et al. (2012) considering the sources of environmental uncertainty, namely: supply uncertainty, demand uncertainty, technology uncertainty. Using the resource-dependence theory, Ganbold and Matsui (2017) examine the impact of environmental uncertainty on supply chain integration—more precisely on customer integration, internal integration, and supplier integration. They investigated 108 manufacturing firms listed on the first section of the Tokyo Stock Exchange, i.e., large firms generally considered as leaders in innovative practices. Their targeted respondents were either supply chain managers, chief executive officers, presidents, senior executives, vice presidents, senior directors, or senior managers. Ganbold and Matsui (2017) found

that collaborating closely with customers is a key to achieving better control over supply uncertainty, and tight collaboration and integration with suppliers are of great importance in dealing with demand uncertainty. Therefore, from a contingency view, this research considers three sources of environmental uncertainty as contextual variables: supply uncertainty, demand uncertainty, and technology uncertainty.

II.3.1.4. Considering lower and higher environmental uncertainties

Although we adopt the existing measure of environmental uncertainty, the scope of our research investigating congruence leads us to consider both higher and lower environmental uncertainty. We assume that it is relevant to consider both higher and lower uncertainties for two reasons. First, achieving congruence is possible in both higher and lower environmental uncertainty. Practically speaking, a profitable firm could evolve in a lower-uncertainty as well as a higher-uncertainty environment. This is supported by Jaworski and Kohli (1993) who noted that an organization's product and services are likely to require relatively little modification in stable markets where the customers' preferences do not change very much; in such a stable market, customer requirements are met. Moreover, Galbraith (1974), adopting an information-processing view, mentioned that in periods of stability, it is cheaper to absorb uncertainty with slack than to apply more coordination efforts.

Conversely, Jelinek (1977) found that under conditions of higher uncertainty or extreme technological specificity, we may expect elaboration of structures and administrative devices to protect the technology. Moreover, Donaldson (2001) recommended that organizations adapt their structures to maintain congruence with changing contextual factors to attain higher performance. Such affirmation leads us to the second reason why we consider both higher and lower uncertainty: to capture the

congruence that could be achieved in changing environments. Thus, we collected cross-sectional data for the present research.

Bagozzi and Phillips (1982) mention that cross-sectional data allows us to learn about relationships among variables by studying differences across people, firms, entity, or business units during a single time period; time series data are data for a single entity collected at multiple time periods. An interesting feature of time series data is that it offers the possibility to study the evolution of variables over time and to forecast future values of those variables (Bagozzi & Phillips, 1982). However, to investigate our research question related to achieving congruence after a change in the environment, that change should be captured somehow. The potential change in the environment may be from higher uncertainty to lower uncertainty or vice versa. If so, instead of capturing the change from time-series data, we propose using the cross-sectional data to capture the potential change by investigating the congruence in higher environmental uncertainty and lower environmental uncertainty.

II.3.2. Response variables

The external environments considered in the previous section share two common features. One feature is that controlling supply, demand, and technology uncertainties require enormous investment in time and effort. A second feature is that the opportunity to control or manipulate supply, demand, and technology uncertainties is limited or indirect and therefore is rarely under control of the business unit manager. However, the response variables considered in this section are designed by the business unit manager. Extant research has mentioned that response variables are associated with the degree of use of practices (Ahire et al., 1996, Flynn et al., 1994, Koufteros et al., 1998, Sakakibara et al., 1993). What we call here response variables are the organizational actions taken in response to current or anticipated contextual factors (Souza & Voss, 2008). In the present

research, investigating the responses to supply, demand, and technology uncertainties should consider both actual and anticipated contextual factors. At a specific point in time, the actual supply, demand, and technology uncertainties could be considered. Then, organizational mechanisms are designed to deal with this actual context.

It is a prerequisite to define what we mean by organizational mechanisms. In the extant literature, Machamer et al. (2000) define mechanisms are entities and activities organized such that they are productive of regular changes from start or set-up to finish or termination conditions. They highlight a relevant feature of mechanisms. Mechanisms are regular in that they work always or for the most part in the same way under the same conditions. However, within a relatively long period of time, such conditions are less likely to remain constant. More specifically, supply, demand, and technology uncertainties are not likely to remain unchanged. Then, in order to design the adequate organizational mechanisms in a dynamic environment, supply, demand, and technological uncertainties should be anticipated. Such anticipation allows the business unit to some extent to reduce its dependencies on environmental uncertainties. From an information processing view (Galbraith, 1977), the business unit may be designed in a way to increase the ability to process information, and to respond effectively to environmental uncertainty; in other words, it will still provide a given level of performance and remain profitable.

This research assumes that when faced with an uncertain environment, the business unit must adapt to it instead of changing the environment. Galbraith (1977) argues that the need for information processing increases with environment uncertainty. To face the environment, the business unit has two alternatives. The first alternative is to reduce the information-processing needs. However, this will lead either to the use of slack resources or to reduce performance. Using slack resources or acquiring additional

resources to meet changes in demand is a capital-intensive approach (Upton, 1994), which is one alternative for an organisation willing to sustain higher competitiveness. Another alternative is to improve the information-processing capacity of the organisation. This requires the use of lateral processes and the creation of a vertical information system, which also represent additional cost. At the business unit level, such use of practices is called *operational practices* and are standardized activities, programs, or procedures that have been developed to address the attainment of certain specific operational goals or objectives (Flynn et al., 1995), consistent with the organizational mechanisms introduced in this section. Therefore, adopting a contingency view, this research considers as response variables three organizational mechanisms consistent with Jansen et al. (2005): coordination mechanisms, system mechanisms, and socialization mechanisms. It is worth mentioning that specific organizational mechanisms could be designed in response to the context at a point in time, to achieve congruence.

Concerning the first organizational mechanism, namely the coordination mechanism, it is defined as the organizational mechanism associated with coordination capabilities and enhancing knowledge exchange across disciplinary and hierarchical boundaries (Jansen et al. 2005). Its dimensions are cross-functional interfaces and job rotation. The second mechanisms considered, namely system mechanisms, are defined as the organizational mechanisms associated with systems capabilities, programming behaviours in advance of their execution and providing a memory for handling routine situations (Galbraith, 1973). Its dimensions are formalization and centralization. The third mechanisms considered, namely socialization mechanisms, are defined as the organizational mechanisms associated with socialization capabilities, creating broad, tacitly understood rules for appropriate action (Volberda, 1998), and contributing to

common codes of communication. Its dimensions are interdepartmental connectedness and socialization tactics.

Concerning the measure of organizational mechanisms, we adopted measures validated and widely used in the extant literature; namely, from Jansen et al. (2005). Although adopting existing measures of organizational mechanisms, the scope of our research for investigating congruence in higher environmental uncertainty and lower environmental uncertainty lead us to consider adding specific measures. This is justified by Boyer and Pagell (2000), who proposed developing measures for the purpose of specific research objectives and situations in order to obtain better data. The additional measures are from extant literature as well. The measures have beem widely used and validated as detailed in the next subsection. The measures for coordination mechanisms are originally from Gupta and Govindarajan (2000), and Jansen et al. (2005). With regards to the measures of system mechanisms, the measures are originally from Dewar et al. (1980) and Desphande and Zaltman (1982). Concerning socialization mechanisms, the measures are originally from Jones (1986) and Jaworski and Kohli (1993). The next section provides more details on these mechanisms and their respective measurement items.

II.3.2.1. Coordination mechanisms

The management challenge for a functional business unit is to coordinate the cross-functional workflows to create and deliver products or services (Galbraith, 1977). From an information-processing perspective, one of the coordination purposes is to decentralize decision-making. This is done to allow for decisions to be made at lower levels of the hierarchy, at the points of product and customer contact, because this is where current and local information are available and accessible. Such decentralization takes place through the establishment of what Galbraith (1977) identified as lateral process, and what

we call coordination mechanisms. Such similarity could be explained by considering how Galbraith (1977) defines lateral processes. In his earlier work, Galbraith (1955) mentioned that if structure is thought of as anatomy of the organisation, processes could be considered as its physiology. From this point of view, management processes are both vertical and horizontal. Vertical processes allocate the scarce resources of funds and talent, usually business planning and budgeting processes. Horizontal processes are usually lateral processes, and are designed around the workflow and carried out from voluntary contacts between members to complex and formally supervised teams.

Interestingly, Galbraith (1977) mentioned that lateral processes should be designed so that they evolve as uncertainty increases. That means that the adequate lateral processes at a specific point in time may not be adequate any more over time and therefore should be redesigned, with the assumption that uncertainty increases or decreases over time. The present research attempts to capture this fluctuation by considering both lower and higher levels of uncertainty. To capture the lateral processes for each of those states of uncertainty, this research focuses on what Galbraith (1973) calls formal lateral processes: job rotation and cross-functional interface. With all those considerations, we establish the similarity between Galbraith's (1973) lateral process and Jansen et al.'s (2005) coordination mechanisms. The latter one brings together different sources of expertise and increases lateral interaction between areas of functional knowledge (Jansen et al., 2005). Therefore, two types of coordination mechanisms are considered: job rotation and cross-functional interface.

a) Cross-functional interface

Cross-functional interfaces are the lateral forms of communication that deepen knowledge flows across functional boundaries and lines of authority (Gupta &

Govindarajan, 2000). They include the use of liaison personnel, temporary task forces, and permanent teams (Galbraith, 1973).

- The liaison roles arise at lower and middle levels of management. They are designed to facilitate communication between two interdependent departments and bypass the long lines of communication involved in upward referral (Galbraith, 1974).
- Task forces are form of horizontal contact designed for problems of multiple departments. They are designed for uncertain and interdependent tasks involving multiple departments, where the decision-making capacity of direct contact is exceeded. The task forces remain only if the problem remains (Galbraith, 1974). The business unit's members are thus temporarily involved in the task forces.
- When uncertainty is higher, and problems arise permanently, the task forces become permanent and labeled teams. Teams are typically formed around frequently occurring problems involving multiple departments. They solve problems that require commitments that they can fulfill. Team could be formed around common customers, geographic regions, functions, processes, product or projects (Galbraith, 1977).

Denison et al. (1996) developed a framework and a set of measures for examining cross-functional teams using qualitative data and survey data. Qualitative data were collected from 200 members of cross-functional teams to develop a conceptual framework and an item pool. Survey data were collected from 565 team members to refine the measures from three separate samples corresponding to three product development projects. Respondents were managers and engineers from multiple divisions and locations of one multinational organization—a large American automobile manufacturer.

Respondents were team members who held responsibility for separate modules of the vehicle. Denison et al. (1996) found that information creation and time compression are closely related. Moreover, their model suggests that contextual factors were more important determinants of team effectiveness than team process. Such findings are relevant to us as it links the context, the cross-sectional interface, and effectiveness, which may be considered as an aspect of performance.

These research focuses on these cross-functional mechanisms. In order to assess the extent of use of such cross-functional mechanisms, measurement items are used. The extant literature provides validated measures. The adopted measurement items are originally from Gupta and Govindarajan (2000). They advance theoretical and empirical understanding of the determinants of intra-multinational corporations' knowledge transfers. The study focusses on the transfer of largely procedural types of knowledge such as product designs, purchasing know-how, process design, packaging design, marketing know-how, distribution know-how, and management system practices—not on declarative types of knowledge such as monthly financial reports. Gupta and Govindarajan (2000) conducted surveys of 374 subsidiaries belonging to 75 major multinational corporations headquartered in the U.S., Japan, and Europe. The targeted respondents were either the subsidiary presidents, managing directors, or general managers of multinational corporations. Their survey included asking the respondents to indicate on a seven-point scale the extent to which the subsidiary is engaged in providing and receiving knowledge and skills to sister subsidiaries and parent corporations. Main findings of Gupta and Govindarajan (2000) include that the value of knowledge stock, called prior relevant knowledge by Tu et al. (2006) and the transmission channels, called communication channels by Tu et al. (2006) improve knowledge outflows. Moreover, knowledge inflows are improved when the motivational disposition to acquire knowledge

is supported by the existence of communication channel. Such findings are relevant to us as they confirm the link between the communication channel, a structure; and knowledge transfer, a process.

b) Job rotation

Job rotation is the lateral transfer of employees between jobs (Campion et al. 1994).

A relevant study for us is Slotegraaf et al. (2011) as it could help in clarifying the concept of job rotation and the context under which it is effectively used. From a knowledge-based view, they examine the relationship between team stability and two decision-making processes: debate and decision comprehensiveness. Stability refers to the extent to which the core members of a cross-functional team remain for the duration of the project, from project approval to product launch. It implies that employees are transferred between their formal positions and the temporary positions in the project. If so, team stability could be assimilated as a characteristic of job rotation determining the duration of an assignment to a given position before the next assignment to another position. Team stability then represents the duration between job rotation, or a specific period between transfers.

Slotegraaf et al. (2011) targeted a first group of respondents including R&D managers and marketing managers for acquiring information on project team stability and new product advantage. A second group of respondents included marketing managers, R&D managers, business development managers, and chief executive officers for obtaining data on decision-making comprehensiveness, team-level debate, and the control variables (size of the team and duration of the project). Their sample consists of 208 higher-technology firms in China. Slotegraaf et al.'s (2011) main findings state that the degree of stability in any new product development project team has a curvilinear relationship to team-level debate and decision-making comprehensiveness. They also

highlight that debate is positively related to decision comprehensiveness, which is positively related to new product advantage only at higher levels. Such findings are relevant to us as they confirm the link between team stability, assimilated as a characteristic of job rotation; decision-making comprehensiveness, assimilated as a process; and new product advantage, assimilated as a performance.

The present research focuses on these details of the job rotation as a coordination mechanism. To capture the extent of use of job rotation, measurement items are taken from extant literature. Most of the existing studies investigating job rotation focus more on the motivations of employees and managers to be involved in such rotation. Therefore, to the best of our knowledge, there are no widely used and validated items for measuring the extent to which employees are rotated. However, Jansen et al. (2005) developed measurement items for job rotation. They checked the desired properties of unidimensionality, reliability, and validity of the developed items. Thus we adopt the items developed by Jansen et al. (2005) for measuring the extent of the use of job rotation.

II.3.2.2. System mechanisms

System mechanisms program behaviours in advance of their execution and provide a memory for handling routine situations (Galbraith, 1973). A first set of dimensions of system mechanisms refer to the use of rules in an organization (Jansen et al., 2005). Three dimensions are considered:

a) Job codification

Job codification, borrowed from Hage and Aiken (1967) and Aiken and Hage (1968), is the degree to which job descriptions are specified. They refer to it as the use of rules defining what the occupants of positions are to do. In other words, it represents the degree of work standardization.

b) Rules observation

Rules observation borrowed, from Aiken and Hage (1968), is the degree to which job occupants are supervised in conforming to the standards established in job codification. They refer to it as the latitude of behaviour that is tolerated from standards.

Concerning the measure of system mechanisms, the adopted measures are originally from Aiken and Hage (1968) and re-examined by Dewar et al. (1980). Dewar et al. (1980) examined the reliability and validity of the scales developed by Aiken and Hage (1968) to operationalize technology, centralization, and formalization. They used an initial set of data from the original data used by Aiken and Hage (1968) collected in 1964, 1967, and 1970 from 16 social service organizations. A second set of data was collected by Whetten (1974) from 69 manpower organizations. The data set include mostly public and non-profit organizations with no more than 1,000 employees; most have fewer than 200 employees, and are service- rather than product-based. The original survey targeting social service agencies and manpower organization asked the respondents about their perceptions of characteristics of their organizations. Dewar et al.'s (1980) findings reveal first that one may need more than five informants per case if reliability is to be improved. Second, they suggest eliminating inconsistent references such as the simultaneous use of "I", "we", "a person", "everyone", "people in general", "most people", and "the organization" in the same survey. The reason is that it may cause the items to be interpreted as referring to a single person, a work group, a department or the entire organization, although for Aiken and Hage (1968), the unit of analysis is the organization. Therefore, after applying the modifications recommended by Dewar et al. (1980), the original items from Aiken and Hage (1968) were adopted to achieve congruence in our research. Again, responding to Sousa and Voss' (2008) suggestion for improving the comparability of different contingency studies and their contribution to a

cumulative knowledge-building process by using established, widely accepted and regularly re-utilized items.

A second set of dimensions of system mechanisms are introduced in addition to the set of dimensions proposed by Jansen et al. (2005). The reason is that the first set of dimensions (job codification, rules observation, job specification) are expected to correspond to organizational mechanisms in response to a lower-uncertainty environment. A second set of dimensions are expected to capture organizational mechanisms in response to a higher-uncertainty environment. The second set of dimensions refers to the delegation of decision-making authority throughout an organization (Aiken & Hage, 1968). In fact, more unexpected events are expected to happen in a higher-uncertainty environment. In that case, we cannot rely on specifying in advance what is the job to be done and how it should be done. Extant research gives us some insight into the system mechanism to be used in higher-uncertainty environments. Galbraith (1973) proposes that in a higher-uncertainty environment, the authority to make decisions should be moved down to lower levels of hierarchy, where the information required to make the decisions are more accurate and available. This reduce the risk of information distortion and decision delay. Accordingly, two dimensions are considered: participation in decision-making, and hierarchy of authority.

c) Hierarchy of authority

Hierarchy of authority is the degree to which the organization members participate in decisions involving the tasks associated with their positions (Hage & Aiken 1967). Let us recall that the second set of dimensions are targeted to capture the system mechanism used in higher-uncertainty environments. The dimensions including participation in decision-making and hierarchy of authority refers to the delegation of decision-making authority throughout an organization (Aiken & Hage, 1968).

Concerning the measure of hierarchy of authority, the adopted measures are originally from Hage and Aiken (1967). Measurement items are used to capture the extent to which the authority to make decisions is moved down to lower levels of hierarchy, where the information required to make the decisions are more accurate and available. For this purpose, items are used to access not only the referral of the business unit to the head-quarters before making decisions, but also to assess the workers' needs for supervisory approval before taking actions. The items developed by Hage and Aiken (1967) are widely used and validated and are reused by Pennings (1973) to assess the degree of centralization and formalization. More precisely, Pennings (1973) used two different set of measures. The first set of measures relies on interviewing official informants. For this purpose, the measures used are originally from Pugh et al. (1968), Blau et al. (1966), and Blau and Schoenderr (1971). However, a second set of measures relies on questionnaires through survey techniques. For this purpose, the measures used are originally from Hage and Aiken (1967), Hall (1962), and Perrow (1970). For the survey, Pennings (1973) targeted supervisory and nonsupervisory personnel among departments within each company. The survey results in a sample of 350 respondents from ten organizations in the Toronto metropolitan area during the first half of 1970. The investigated organizations include various industries such as chemical, nutritional, electronic, and paper. What is relevant for us is that Pennings (1973) checked the desired properties of unidimensionality, reliability, and validity of the original items from Hage and Aiken (1967).

Moreover, the original items developed by Hage and Aiken (1967) are revised by Dewar et al.(1980), and readopted by Desphande and Zaltman (1982) to be included in their measures of centralization. Desphande and Zaltman (1982) examined the factors affecting the consumption by managers of market research provided by external research

agencies. They address questions such as: Do managers consider research results while making product or service decisions? What factors influence and enhance the consideration of research results? They investigated 86 product managers in marketing divisions of company in the consumer goods and services industry, and 90 researchers from the Membership Roster of the American Marketing Association. Main findings include that the most important variables affecting the use of research are the organizational structure, technical quality, researcher and manager interaction.

The attempt to capture the extent of hierarchy of authority in uncertain environments lead us to reuse the original items from Hage and Aiken (1967) which are reused by Pennings (1973) to assess the degree of centralization and formalization. Therefore, reverse scores are used, considering the definition of hierarchy of authority we adopted.

II.3.2.3. Socialization mechanisms

The two organizational mechanisms introduced previously address the management challenges, which include not only to coordinate the cross-functional work flows to create and deliver products or services (Galbraith, 1977), but also to program behaviors in advance of their execution and provide a memory for handling routine situations (Galbraith, 1973). What the two organizational mechanisms, coordination mechanisms and system mechanisms have in common is that they refer to the extent of use of written and explicit rules. The next mechanisms deal with more implicit rules to address those same management challenges in higher- and lower-uncertainty environments: socialization mechanisms.

Socialization mechanisms create broad and tacitly understood rules for appropriate action (Volberda, 1998). We are aware that such tacit rules differ from one business unit to another. To facilitate further investigation, more common aspects of the

tacit rules should be considered. Such common aspects could be found if the tacit rules are assimilated as social relations. Therefore, the extent of adoption of such tacit rules are investigated considering two aspects of social relations: the structural aspects addressed here as the interdepartmental connectedness, and the cognitive aspects addressed here as the socialization tactics.

d) Interdepartmental connectedness

From a long-term perspective, firms have their own traditions and values, and therefore their own tacit rules determining acceptable behaviour internally and with their collaborators. The respect for those traditions and values is perceived as a strength for a particular business unit with a long-term vision. However, the environmental uncertainty a firm faces at a specific point in time requires the firm to find the balance between maintaining tradition and achieving its mission as a profit-making organization. In fact, each business unit belonging to a firm perceives the environmental uncertainty differently. Therefore, making the balance between keeping traditions and values in terms of social relation on one hand, and breaking traditions to remain competitive on the other hand, is another managerial challenge.

The present research investigating socialization mechanisms could consider social relations between departments of the same business unit. More precisely, we investigate the extent to which individuals in a department networked to various levels of the hierarchy in other departments, through informal means. Extant research provides us social relation concepts that could be adopted for our investigation. Jaworski and Kohli (1993) define interdepartmental connectedness as a social relation driven by tacit rules and referring to the degree of formal and informal direct contact among employees across departments.

Concerning the measure of interdepartmental connectedness, the original items from Jaworski and Kohli (1993) are adopted. Their study determines empirically the effect of three sets of factors—top management risk aversion, interdepartmental dynamics, and organizational systems—on market orientation. Subsequently, they determine empirically the effect of market orientation on business performance. What is relevant to us is first that they investigate the moderating role of environmental characteristics as well as the relationship between market orientation and business performance. Second, the considered business performance is assessed by judgmental measures, not by market share. The considered environmental characteristics relate to the market, the competitors, and the technology. For this purpose, Jaworski and Kohli (1993) conducted a first survey resulting in 222 strategic business units. To cross-validate the findings from the first survey, they conducted a second survey resulting in 230 strategic business units. The targeted respondents for each business unit were senior marketing executives and senior non-marketing executives, subsidiary presidents, managing directors, or general managers of multinational corporations. Jaworski and Kohli (1993) found that the market orientation of a business unit is an important determinant of its performance, regardless of environmental characteristics and refer to market orientation as "the organisation-wide generation of market intelligence pertaining to current and future customer needs, dissemination of the intelligence across departments, and organisation-wide responsiveness to it" (p. 54).

e) Socialization Tactics

Concerning social relations, the respect of traditions and values is perceived as a strength for a firm. In order to maintain such particular values, the challenge for business unit managers is to design the appropriate socialization mechanism that not only reflects the tacitly shared perpetual values and traditions, but also helps the firm to remain

competitive in the actual environment. Let us recall that socialization mechanisms create broad and tacitly understood rules for appropriate action (Volberda, 1998). The first socialization mechanism introduced previously, interdepartmental connectedness, deals with the structural aspect of the socialization mechanism. The next socialization mechanism deals with the cognitive aspect, i.e., socialization tactics. In fact, socialization tactics refers to the process by which organizations offer newcomers specific information and encourage them to interpret and respond to situations in a predictable way (Jones, 1986). In other words, the cognitive aspect of the socialization mechanisms could be used to share with the new members the business unit's perpetual tradition and values in terms of social relations. Through sequential socialization tactics, an organization provides newcomers with explicit information concerning the sequences of activities they will go through in their organizations (Jones, 1986). This is in contrast to random socialization tactics, where no information is given to newcomers concerning the stage they reach during a learning process or the sequences of such process.

Concerning the measure of socialization tactics, the measurement items are originally from Jones (1986). They examine first how the information provided by organizations through their socialization practices may influence the way newcomers adjust to the organizations. Jones (1986) conducted a longitudinal survey research targeting MBA students from two successive annual graduating classes of a major Midwestern university. The first wave was completed by 127 respondents after they had accepted jobs but before they joined organizations. The second wave was completed by 102 respondents after five months on the job. The respondent had joined 96 diverse firms located in the Midwest and Southwest. These are accounting firms, banks, manufacturing and service companies, and small specialized organizations. Among the main findings of Jones (1986), what is

more relevant to us is that social socialization tactics were found to have more effect on newcomers' transition into organizations.

II.3.3. Performance variables, financial performance

Let us recall that Souza and Voss (2008) stated that performance variables are dependent measures and represent specific aspects of effectiveness that are appropriate to evaluate the congruence between contextual variables and response variables for the situation under consideration. They added that researchers may develop different contingency models directed to achieve different performance objectives. With those considerations and following Souza and Voss's study (2008)—which stated that bringing together existent scales and metrics for general Operations Management research is a strong contribution to foster generalizability—the present research focuses on financial performance.

Concerning financial performance, previous research gives us some insight into the appropriate measures. Kawai and Chung (2019) measured financial performance in terms of operating profit, sales growth, and market share, consistent with Anderson et al. (2002). Kawai and Chung (2019) asked respondents to assess their subsidiaries' financial performance, compared to their company's own target, on a 7-point scale ranging from 1=much inferior, 4=average, and 7=much superior. Yee et al. (2008) measured financial performance in terms of return on assets, return on sales, return on investment, and overall profitability. They asked the respondents to assess on a 7-point scale their shop's profitability relative to industry norms.

Swamidass and Newell (1987) measured business performance in terms of growth in return on assets, growth in sales, and growth in return on sales. They asked the respondents to assess on a 10-point scale their units' performance compared to industry average in the last 5 years. Then the growth in three major aspects of performance were

aggregated into a composite measure of growth. Even though Swamidass and Newell (1987) used perceptual measures of business performance, most respondents declined to provide objective performance data. They suggest that objective measures of business performance will be more appropriate if available.

Sharing the same view concerning objective measures, Parast et al. (2015) highlight that the availability of objective measures reduces concerns of various psychological biases, consistent with Donampour (1996), Ketokivi and Schroeder (2004). Moreover, Swamidass and Newell (1987) mention that objective performance measures are preferable to perceived measures of performance, consistent with Dess and Robinson (1984). Additional support for the use of objective measures of financial performance is provided by Yee et al. (2008), referring to Dollinger and Golden (1922) and Powell (1992) who note that positive correlation was found between perceptual measure of firm performance and objective measure of firm performance.

Our respondents are all listed companies. Thus objective data on financial performance are available from the latest annual financial reports disclosed online through the company websites. Therefore, we collected objective data to assess financial performance. The available information allowed us to obtain information about return on assets, return on sales, and return on equity. Concerning the use of return on assets as a measure of financial performance, Swamidass and Newell (1987) stated that the appropriate measure of performance depends on the circumstances unique to the company. Considering that we targeted companies in different industries, investment in facilities differ in necessity to compete in their respective environments. Added to the fact that the industries were generally mature, firms choosing to operate with smaller assets may erroneously appear to be performing better than firms with larger assets, as noted by Swamidass and Newell (1987). This suggests to us that return on assets as an objective

measure of performance yields results that are difficult to generalize due to the plant-specific nature of manufacturing (Furlan & Vinelli, 2018). Therefore, return on assets is not an appropriate measure for our research.

Objective measures of financial performance are used in the extant research focusing on the service industry. Parast et al. (2015) measured financial performance by profitability and defined it as the ratio of operating profit over operating revenue. The ratio is multiplied by 100 before conducting analyses in order to facilitate interpretability. Parast et al. (2015) investigated the relationship between service failures (as opposed to service quality) and airline financial performance and propose that the relationship between service failures and airline financial performance is contingent on an airline's competitive strategy, either "focused" or "non-focused" as labeled by Drawing and Skinner (1974). More precisely, Parast et al.'s (2015) investigation includes using objective data on operational performance, such as arrival delays, mishandled baggage, and involuntary denied boarding, to investigate how service failures relate to measures of airline financial performance. They collected objective longitudinal data on a quarterly basis from 1998 to 2009. In total, their data set include 161 quarterly observations for seven focused airlines, and 288 observations for seven non-focused airlines. Parast et al. (2015) found that the relationship between arrival delays and profitability is more concave for non-focused airlines than focused airlines. However, the relationship between mishandled baggage and profitability is negative for focused carriers, while such relationship is positive for non-focused carriers.

II.4. Resource based theory

Resource-based theory originated in the field of economics in the work of Edith Penrose (1959). The resource-based theory sees the uniqueness of the resources and capabilities of an organization as the means of gaining a competitive advantage. Barney (1991)

classified firm resources into three categories: physical capital resources, human capital resources, and organizational capital resources. The latter include a firm's formal reporting structure, its formal and informal planning, controlling, and coordinating systems, as well as informal relations among groups within firms, between firms, and groups in the firm's environment (Barney et al., 1991). A firm's resource includes all assets, capabilities, organizational processes, firm attributes, information, and knowledge, controlled by the firm and enabling the firm to conceive and implement strategies that improve its efficiency and effectiveness.

Effectiveness refers to the extent to which customer requirements are met; efficiency is a measure of how economically the firm's resources are utilized in providing a given level of product or service to customers (Liyanage & Kumar, 2003). Teece et al. (1997) initially defined resources as the firm-specific assets that are difficult if not impossible to imitate. Second, Teece et al. (1997) assert that such assets are difficult to transfer among firms because of transactions costs and transfer costs, and because the assets may contain tacit knowledge. More relevant to our research, Irawani et al. (2005) stated that the resources must be managed to create effectiveness, and do so in a highly efficient manner that can handle uncertainty in the environment.

In extant research, vertical integration is suggested to create a more predictable environment. The present research considers the dynamism in the environment and suggest that the ability to create congruence in a dynamic environment is essential to achieve a given level of performance. According to Barney (1991) and Simon et al. (2011), resource-based theory suggests that firms are able to create and sustain competitive advantages through the collection and integration of rare, valuable, inimitable, and non-substitutable resources. They added that allocation of time and resources is essential to ensure regenerative improvements. In the present research, the

ability to create congruence after change occurs in environmental uncertainty represents such regenerative improvements. Hitt et al. (2016) reviewed and evaluated the application of resource-based theory to the study and understanding of Operations Management-related issues and phenomena and note that product and service innovations involve the introduction of new products or services to meet customer or market needs. Dierickx and Cool (1989) argue that in order to sustain competitive advantage when they are faced with different contingencies, organizations continuously recombine their asset stocks and apply them to new market opportunities. Such ability to develop sustainable competitive advantage, and such ability to meet market demand, depend on a firm's ability to convert knowledge into capabilities. Since this may explain how similar bundles of resources between two firms can have different effects on performance, this ability relates precisely to the relationship between absorptive capacity and congruence; this is investigated through the second research question in the present study.

What we investigated through the second research question is highlighted by Hitt et al. (2016), who remind us of the criticism of the arguments that the resource must be rare, valuable and difficult to imitate, consistent with Qi et al. (2011). Hitt et al. (2016) stated that the reason for such criticism is that it ignores the potential influence of the external environment. Similarly, Simon et al. (2011) argue that holding valuable, rare, inimitable, and non-substitutable resources is a necessary but insufficient condition for firms to achieve a competitive advantage. Therefore, we confirm support for the potential complementarity between resource-based theory and contingency theory. Studies have not only use theories to explain Operations Management phenomena, but also often integrate more than one theory to enrich the theoretical arguments used to address their research questions. This is supported by Hitt et al.'s (2016) point of view on the resource-based theory that affirms that special resources and special capabilities are necessary—

but not sufficient—to integrate the market demand into the process of developing product and service innovations, and subsequently achieve higher performance. Such integration involves not only effective communication and collaboration between product development and marketing units (Tatikonda & Stock, 2008), but also anticipating future customer needs. In such affirmation, two significant points can be made. The first point is the necessity of special capabilities to anticipate future customer needs in addition to the special and inimitable resources. The second point is the induced differentiation between what is called resources and what is called capabilities. Flynn et al. (2010) also clarify the difference between operational capabilities, resources, and operational practices by explicitly providing the following definitions:

- *Operational capability* consists of firm-specific sets of skills, processes, and routines, developed within the operations management system, that are regularly used in solving the problems faced by a unit and which provide that unit—and ultimately, the firm—with the means of configuring the resources of the operations management system to meet the firm's distinctive needs and challenges. *Operational capabilities* provide unity, integration and direction to resources and operational practices.
- *Resources* form a firm's foundation, consisting of the firm's capacity and its stocks (Wang & Ahmed, 2007), such as the knowledge stock considered in the following section.
- *Operational practices* are standardized activities, programs, or procedures that have been developed to address the attainment of certain specific operational goals or objectives (Flynn et al., 1995), such as the organizational mechanisms introduced in the present research.

Those definitions are relevant to our research and bring us to the concern of the next subsection—absorptive capacity.

II.4.1. Concept of absorptive capacity

The original definition from Cohen and Levinthal (1990) is the ability of a firm to recognise the value of new, external information, assimilate it, and apply it to commercial ends. To explain our interest in this concept, let us consider Flynn et al.'s (2010) definitions of operational capabilities in the previous section. Through the analogy between such definitions and the present research concerns, we could receive support in affirming that if *operational capabilities* provide direction to resources and operational practices, then *absorptive capacity* can provide direction to the knowledge stock and organizational mechanisms to attain specific operational goals. Through this process, absorptive capacity is expected to impact congruence, therefore leading us to investigate further the concept of absorptive capacity.

The seminal work on absorptive capacity was Cohen and Levinthal (1990) after Kedia and Bhagat (1988) initially labeled the concept. In fact, the concept of absorptive capacity originates in the strategy literature (Patel et al., 2012). Other definitions could be seen in later research. One study defines absorptive capacity as the ability to continuously recombine new acquired knowledge and existing knowledge to respond to change (Gupta & Govindarajan, 1991). Later, Zahra and George (2002) suggest that absorptive capacity is a set of organizational routines and processes by which firms acquire, assimilate, transform, and exploit knowledge to produce a dynamic organizational capability. To gain more understanding on the definition given by Zahra and George (2002), which relates to our research, let us refer to Teece et al. (1997) who define organizational routines: "When firm-specific assets are assembled in integrated clusters spanning individuals and groups so that they enable distinctive activities to be

performed, these activities constitute organizational routines and processes" (p. 516). With this concept of absorptive capacity, Zahra and George (2002) propose four dimensions of absorptive capacity that correspond to the process view of absorptive capacity: acquisition, assimilation, transformation, exploitation. Another view of absorptive capacity is proposed by Brown (1997), where the firm's absorptive capacity has three major components: prior relevant knowledge, communication network, and communication climate. These three components may be adequate for absorbing internal existing knowledge (Tu et al., 2006). A fourth component, knowledge scanning, suggested by Cohen and Levinthal (1990), stands for monitoring the environment and identifying external concepts and ideas that may be useful for the firm (Tu et al., 2006).

While existing literature provides several conceptualizations of absorptive capacity, the present research conceptualizes absorptive capacity as suggested by Zahra and George (2002). Thus absorptive capacity is a set of organizational routines and processes by which firms acquire, assimilate, transform, and exploit knowledge to produce a dynamic organizational capability. The following definitions are adopted from Zahra and George (2002) for each dimensions of absorptive capacity:

- *Knowledge acquisition* refers to the business unit's capability to identify and acquire externally-generated knowledge that is critical to its operations
- *Knowledge assimilation* refers to the business unit's routines and processes that allow it to analyze, process, interpret, and understand the information obtained from external sources
- *Knowledge transformation* refers to the business unit's capability to develop and refine the routines that facilitate combining existing knowledge with newly acquired and assimilated knowledge

- *Knowledge exploitation* refers to the business unit's capability based on the routines that allow firms to refine, extend, and leverage competencies or to create new ones by incorporating acquired and transformed knowledge into its operations.

Setia and Patel (2013) note that the capabilities perspective is more appropriate for studying internal organizational activities, consistent with Lane and Lubatkin (1998). Therefore, adopting a conceptualization of absorptive capacity requires specifying dynamic organizational capability, or simply, dynamic capability. Eisenhardt and Martin (2000) define dynamic capability as the organizational and strategic routines by which firms achieve new resource configurations as markets emerge, collide, split, evolve, and die. They added that this definition of dynamic capability is consistent with what Kogut and Zander (1992) call combinative capabilities, or what Henderson and Cockburn (1994) call architectural competence, or what Amit and Schoemaker (1993) call capabilities. This definition of dynamic capability is relevant in answering our second research question. In fact, the reconfiguration of the internal resources as markets emerge, collide, split, evolve and die, correspond to what we identify as achieving congruence to face environmental uncertainty in term of demand, supply, and technology.

In fact, Zahra and George (2002) raised two points relevant to our research. They define absorptive capacity as a set of organizational routines and processes by which firms acquire, assimilate, transform, and exploit knowledge to produce a dynamic organizational capability. A first relevant point is that absorptive capacity is not a part of dynamic capability as it produces dynamic capability. The second is that they also stated that the presence of such routines provides structural, systemic, and procedural mechanisms that allow firms to sustain the exploitation of knowledge over extended periods of time, which implies dynamism in the effect of absorptive capacity.

II.4.1. Relationship between absorptive capacity and congruence

Cohen and Levinthal (1990) mention about absorptive capacity as an organizational learning concept, and the cumulative effect of continuous learning. As Doll and Vonderembse (1991) note, firms strive to enhance their absorptive capacity so they can respond to a dynamic external environment. Such affirmations provide us insight into the existence of a relationship between absorptive capacity and congruence.

To further investigate our second research question, it is relevant to clarify the concept of congruence at this stage and how it relates to absorptive capacity. An interesting starting point is Teece et al.'s (1997) terminology on dynamic capability. They defined the term *"dynamic"* as referring to the capacity to renew competencies so as to achieve congruence with the changing business environment. They also mention that the term *"capabilities"* emphasizes the key role of strategic management in appropriately adapting, integrating, and reconfiguring internal and external organizational skills, *resources*, and functional *competencies* to match the requirements of the changing environment. Brought together, *dynamic capabilities* are the firm's ability to integrate, build and reconfigure internal and external *competencies* to address the rapidly changing environment (Teece et al., 1997). Moreover, Su et al. (2014) define three components of dynamic capabilities: the reconfiguration component, the sensing component, and the seizing component. The proposed reconfiguration component is relevant to this research as it comprises not only a constant search for ways to capture customers' future and emerging needs, but also an ongoing renewal and update of product and process improvement processes, implying a relationship between dynamic capability and achieving congruence.

As mentioned previously, considering a more unstable environment, different organizational mechanisms should be designed to (re)achieve congruence. Extant research give us some insight into such ability to reconfigure the organizational

mechanisms to achieve congruence. Among those studies that of is Teece et al. (1997), which found that dynamic capabilities include the firm's ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments, and advocating that the term "dynamic" refers to the capacity to renew competencies so as to achieve congruence with the changing business environment. Such affirmation on what is include in the term "capability" confirms the link between the business environment and the internal competencies of the organization. Additional insight came from Tsang (1999) who noted that "capability" is the ability to perform a specified function within a range of performance levels that may relate to capacity, rate, quality, safety and responsiveness. Thus, this definition of "capability" confirms the link between the internal function and performance levels.

To gain more understanding on this conceptualization of dynamic capabilities, let us highlight how Teece et al. (1997) defined capabilities: "The term 'capabilities' emphasizes the key role of strategic management in appropriately adapting, integrating, and reconfiguring internal and external organizational skills, resources, and functional competences to match the requirements of changing environment." Regarding the scope of our research, we adopted Teece et al.'s (1997) concept of dynamic capabilities. In our second research question that considers changing environments, reconfiguring the organizational mechanisms to achieve congruence is therefore conceptualized as dynamic capability.

With these considerations, and by adopting Zahra and George's (2002) definition of absorptive capacity, and Teece et al.'s (1997) definition of dynamic capability, we conclude that (re)achieving congruence after a change in the environment is one of a firm's dynamic capabilities, and absorptive capacity is hypothesized to positively affect this congruence, just as it affects dynamic capability. This positive impact could be

expected depending on the component of absorptive capacity considered. In fact, referring to extant literature regarding whether the impact is positive or negative, it depends not only on the component of absorptive capacity considered, but also on the uncertainty faced by the business unit. Regarding this, Setia and Patel (2013), referring to Zahra and George (2002), suggest that in order to differentiate between the creation and the utilization of knowledge, a capabilities perspective of absorptive capacity must define two distinct aspects of absorptive capacity: potential absorptive capacity and realized absorptive capacity. Cohen and Levinthal (1990) mention that absorptive capacity results from the cumulative effect of continuous learning. Jansen et al. (2005) add that market dynamism moderates the effectiveness of both components of absorptive capacity, potential and realized absorptive capacity, consistent with Eisenhardt and Martin (2000) and Zahra and George (2002). With those considerations, different impacts of absorptive capacity are expected in different market conditions, and more specifically at different levels of uncertainty.

When investigating the impact of absorptive capacity on congruence, extant research relating to absorptive capacity and performance is relevant. One of those studies is that of Setia and Patel (2013), assessing if absorptive capacity directly enhances organizational performance and explaining when these effects are higher. Let us recall that Souza and Voss (2008) stated that performance variables are dependent measures and represent specific aspects of effectiveness that are appropriate to evaluate the congruence between contextual variables and response variables for the situation under consideration. As we mentioned, congruence here is conceptualized as dynamic capability, and dynamic capability cannot be measured directly. Therefore, latent variables are used to measure dynamic capability. Such latent variables could capture either the process or the outcome associated with dynamic capability. Specifically, in our

case the outcome will be considered, which is the measure of profitability associated with congruence. extended and empirically validated the conceptual distinction between potential and realized absorptive capacity, then suggested specific organizational mechanisms and examined how they influence potential and realized absorptive capacity.

According to Jansen et al. (2005), potential absorptive capacity includes knowledge acquisition and assimilation, and captures efforts expended in identifying and acquiring new external knowledge and in assimilating knowledge obtained from external sources; this definition extended from Zahra and George (2002). Concerning realized absorptive capacity, Jansen et al. (2005) states that it includes knowledge transformation and exploitation and deriving new insights and consequences from the combination of existing and newly acquired knowledge into operations—a definition also extended from Zahra and George (2002).

As detailed previously, the element of congruence are environment uncertainty, organizational mechanisms, and financial performance, representing respectively the contextual, response and performance variables. With this in mind, extant research relating to absorptive capacity and environmental uncertainty, absorptive capacity and organizational mechanisms, and absorptive capacity and financial performance, could help us in answering our second research question.

II.4.2. Relationship between absorptive capacity and environmental uncertainty

The congruence hypothesized in investigating our first research question is achieved considering a static state of the environment. As mentioned previously, the organizational mechanisms implemented to face a given environment might not be adapted when such environment changes in terms of level and sources of uncertainty. If so, the organizational mechanisms should be converted dynamically or adjusted continuously to face the uncertain environment. In this situation, we propose that absorptive capacity impacts the

ability to regain congruence after a change in the environment. A relevant feature of absorptive capacity is highlighted by Patel et al. (2012), who noted that absorptive capacity allows the business unit to rapidly analyze and interpret information about changes in the environment and initiate necessary reconfigurations and renewal of operational capabilities. This affirmation is supported by Tu et al. (2006), who stated that absorptive capacity of an organization is perhaps the most critical factor in determining whether a planned change can be implemented successfully.

In the present research, planned change is represented by the set of organizational mechanisms, congruent with the environment, to be implemented to improve financial performance. As stated by Fry and Smith (1987), achieving congruence in the short term may be the most efficient, but in the long run, it may hinder the organization's ability to adapt. Thus, absorptive capacity is proposed as playing a role in anticipating the context calling for such a new state of congruence.

II.4.3. Relationship between absorptive capacity and organizational mechanism

Concerning organizational mechanisms, Jansen et al. (2005) investigated whether organizational mechanisms have different effects on dimensions of absorptive capacity, which would lead to different performance outcomes and thus suggest a relationship between organizational mechanisms and absorptive capacity. However, the relationship this research is interested in is not on the antecedent of absorptive capacity, but on its impact on achieving congruence. Teece et al. (1997) can provide insight into the relationship between organizational mechanism and absorptive capacity. They define *dynamic capabilities* as the firm's ability to integrate, build and reconfigure internal and external *competencies* to address rapidly changing environments, while also clarifying what they called competencies: "When firm-specific assets are assembled in integrated

clusters spanning individuals and groups so that they enable distinctive activities to be performed, these activities constitute organizational routines and processes" (p. 516).

This clarification provides support for the relationship between absorptive capacity and the second element of congruence in this research—organizational mechanisms. This support exists, as the concept of organizational routines of Teece et al. (1997) and the concept of organizational mechanisms adopted in this research, are similar. Jansen et al. (2005) revealed that although cross-functional interfaces contribute to transformation, using many liaisons, task forces, and cross-functional teams may eventually hurt transformation by creating too much redundancy among unit members. Jansen et al. (2005)'s main findings suggest that organizational mechanism drives a unit's potential and realized absorptive capacity in different ways. Coordination mechanisms enhance a unit's potential absorptive capacity, while socialization mechanisms increase a unit's realized absorptive capacity.

More discussion related to the relationship between absorptive capacity and the other constructs in our framework will be addressed in a dedicated section. Imai (1986) explains what he calls process-oriented thinking: "Top management that is too process-oriented runs the risk of lacking long-term strategy, missing new ideas and innovations, whilst a result-oriented manager is more flexible in setting targets and can think in strategic terms" (p. 17). The author stated that the process-oriented way of thinking bridges the gap between process and result, between ends and means, and between goals and measures, and helps people see the whole picture without bias. Thus, managers could successfully find the congruent set of organizational mechanisms in a given environment.

However, in the long run, environments change. As stated by Fry and Smith (1987), achieving congruence in the short term may be the most efficient; but in the long

run, it may hinder the organization's ability to adapt. Then, managers need to readjust, reconfigure the resources, and find a new set of organizational mechanisms that are congruent in the new environment. Such decision to readjust needs a trigger that not only provides the organization with the ability to sense the relevant change in the environment, but allows managers to anticipate the new congruent organizational mechanism. The present research conceptualizes this ability to achieve congruence as the absorptive capacity of the organization. This is consistent with Patel et al. (2012), which noted that absorptive capacity allows the unit to rapidly analyze and interpret information about changes in the environment, and initiate necessary reconfiguration, realignment, and renewal of operational capabilities.

This research operationalizes absorptive capacity by using the four dimensions defined by Zahra and George (2002): acquisition of knowledge, assimilation of knowledge, transformation of knowledge, and exploitation of knowledge. It is relevant to clarify the types of knowledge considered in this research. Gupta and Govindarajan (1991) make the distinction between administrative information and knowledge. In this research, knowledge refers to either expertise or external market data of strategic values. Such expertise could include purchasing skills, product designs, process designs, or marketing know-how. According to resource-based theory, an organization's most critical resources are accumulated rather than acquired. In this research, knowledge is one of the critical resources which is accumulated and could provide a competitive advantage. Patel et al. (2012) found that firms that can absorb external knowledge and pursue ambidextrous capabilities with respect to exploitation and exploration can better leverage manufacturing flexibility. The impact of absorptive capacity on manufacturing flexibility is not the concern of this research; however, if we think about manufacturing flexibility as the capacity for taking new actions to meet new circumstances, or the capacity to

continue functioning effectively despite change, then Patel et al.'s (2012) finding suggests a relationship between knowledge exploitation and resource reconfiguration.

Moreover, Patel et al. (2012) revealed discriminant validity between the construct of absorptive capacity and ambidexterity. Correlation value between absorptive capacity and ambidexterity is .08 from Patel et al.'s (2012) analysis. As Penning's (1973) methodological note stated, if measures of different characteristics obtained by the same method are uncorrelated, this is said to imply discriminant validity. Therefore, we assume that we can investigate our second research question independently from the construct of ambidexterity. Furthermore, the validated measurement items for each of the four dimensions of absorptive capacity from Jansen et al. (2005), also used by Patel et al. (2012), is adopted.

In order to conduct our investigation, extant studies are examined to gain some insight into the relationship between the elements of congruence and absorptive capacity. The following subsection introduces the hypothesized impact of absorptive capacity on congruence, grounded in the resources-based view theory.

III. Hypotheses development

We adopted Teece et al.'s (1997) concept of dynamic capabilities to conceptualize the ability to achieve congruence. If a changing environment is considered, then reconfiguring the organizational mechanisms to achieve congruence is therefore conceptualized as dynamic capability. We discussed in the previous section that research grounded in contingency theory identified the congruent response variables and contextual variables. In other words, such research investigated what are the feasible set of organizational mechanisms in environments characterized by uncertainty in terms of supply uncertainty, demand uncertainty and technology uncertainty. In this uncertain environment, an organization must adjust both internal structures and processes to maintain effectiveness (Jelinek, 1977). Let us recall that Galbraith (1955) conceived of structure as the anatomy of the organization, and processes as its physiology. The following hypotheses are built with consideration of different organizational mechanisms that may be used by business unit managers to face the perceived environmental uncertainty.

From an information processing view, Galbraith (1977) noted that a business unit may be designed either in a way to increase the ability to process information or to reduce the need for information processing. If we consider the need for context anticipation, and for responding effectively to the environmental uncertainty, then increasing the ability to process information is more adequate. This is justified, as reducing the information processing needs will lead either to the use of slack resources or to reduce performance. However, improving the information processing capacity of the business unit would require lateral processes (Galbraith, 1977), which are more generally called operational practices (Flynn et al., 1995) or organizational mechanisms (Jansen et al., 2005). Adopting a contingency approach, this research considers as response variables two

organizational mechanisms among those proposed by Jansen et al. (2005): coordination mechanisms, and socialization mechanisms.

It is expected that coordination mechanisms and socialization mechanisms contribute more to long-term performance and strategic benefits, while system mechanisms contribute more to short-term goals and day-to-day operational benefits. Such expectations were sourced by Villena et al. (2011): "Pursuing strategic benefits would involve a longer time horizon compared to when trying to attain operational benefits" (p. 566). Considering the adopted definition of environmental uncertainty, and its relationship with environmental dynamism and environmental velocity, we suggest that long-term consideration is associated with higher uncertainty. Therefore, pursuing strategic benefits would be associated with higher uncertainty. Among the organizational mechanisms expected to be efficient in higher environmental uncertainty are cross-functional interface, job rotation, interdepartmental connectedness, and sequential socialization tactics. On the other hand, the organizational mechanisms expected to be efficient in lower environmental uncertainty are job codification, rules observations, hierarchy of authority, and sequential socialization tactics.

Therefore, in the first set of hypotheses, it is expected that exploitative activities (transformation and exploitation) positively impact the achievement of operational benefits through system mechanisms and socialization mechanisms. In the second set of hypotheses, it is expected that explorative activities (acquisition and assimilation) positively impact the achievement of strategic benefits through coordination mechanisms. The following hypotheses are developed under the assumption that among the absorptive capacity components, potential absorptive capacity is expected to positively impact congruence in higher environmental uncertainty, while realized absorptive capacity is expected to positively impact congruence in lower environmental uncertainty.

III.1. Hypotheses on the congruence between organizational mechanisms and lower uncertainty environment

It is expected that system mechanisms and socialization mechanisms contribute more to short-term performance and day-to-day operational benefits, while coordination mechanisms and socialization mechanisms contribute more to long-term goals and strategic benefits. We again refer in Villena et al. (2011) to support that pursuing operational benefits would be associated with lower uncertainty. Among the organizational mechanisms expected to be efficient in lower environmental uncertainty are: job codification, rules observation, hierarchy of authority, and sequential socialization tactics.

III.1.1. Job codification

In this research, job codification is defined as the degree to which job descriptions are specified (Dewar et al. 1980). This research calls for clarifying the relationship between job codification using specialized language and the degree of environmental uncertainty. Galbraith (1977) mentions that for organizations performing uncertain tasks, there is widespread existence of multiple authority relations and role conflict. In other words, job codification is overlapped in a higher uncertainty environment. Therefore, leaving ambiguity in the job description or in the roles expected of each job may be more effective when targeting a more short-term performance and day-to-day operational benefits, assumed as a lower uncertainty environment. Organizational members tend to go beyond the procedures specified in a voluntary process to face a higher uncertainty environment. Galbraith (1977) noted that organizations are dependent on this voluntary process when an unanticipated event has occurred, and some actions are required from organization members who were not necessarily expected to perform these actions nor are held accountable for them.

While this affirmation confirms the link between job codification and voluntary process, what is interesting concerning the voluntary process is that it does not occur instantaneously. In fact, one feature of the voluntary process is that managers can design organizational mechanisms to foster it. Therefore, it could be controlled to some extent. Let us recall that Machamer et al. (2000) highlighted a relevant feature of mechanisms by affirming that mechanisms are regular in that they work always, or for the most part in the same way, under the same conditions. The issue is that job codification for effective performance cannot anticipate all potential conditions (Galbraith 1977) because of environmental uncertainty. In the basic bureaucratic model, behaviors were determined by rules created before their execution and communicated to the role occupants (Galbraith, 1977).

Concerning the context under which business managers use such organizational mechanism, let us consider first the supply uncertainty. Supply uncertainty is defined as the extent of change and unpredictability of the supplier's product quality and delivery performance (Li & Lin, 2006). It could be expected that achieving such a reliable supply could occur through a long-time relationship. What is relevant to us is the organizational mechanisms used for day-to-day operational benefits with reliable suppliers, at least in terms of quality and delivery. Also relevant is that clearly establishing the procedures to be followed when holding a given position in the business unit is one requirement when adhering to specific quality standards (Naveh & Marcus, 2005). This implies that job codification is expected to be of great importance in lower supply uncertainty, as it should enhance the supplier's conformance to specific quality standards specified by the business unit.

A second point provides us the condition under which job codification could be effective in lower supply uncertainty. In this context, there must be a minimum

intermediary between the business unit and its supplier. Organizational mechanisms requiring the use of specialized languages through the procedure established by job codification may increase communication efficiency within departments but decrease efficiency between departments. This is supported by Galbraith (1977), affirming that specialized languages increase communication efficiency within a department through transmitting more information with fewer symbols, and avoiding confusion. Therefore, achieving lower supply uncertainty by siting the supplier within the business unit would require job codification for effective communication. Chandler (1977) noted the make or buy trade-off, where the choice to make corresponds to integrating parts manufacturing in-house so that some procurement can be done through a "visible hand"; in other words, parts supply can be controlled as an internal process. Therefore, the following hypothesis is stated:

Hypothesis 1a: In lower supply uncertainty environment, job codification enhances return on sales.

Regarding lower demand uncertainty, a relevant phenomenon could help us in finding the potential impact of job codification in such a context. Lee et al. (1997) define the bullwhip effect as: "the phenomenon where orders to the supplier tend to have larger variance than sales to the buyer (i.e., demand distortion), and the distortion propagates upstream in an amplified form (i.e, variance amplification)" (p. 546). In considering lower demand uncertainty, distortion may be found between the business unit's order, the demand, and the supplier's actual delivery to the business unit. If so, the actions proposed by Lee et al. (1997) to mitigate the detrimental impact of the bullwhip effect are relevant to our research—specifically, the actions to mitigate the demand distortion from the business unit's supplier perspective.

One of Lee et al.'s (1997) suggested countermeasures is to facilitate quick and easy transmission of demand data upstream. This is suggested for relationships such as retailer-supplier, wholesaler-distributor, or distributor-manufacturer. One way to achieve this proposed countermeasure is by specifying the procedure to be used, as it allow quick and easy transmission of demand data to suppliers in a lower demand-uncertainty context. Therefore, it is expected that in lower demand uncertainty, establishing clearly the procedures to be followed in each job at the interface between the supplier and the business unit facilitates quick and easy communication. The following hypothesis is stated:

Hypothesis 2a: In a lower demand-uncertainty environment, job codification enhances return on sales.

When considering the context of lower technology uncertainty, organizational mechanisms could be designed to protect the technology. One way to do so is by using administrative devices, as suggested in existing research. Jelinek (1977) notes that under conditions of great technological specificity, we may expect elaboration of structures and administrative devices to protect the technology with specificity in procedures as an administrative device. A point relevant us is that, under lower technology uncertainty—which is defined as the extent of change and unpredictability of technology development in an organization's industry (Ganbold & Matsui, 2017)—we may expect that the business unit will engage in such technology specificity. A second point is brought by Burack and Elmer (1967), clarifying what could be included in such administrative devices. Burack and Elmer (1967) state that administrative technologies include roles and rules specification corresponding in development to the increasing technical complexity that addresses the physical production processes. These two points imply that clarifying

procedures for each job in each department requires a specific, codified and understandable language to protect the technology. In other words, under lower technology uncertainty, job codification could be used to protect technology specificity. Therefore, the following hypothesis is stated:

Hypothesis 3a: In a lower technology-uncertainty environment, job codification enhances return on sales.

While this hypothesis addresses the job expected to be done, the next hypothesis relates more to ensuring that job occupants meet such expectation.

III.1.2. Rules observation

We have seen that job codification is define as the degree to which job descriptions are specified (Dewar et al. 1980). Extant literature established the relationship between job codification and rules observation. Consistent with establishing clear job descriptions, rules observation refers to the degree to which job occupants are supervised in conforming to the standard established earlier through job codification (Aiken & Hage, 1968), which could be seen as the latitude of behavior that is tolerated within those standards.

Despite the fact that emphasis on rules is typically expected to make an organization less adaptive to external environment change (Jaworski & Kohli, 1993), the content of the rules established may enable organizational members to focus on specific aspects of the environment, and subsequently allows for adequate responses. Moreover, conforming to the standard established is expected to enhance the business unit's responsiveness. This requires firms not only to update the standards according to the perceived uncertainty, but also to raise employee willingness to follow the rules and adopt the updated standard.

Extant research mentioned that willingness to follow the rules is enhanced by the value orientation that arises only in a group context (Galbraith, 1977). It could be said that a consistent goal perception among the business units contributes to such value orientation. A logical step after directing business unit members to adopt a consistent goal perception is to ensure that the business unit is conforming to the standard established earlier through job codification. This is done through rules observation, ensuring that the business unit's members are conforming with the standards established through job descriptions.

Concerning the context within which rules observation is proposed to be congruent, it is relevant to refer to the context within which job codification is congruent, as discussed previously. This requires considering the relationship between rules observation and job codification as mentioned by Aiken and Hage (1968) in providing the definition of rules observation. We hypothesized in the previous section that setting clear job descriptions through job codification is congruent with lower supply uncertainty, lower demand uncertainty, and lower technology uncertainty. Therefore, rules observation is expected to work well in those contexts.

Concerning the context of lower supply uncertainty, it refers to a context where the extent of change and unpredictability of the supplier's product quality and delivery performance (Li & Lin, 2006) is of lower concern. Having a reliable supplier could reduce the latitude of behavior that is tolerated within standards. Considering the relationship between the business unit and its supplier, a common value orientation that arises only in a group context (Galbraith, 1977) could be found. Maintaining such a common goal perception would require an organizational mechanism to be used for day-to-day operational benefits with a reliable supplier. It is expected then that rules observation enhances the supplier conformance to specific quality standards specified by the business

unit, and allows it reduce as much as possible the latitude of behavior that is tolerated within those standards. Therefore, the following hypothesis is stated:

Hypothesis 1b: In a lower supply-uncertainty environment, rules observation can enhance return on sales.

Regarding lower demand uncertainty, the extent of change and unpredictability of the customers' demands and tastes (Li & Lin, 2006) are of lower concern. What is relevant to us are the organizational mechanisms to be used for day-to-day operational benefits within such a lower demand-uncertainty environment. A feature of such day-to-day targets according to Villena et al. (2011) is: "It typically entails short-term, tactical issues with minimal risk-taking and is associated with short-term results" (p. 565).

Such minimal risk-taking could be associated with the use of system mechanisms programming behaviors in advance of their execution and providing a memory for handling routine situations (Galbraith, 1973). Rules observations could capture such minimal risk-taking in lower demand uncertainty, assuming that the established rules could be used in response to the actual demand. Previously, it was argued that job codification could be used as one alternative to allow quick and easy transmission of demand data to supplier. Rules observation could ensure minimal risk-taking in the interactions with customers, allowing a firm to take advantage of a lower demand-uncertainty context. Therefore, the following hypothesis is stated:

Hypothesis 2b: In a lower demand-uncertainty environment, rules observation allows a firm to enhance return on sales

Regarding technology uncertainty, consideration should be given to the expected output of rules observation. Extant research mentions that rules observation is expected

to ensure the job occupant will respond to organizational phenomena in a known way (Daft, 1982). Let us recall that what is relevant to us are the organizational mechanisms to be used for day-to-day operational benefits within such a lower technology-uncertainty environment. Therefore, such organizational mechanisms should not only allow for a common perception but also for predefined behaviors to adopt in day-to-day responses to such common perceptions.

Regarding a common perception of lower technology-uncertainty context, it is a context where the extent of change and unpredictability of technology development in an organization's industry (Ganbold & Matsui, 2017) is of lower concern. A relevant point in lower technology uncertainty is that, since production technology is less variable, business units tend to protect their technology's specificity through administrative devices. Jelinek (1977) confirmed that under conditions of great technological specificity, we may expect elaboration of structures and administrative devices to protect the technology. Therefore, specific rules should be established in order to program such desired behaviors in advance of their execution.

However, leaving perceptions to the individual members is associated with a certain risk-taking in a lower technology-uncertainty environment. As Weick (1979) noted, it is the perceptions of situations that are the triggers of action. In order to have such desired perception of the environment by the business units' members, system mechanisms should enhance members' values and conceptions of purpose, which influence their decision-making (Galbraith, 1977). Among such system mechanisms, job codification could be used to ensure responses are updated according to the actual lower technology uncertainty. Then rules observation will be used to ensure that such updated common responses are adopted among the business unit members. The rules observation could work in unifying the response to the lower technology-uncertainty perception.

Therefore, the following hypothesis is drawn, consistent with the defined relationship between job codification and rules observation:

Hypothesis 3b: In a lower technology-uncertainty environment, rules observation allows a firm to enhance return on sales.

III.1.3. Hierarchy of authority

Extant research mentions that organizations with diffuse pressures from uncertain environments were more likely to have not only decentralized structures and higher internal communications, but also higher membership involvement (Simpson & Gulley, 1962). Such affirmation implies not only a relationship between higher membership involvement and hierarchy of authority as defined by Hage and Aiken (1967), but also the relationship between environmental uncertainty and hierarchy of authority. In this research, hierarchy of authority is defined as the degree to which business unit employees participate in decisions involving the tasks associated with their positions, as adapted from Hage and Aiken (1967). We assume that the business unit employees who are professionally active are also highly involved, therefore showing higher membership involvement in the business unit.

In fact, previous studies support the idea that close supervision is less required when members of an organization are professionally active and have been professionally trained (Hage & Aiken, 1967). It was introduced previously that socialization mechanisms such as sequential socialization tactics provide not only knowledge and skills to employees, but also encourage them to interpret and respond to situations in a predictable way (Jones, 1986). With those considerations, in a business unit where employees are provided with training in order to perceive the environment in the desired way, the degree to which the employees participate in decisions involving the tasks associated with their positions is more likely to increase, as a form of higher involvement.

Consequently, less supervision from the business unit's manager is expected. Highly involved employees are less likely to need referrals to higher levels of the hierarchy when making decisions involving their work.

Moreover, in lower-uncertainty environments where unexpected situations are less likely to occur, the intervention of a higher-level manager for supervision or problem-solving is also less likely to be required. In support of this expected relationship, Pennings (1973) revealed that if an organization is decentralized, both supervisory and nonsupervisory personnel will exhibit higher scores on participation in decisions involving their work and working environment. This finding supports our expected relationship considering that the degree to which business unit employees participate in decisions involving the tasks associated with their positions, and is what we define as hierarchy of authority, as adapted from Hage and Aiken (1967). Similar phenomena are also expected at higher levels of management regarding the relationship between business unit managers and managers at headquarters.

With this in consideration, hierarchy of authority is expected to allow decisions to be made at lower levels of the hierarchy, thus reducing the information distortion during decision-making. However, the defined hierarchy of authority is expected to be effective in specific contexts only. While we noted previously that hierarchy of authority is expected to be effective in lower uncertainty environments, the contexts we are investigating also concern the sources of environmental uncertainty. In fact, hierarchy of authority is expected to be effective under lower supply uncertainty, lower demand uncertainty and lower technology uncertainty.

Concerning the context of lower supply uncertainty, relevant statements are found in Ganbold and Matsui (2017), who examine the impact of environmental uncertainty on

supply chain integration—more precisely, on customer integration, internal integration, and supplier integration. They investigated 108 manufacturing firms in Japan, listed on the first section of the Tokyo Stock Exchange, to focus on large firms generally considered as leaders in innovative practices. Their targeted respondents were supply chain managers, chief executive officers, presidents, senior executives, vice presidents, senior directors, or senior managers. Ganbold and Matsui (2017) concluded that collaborating closely with customers is a key to achieving better control over supply uncertainty, which implies that lower supply uncertainty would require only limited collaborations with customers. At the business unit level, that mean less collaboration between marketing—as the demand uncertainty-absorbing department—and the production function.

Galbraith (1977) noted that the greater the subtask uncertainty, the greater the dependence upon the uncertainty-absorbing department. This implies that, in lower uncertainty environments, there is less dependence upon the uncertainty-absorbing department. However, the quality of the joint decisions between departments is still more dependent on the confidence and trust between among participants (Galbraith, 1977) than on willingness to participate. If so, the process of joint decision-making would be driven not by dependence on a particular department's power to make decisions, but on the confidence and trust among participants, even if having different opinions. Therefore, in the lower supply uncertainty context, where limited collaboration with customers is required, managers should create an organizational climate that fosters employees' commitments and strives to include all team members' opinions and ideas (Ahmad & Schroeder, 2003).

However, Atuahene-Gima's (2003) findings highlight that participation in decision-making reduces new-product development speed because it makes consensus

difficult to gain in the development phase; this potentially delays the product's introduction to the market, resulting in profit loss. Nevertheless, we found support for consensus providing an advantage in lower supply uncertainty environments. The advantage of including members from multiple interdependent departments in decision-making is supported by Galbraith (1977), who mentions that different departments preferring different alternatives as a solution to the same problem was the basic source of conflict. Confronting conflict must be the primary basis for resolving such interdepartmental issues (Galbraith, 1977). Therefore, it is expected that in lower supply uncertainty environments, which do not require fast decisions, hierarchy of authority allows for such confrontation, therefore enhancing conflict resolution. To recapitulate: In lower supply uncertainty environments, where only limited collaboration with customers is required, hierarchy of authority is expected to enhance conflict resolution; this is expected to positively impact gaining consensus, allowing for more effective joint problem-solving and thus contributing to improved financial performance. The following hypothesis is stated:

Hypothesis 1c: In a lower supply-uncertainty environment, hierarchy of authority allows a firm to enhance return on sales.

Regarding the context of demand uncertainty, Li and Lin (2006) defined it as the extent of change and unpredictability of the customers' demands and tastes. Extant research not only gives us some insight into the relationship between environmental uncertainty in general and hierarchy of authority, but also implies the difference between autonomy and hierarchy of authority. Pennings (1973) noted that environmental uncertainty may have a much greater impact on participation in decision-making than does the degree of autonomy. Where autonomy refers to the extent to which organization

has the formal authority to make decisions. Regarding lower demand uncertainty, Jaworski and Kohli (1993) mentioned that organizations that operate in more turbulent markets are likely to modify their products and services continually in order to respond to customers' changing preferences, which implies that in a more stable market, decisions considering the customers' changing preferences are expected to be less frequent.

Additional support for this relationship could be found in Ganbold and Matsui (2017), who found that tight collaboration and integration with suppliers are of great importance in dealing with demand uncertainty. Considering that internal integration is a prerequisite for external integration, a context of lower demand uncertainty will require less internal integration. Let us also consider that internal integration is the degree to which a business unit integrates its own organizational strategies, practices and processes into collaborative and synchronized processes across functions; collaboration across product design, procurement, production, sales and distribution functions takes place to fulfill customers' requirements at lower cost (Ganbold & Matsui, 2017). If so, less required internal integration would be assimilated as a limited need for synchronized process across functions, allowing decisions to be made more independently for each function. In other words, less internal integration allows business unit employees to participate more in decisions involving the tasks associated with their positions, which is the defined hierarchy of authority. Therefore, the following hypothesis is stated:

Hypothesis 2c: In a lower demand-uncertainty environment, hierarchy of authority enhances return on sales.

Regarding technology uncertainty, consideration should be given to the relationship between conflict resolution and production technology alternatives. Let us recall that what is relevant to us are the organizational mechanisms to be used for day-to-

day operational benefits within a lower technology-uncertainty environment. The focus on technology uncertainty here refers to the uncertainty in terms of production technology. Extant research mentioned some relevant input. On one hand, it could be expected that the process of comparing technology alternatives helps decision-makers to ascertain the alternatives' strength and weaknesses and build their confidence that the most viable technology alternatives have been considered (Eisenhardt, 1989). On the other hand, it is possible that participation in decision-making reduces new-product development speed because it makes consensus difficult to gain in the development phase and potentially delay the product introduction to the market, resulting in profit loss (Atuahene-Gima, 2003).

In the context where the extent of change and unpredictability of technology development in an organization's industry is of lower concern, product and services do not change so often. Therefore, the required speed of decision-making would allow for such technology alternative comparisons and conflict resolution without any delay in market introduction, or any impact on profitability. Galbraith (1977) noted an example where different departments preferring different alternatives as a solution to the same problem was the basic source of conflict and of conflict confrontation must be the primary basis for resolving such interdepartmental issues. Therefore, under lower technology uncertainty environment, we could expect that the degree to which business unit employees participates in decision involving the tasks associated with their positions, allow for such conflict resolution by confrontation. The following hypothesis is stated:

Hypothesis 3c: In a lower technology-uncertainty environment, hierarchy of authority enhances return on sales.

III.1.4. Sequential socialisation tactics

In a broad context, socialization tactics refer to the process by which organizations offer newcomers specific information and encourage them to interpret and respond to situations in a predictable way (Jones, 1986). One type of socialization tactic is sequential socialization. Through sequential socialization, a business unit provides newcomers with explicit information concerning the sequences of activities they will go through in their organizations (Jones, 1986). Further details are provided by Maanen and Schein (1979) who note a relevant role of socialization mechanisms in general: to provide an individual with the social knowledge and skills necessary to assume an organizational role. Let us recall what we mentioned previously—that although Galbraith (1977) suggests mechanisms for controlling the external environment to some extent, we assume the external environment is not controlled by business unit managers.

More control could be addressed regarding the internal environment through organizational mechanisms. This is supported by Jelinek (1977) who notes that to control the internal environment in response to external uncertainties, organizations must see to a large extent what their program members perceive. In other words, organizations precondition members to perceive the environment the same way, and eventually to assess the external uncertainty the same way, by the mean of sequential socialization tactics. Sequential socialization tactics teach newcomers a business unit-specific language that facilitates the comprehension of background knowledge and communication with others (Chao et al. 1994). Maanen and Schein (1979) argued that interpretations offered by organizational members, transferred through sequential socialization tactics, may strongly influence a newcomer's perceptions of contexts. The necessity of such organizational mechanisms is supported in extant literature. Galbraith (1977) mentions that to take a large number of people with diverse goals, habits, and skills and evoke an integrated pattern of behavior from them is a problem of considerable magnitude.

Galbraith (1977) advocates that the role of the organization is to remove the factors hindering its members from performing the appropriate behaviors. The challenge is first to clarify what are appropriate behaviors, then to facilitate the adoption of such behaviors.

Concerning the first part of the challenge, one alternative has been hypothesized concerning job codification, specifying in advance the appropriate behaviors. Another alternative is to align the perception of the business unit's members with the perception of the organization. Weick (1979) noted that it is the perceptions of situations that are the triggers of action. In order to foster the desired perception of environmental uncertainty among business units' members, organizational mechanisms should enhance members' values and conceptions of purpose that influence their decision-making (Galbraith, 1977).

Concerning the second part of the challenge, to facilitate the adoption of the appropriate behaviors, extant research conceives it as an integration problem (Galbraith, 1977). The author acknowledges that: "To take a large number of people with diverse goals, habits, and skills and evoke an integrated pattern of behaviour from them is a problem of considerable magnitude" (p. 243). Among the factors that may hinder the business unit's members from adopting the appropriate behaviors are the extent of the members' knowledge of things relevant to their jobs (Galbraith, 1977). This bring us back to the organizational mechanism referring to sequential socialization tactics, as it provides recruits with explicit information concerning the sequences of activities they will go through in their organizations (Jones, 1986).

Concerning the context under which such appropriate behaviors may effectively contribute to the business unit's goal, we initially consider a lower supply uncertainty environment. Let us recall that lower supply uncertainty is a context where the extent of change and unpredictability of the supplier's product quality and delivery performance

(Li & Lin, 2006) is of lower concern. It is then expected that a reliable supplier has a long-time relationship with the business unit.

Yet again, what is relevant to us are the organizational mechanisms to be used for day-to-day operational benefits within a lower supply uncertainty environment. In providing new members knowledge of things relevant to their jobs and encouraging them to interpret and respond to situations in a predictable way, sequential socialization tactics are expected to secure the relationship with reliable suppliers. More precisely, sequential socialization tactics facilitate a unified context perception among the business units and the suppliers. In day-to-day operations, sharing common values and social relational norms allow firms to secure the relationship with reliable suppliers, maintaining a lower supply uncertainty context. This is supported by Villena et al. (2011), who note that stating norms that govern appropriate behavior in a well-established buyer-supplier relationship suppresses the possibility of opportunistic behavior and thus lowers monitoring costs. Therefore, the following hypothesis is stated:

Hypothesis 1d: In a lower supply-uncertainty environment, sequential socialization tactics enhances return on sales.

Regarding lower demand uncertainty, the bullwhip effect is a relevant phenomenon that could help uncover what may be the impact of sequential socialization tactics in this context. As introduced earlier, Lee et al. (1997) suggested countermeasures to facilitate quick and easy transmission of demand data upstream. One countermeasure is to provide explicit information concerning the sequences of activities employees will conduct, as it allows quick and easy transmission of demand data to suppliers in a lower demand-uncertainty context. Obtaining knowledge on things relevant to the job at the interface between suppliers and the business is expected to encourage members to choose

the appropriate behaviors (Galbraith, 1977). Therefore, it is expected that in lower demand uncertainty, sequential socialization tactics help mitigate the bullwhip effects by providing new members with explicit information concerning the sequences of activities they will go through at the interface between suppliers and the business unit. Therefore, the following hypothesis is stated:

Hypothesis 2d: In a lower demand-uncertainty environment, sequential socialization tactics observation enhances return on sales.

When considering the context of lower technology uncertainty, organizational mechanisms could be designed to protect the technology specificity. This context refers to a lower extent of change and unpredictability of technology development in an organization's industry (Ganbold & Matsui, 2017). Let us recall that sequential socialization tactics teach newcomers a unit-specific language that facilitates the comprehension of background knowledge and communication with other members in the business unit (Chao et al. 1994). In seeking day-to-day operational benefits, teaching such unit-specific language is expected to be relevant to protect the unit's technology specificity. Through facilitating communication with other members of the business unit, sequential socialization tactics are expected to enhance information processing, supporting decision-makers in business units. Schein (1984) defined organizational culture as the pattern of basic assumptions that a given group has developed in learning to cope with external adaptation and internal integration and that have worked well enough to be considered valid—and therefore, it may be tough for new members to perceive these assumptions correctly. Under lower technology uncertainty, sequential socialization tactics maintain a valid way to cope with technology specificity and maintain a strong organizational culture. Thus the following hypothesis is stated:

Hypothesis 3d: In a lower technology-uncertainty environment, sequential socialization tactics enhance return on sales.

III.2. Hypotheses on the impact of realized absorptive capacity in lower environmental uncertainty

III.2.1. Relationship between realized absorptive capacity and lower uncertainty

Section II.3.2. introduced the relationship between absorptive capacity and environmental uncertainty. In this section, more specific aspects of the relationship are described by considering realized absorptive capacity and lower environmental uncertainty. The realized absorptive capacity is expected to positively impact congruence in lower environmental uncertainty. Jansen et al. (2005) noted that units with well-developed realized absorptive capacity do not necessarily increase their performance in dynamic environments; indeed, knowledge exploitation even decreases performance in dynamic environments. It could be expected that knowledge exploitation is more effective in a more stable environment, i.e., a lower uncertainty environment.

In investigating the impact of realized absorptive capacity on congruence, some extant research supports the expected relationship. Villena et al. (2011) argues: "The operational benefits are usually realised by promoting exploitative activities such as refinement, efficiency, productivity, and process control within the buyer-supplier relationship. It typically entails short-term, tactical issues with minimal risk-taking and is associated with short-term results" (p. 565). Considering the adopted definition of environmental uncertainty and its relationship with dynamism, velocity, and risk as introduced in section II.2.1.1, such minimal risk-taking is associated with a lower uncertainty environment.

III.2.2. Hypothesized relationship between realized absorptive capacity and congruence

A more general relationship between absorptive capacity and congruence is introduced in section II.3.1. This section is more specific in considering the relationship between realized absorptive capacity and the congruence hypothesized previously with lower environmental uncertainty. Setia and Patel (2013) support that realized absorptive capacity enables business units to exploit knowledge to service customers, meet market demands and launch new products by establishing structures, norms, policies, roles and responsibilities. This affirmation is relevant to us, as it implies a relationship between realized absorptive capacity and financial performance, as delays in new products' introduction to the market may result in profit loss (Atuahene-Gima, 2003).

Moreover, the affirmation that realized absorptive capacity allows the business unit to establish norms, policies, roles and responsibilities implies a relationship between realized absorptive capacity and the considered organizational mechanism. Therefore, it could be expected that realized absorptive capacity (knowledge transformation and knowledge exploitation) improves the congruence hypothesized previously between lower uncertainty environment and job codification, rules observation, hierarchy of authority, and sequential socialisation tactics.

In a context of lower supply uncertainty, there must be a minimum intermediary between the business unit and its supplier. We reiterate yet again that in the context where the extent of change and unpredictability of the supplier's product quality and delivery performance is of lower concern (Li & Lin, 2006), it is expected that the reliable supplier has a long-time relationship with the business unit. Having a lower supply uncertainty by keeping suppliers close or within the business unit would require job codification to increase communication efficiency by transmitting more information with fewer symbols and avoiding confusion (Galbraith, 1977). Let us recall that knowledge exploitation requires retrieving knowledge that has already been created and internalized for use

(Lyles & Schwenk, 1992). Therefore, knowledge exploitation is expected to enhance job codification in the context of lower supply uncertainty by improving communication efficiency.

Considering the relationship between job codification and rules observation, the latter enhances the suppliers' conformance to specific quality standards specified by the business unit and allows them to stay within the latitude of behavior tolerated through those standards. It was introduced previously that in a lower supply-uncertainty environment that does not require fast decisions, hierarchy of authority allows for confrontation, enhancing conflict resolution and enhancing financial performance. This could be accomplished by adding or deleting knowledge or simply by interpreting the same knowledge in a different manner (Zahra & George, 2002). By interpreting the same knowledge in a different manner, knowledge transformation could enhance the conflict resolution initially achieved through hierarchy of authority, while also reminding participants to stay within the latitude of behavior that is tolerated by the standards initially achieve through rules observation. As we stated before, sequential socialization tactics allow for a unified context perception among the business units and the suppliers. Knowledge transformation, by interpreting the same knowledge in a different manner, contributes to enhancing the impact of sequential socialization tactics on maintaining common values and social relational norms, and securing the relationships with the reliable suppliers. The following hypothesis is stated:

Hypothesis 1e: In a lower supply-uncertainty environment, enhancing return on sales requires the use of knowledge transformation and exploitation activities to enhance congruence with coordination mechanisms and socialization mechanisms.

Concerning the context of lower demand uncertainty, where the extent of change and unpredictability of the customers' demands and tastes (Li and Lin, 2006) are of lower concern, Lane and Lubatkin (1998) indicate that the ability to develop sustainable competitive advantage depends on a firm's ability to convert knowledge into capabilities to meet environmental demands.

As we have mentioned time and again, it is expected that in lower demand uncertainty, clearly establishing the procedures to be followed in each job, through job codification at the interface between the supplier and the business unit, facilitates quick and easy communication of demand data upstream. At the interface between the business unit and customer, rules observation can ensure minimal risk-taking in the interaction with customers, allowing firms to take advantage of a lower demand-uncertainty context.

Concerning knowledge exploitation, let us recall that it refers to the business unit's capability based on the routines that allow firms to refine, extend, and leverage competencies or to create new ones by incorporating acquired and transformed knowledge into its operations (Zahra & George, 2002). However, in a more stable market, decisions considering the customers' changing preferences are expected to be less frequent. If so, less internal integration and less synchronized process across functions would be required. Such a situation allows business unit employees to participate more in decisions involving the tasks associated with their positions. As knowledge exploitation requires retrieving knowledge that has already been created and internalized for use (Lyles & Schwenk, 1992), doing so would call for employees' participation in decisions to refine existing competencies for day-to-day operations. Therefore, knowledge exploitation could enhance hierarchy of authority in a more stable market, with lower demand uncertainty. Therefore, the following hypothesis is stated:

Hypothesis 2e: In a lower demand-supply-uncertainty environment, enhancing return on sales requires the use of knowledge transformation and exploitation activities to enhance congruence with coordination mechanisms and socialization mechanisms.

Regarding lower extent of change and unpredictability of technology development in an organization's industry (Ganbold & Matsui, 2017), consideration should be given on the relationship between conflict resolution in considering production technology alternatives and protecting technology specificity. Stock and Tatikonda (2008) found that when there is a large gap between the information needed to acquire and implement a new technology and the information existing within an organization, firms engage in a higher degree of interorganizational interaction. Regarding interorganizational interaction, Tsai (2001) investigated how organizational units can gain useful knowledge from other units to enhance innovation and performance. What is relevant for our research is that Tsai (2001) focused on how the interaction between network position and absorptive capacity affects innovation and performance. Tsai (2001) concluded that a unit's centrality in its intra-organizational network contributes to its innovation. In other words, by occupying a central network position, a business unit is likely to access useful knowledge from other units. Moreover, the effect of network position on innovation and performance is dependent on a business unit's absorptive capacity. Units with higher absorptive capacity, measured by the percentage of R&D expenditure on sales, are likely to be more innovative, and thus more profitable.

In the context where the extent of change and unpredictability of technology development in an organization's industry is of lower concern, products and services do not change so often. Therefore, the need for interorganizational interaction, or the need for access to useful knowledge from other units, is less critical for the business unit.

Instead, more control could be addressed in the internal environment through enhancing the congruence achieved with the designed organizational mechanisms. As we have mentioned, clarifying procedures for each job through job codification requires a specific, codified language, understandable in each designated department, to protect the technology specificity. Galbraith (1977) stated that: "The process engineering unit had chosen to divide its work on the basis of common technical problems. The department was able to recognize the latest technological changes and quickly convert them in the form of tooling and manufacturing process when these changes were beneficial" (p. 142). This is where knowledge exploitation, by retrieving knowledge that has already been created and internalized for use (Lyles & Schwenk, 1992), could reinforce the administrative devices to protect the technology specificity when production technology is more stable. Burack and Elmer (1967) affirmed that roles and rules specification, corresponding in development to the increasing technical complexity that addresses the physical production processes, are administrative technologies.

Concerning knowledge transformation, adding or deleting knowledge or simply interpreting the same knowledge in a different manner (Zahra & George, 2002) could allow deeper consideration of limited technology alternatives. In lower technology uncertainty, the required speed of decision-making would not be critical, therefore allowing for consideration of alternatives from different perspectives. Moreover, knowledge transformation would allow departments to address conflictual perspectives without any delay in market introduction or any impact on profitability. As we have stated before, Galbraith (1977) noted the case where different departments preferring different alternatives as a solution to the same problem was the basic source of conflict, and confronting the conflict must be the primary basis for resolving such interdepartmental issues. Allowing business unit employees to participate more in decisions involving the

tasks associated with their positions, which is the defined hierarchy of authority, contributed to conflict resolution. Additionally, knowledge transformation allows for new interpretations of technology alternatives as a valid way to cope with the context of lower technology uncertainty. Knowledge transformation would support sequential socialization tactics in maintaining a valid way to cope with the technology specificity. Therefore, the following hypothesis is stated:

Hypothesis 3e: In a lower technology-uncertainty environment, enhancing return on sales requires the use of knowledge transformation and exploitation activities to enhance congruence with coordination mechanisms and socialization mechanisms.

Considering the stated hypotheses grounded in the contingency view and resource-based view theory, and considering lower uncertainty environments, the following research framework is built in Figure 1.

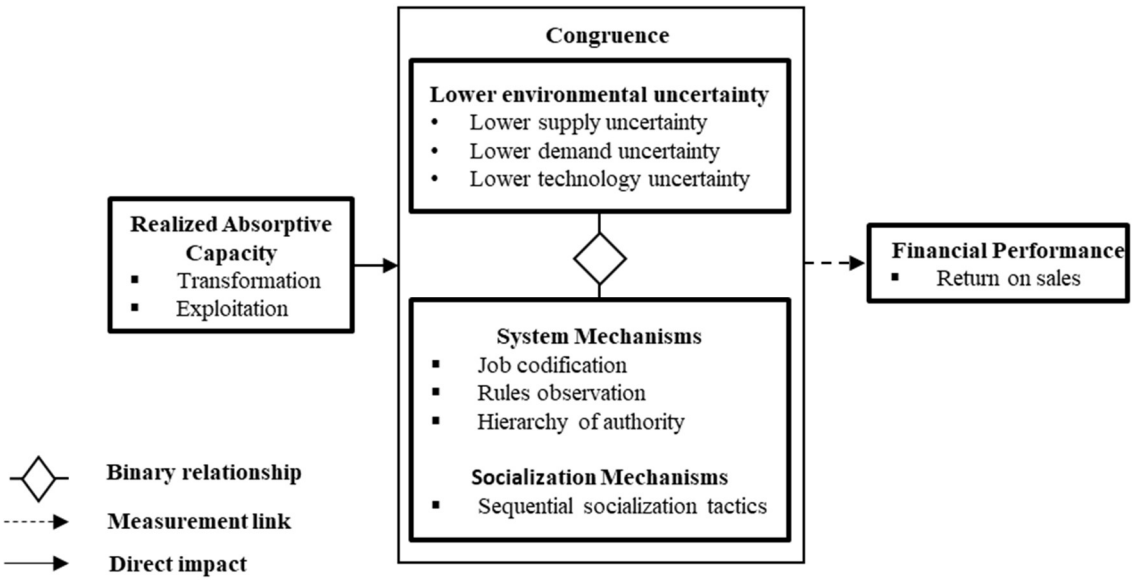

Figure 1_Research framework in lower uncertainty environment

III.3. Hypotheses on the congruence between organizational mechanisms and higher uncertainty environment

As we have stated before, it is expected that coordination mechanisms and socialization mechanisms contribute more to long-term performance and strategic benefits, while system mechanisms contribute more to short-term goals and day-to-day operational benefits. This expectation was stated by Villena et al. (2011): "Pursuing strategic benefits would involve a longer time horizon compared to when trying to attain operational benefits" (p. 566). Considering the adopted definition of environmental uncertainty, and its relationship with environmental dynamism and environmental velocity, we suggest that long-term consideration is associated with higher uncertainty. Therefore, pursuing strategic benefits would be associated with higher uncertainty. Among the organizational mechanisms expected to be efficient in higher environmental uncertainty are cross functional interface, job rotation, and interdepartmental connectedness.

III.3.1. Cross-functional interface

Cross-functional interface consists of lateral forms of communication that deepen knowledge flows across functional boundaries and lines of authority (Gupta & Govindarajan, 2000). What differentiates cross-functional interfaces from interdepartmental connectedness is the existence of specific positions serving as interfaces between the interdependent department and the integrator's job. Lawrence and Lorsch (1967) state that: "The integrator's role involves handling the nonroutine, unprogrammed problems that arise among the traditional functions as each strives to do its own job" (p. 142). Thus, it is expected that the integrator can make decisions and find consensus when the interdependent department does not. This expectation requires clarification on what is meant by interdependence. Handfield and Bechtel (2002) define perceived interdependence as a perceived state when no organization entirely controls all of the conditions necessary to achieve desired outcomes.

What is relevant for us is that this perception of interdependence at the business unit level leads the interdependent unit to recognize the need for engaging intensely in the collaboration (Zacharia et al., 2011).

However, this perception of interdependence is expected to arise inside business units in specific contexts. Such specific contexts would be where one entity inside the business unit perceives an inability to predict the business unit's environment accurately or an inability to discriminate between relevant and irrelevant data. Such inability is expected to hinder the achievement of the desired outcome and leads to interdependence inside the business unit. In this research, environmental uncertainty provide this context. In the next subsection, the considered coordination mechanisms of cross-functional interface are expected to be effective under higher supply, higher demand, and higher technology uncertainties, where intense cooperation is require for success.

Galbraith (1974) noted that under a higher level of uncertainty, decision-making will involve all the relevant departments, bring relevant information to the decision process, and the relevant authority to implement the decision. The more uncertain the environment, the more information is needed to be processed to face the uncertainty. To facilitate information-sharing across organizations, internal integration is adopted to break down function barriers (Wong et al., 2011). Let us recall that internal integration is the degree to which a business unit integrates its own organizational strategies, practices and processes into collaborative and synchronized processes across functions, where collaboration across product design, procurement, production, sales and distribution functions takes place to fulfill customers' requirements at lower cost (Ganbold & Matsui, 2017).

Concerning the context under which cross-functional interface is effective, we consider first a higher supply-uncertainty environment. Yet again, we reiterate that supply

uncertainty is defined as the extent of change and unpredictability of the suppliers' product quality and delivery performance (Li & Lin, 2006). Extant research notes that conflict and problem-solving are potentially recurrent if the prices of material and quality of the input from suppliers are not consistent with the business expectation. In such an environment, conflict is more likely to happen and problem-solving more frequently needed. Therefore, cross-functional interface is expected to be more appropriate to face this environment. In fact, much of the time involved in cross-functional processes is devoted to communicating, problem-solving, and conflict resolution (Galbraith, 1974).

Hypothesis 1f: In a higher supply-uncertainty environment, cross-functional interface enhances return on sales.

Let us consider the environmental uncertainty from the demand side—more precisely, the demand uncertainty, which is defined as the extent of change and unpredictability of the customers' demands and tastes (Li & Lin, 2006). The present research assumes that demand uncertainty is not under the control of business unit managers, as introduced in section II.2.2. However, the input from suppliers as well as the input from the demand side are expected to impact the business unit's effectiveness. Concerning the environmental uncertainty from the demand side, extant research clarifies not only the relevant information but also the departments concerned.

As we have noted, Lee et al. (1997) suggested countermeasures to the bullwhip effect. These include systems facilitating quick and easy transmission of demand data upstream in the marketing channel. Although this countermeasure could be applied to the retailer-supplier relationship, wholesaler-distributor relationship, or the distributor-manufacturer relationship, we propose an organizational mechanism that could be applied internally at the business unit level. Therefore, if the unexpected situation is from the demand side, the relevant information is information on demand and the department

concern involves those in the marketing channel. Galbraith (1977) stated that, from an information-processing perspective, the greater the subtask uncertainty, the greater is the dependence upon—and therefore the power of—the uncertainty-absorbing department. If the considered uncertainty is the extent of change and unpredictability of the customers' demands and tastes (Li & Lin, 2006), then the uncertainty-absorbing department is the marketing department. This increased dependence upon the marketing department calls for an adequate organizational mechanism that facilitates quick and easy transmission of demand data to the production department.

Ganbold and Matsui (2017) mentioned that tight collaboration and integration with suppliers are of great importance in dealing with demand uncertainty. In higher demand-uncertainty environments, the business unit is more likely to face unexpected situations, which could be translated as the variation of market price and demand. Internally, that means that in order to face changing market demand and price variations, close cooperation between marketing department and production department is necessary in order to adjust product and services accordingly. Breaking down functional barriers is then essential for an organization to structure its own practices and processes into collaborative and synchronized processes across functions (Ganbold & Matsui, 2017). To sum up, when faced with a higher demand-uncertainty environment, cross-functional interfaces are used by organizations to break down functional barriers, bring the relevant information to the decision process, and empower the relevant authority to implement the decision.

Hypothesis 2f: In a higher demand-uncertainty environment, cross-functional interface allows a firm to enhance return on sales.

Concerning technology uncertainty, defined as the extent of change and unpredictability of technology development in an organization's industry (Ganbold & Matsui, 2017), an unexpected situation could be translated as a new production technology allowing product design improvement. The relationship between technological uncertainty and the use of a liaison is illustrated by a case studied by Galbraith (1977). The liaison personnel of process designers are physically stationed in the product design area. Thus, liaison personnel could suggest design alternatives to the product designers, which can facilitate less-costly manufacturing processes. The proximity of these two interdependent departments allow them to adjust more efficiently to potential change in terms of production technology (Galbraith, 1977). In this case, the entities expected to perceive interdependence as defined by Handfield and Bechtel (2002) are the process design function and product design functions. It is then expected that those two entities will intensify their collaboration. In higher technology uncertainty, cross-functional interface facilitates such collaboration. It allows not only for quick and easy transmission of the relevant information with as little distortion as possible to the decision-makers on production technology, but also to empower the relevant authority to implement such decision. This expected relationship is consistent with Aiken and Hage's (1968) findings: "Organizations with many joint programs tend to be more complex, more innovative, have more active internal communications channels, and somewhat more decentralized decision-making structures" (p. 912). Therefore, the following hypothesis is stated:

Hypothesis 3f: In a higher technology-uncertainty environment, cross-functional interface allows a firm to enhance return on sales.

III.3.2. Job rotation

There are situations where spontaneous behaviors are joint-decision behaviors (Galbraith, 1977). As different departments may choose different alternatives to the same problem, conflict may arise in that joint-decision process. To manage conflicting perspectives, lateral processes such as interdepartmental rotation of employees are used.

Coordination between functions bring together different sources of expertise and increase lateral interaction between functions (Jansen et al., 2005). Apart from cross-functional interface, another form of coordination mechanism is job rotation, which is the lateral transfer of employees between jobs (Campion et al., 1994). In uncertain environments, such lateral transfer of employees between jobs should not only increase the knowledge and expertise of the employees but should also introduce them to a constant learning process (Jansen et al., 2005). Thus, job rotation may be effective when more information is needed to cope with the environment. Previous research findings suggest that the extent to which employees receive cross-training so that they can perform multiple tasks impacts operational performance (Ahmad & Schroeder, 2003). At the business unit level, regular lateral transfer of employees between different functions will them to gain expertise in different jobs. Laterally transferring personnel from one department to another through rotational assignments not only trains and develops them in all facets of the business, but also creates a lateral communication network across the company as they develop relationships in the various departments (Galbraith, 1977). Through such relationships, rotated employees can more effectively participate in cross-functional teams.

However, the defined job rotation is expected to be effective in specific contexts. Let us recall yet again that supply uncertainty is defined as the extent of change and unpredictability of the supplier's product quality and delivery performance (Li & Lin, 2006). Laterally transferring personnel from one department to another through rotational

assignments may improve the their knowledge on not only the input they need to accomplish their tasks but also their knowledge of the required output they should provide to each workstation. In a context where the supply product quality and delivery performance are uncertain, such knowledge may give employees an appreciation of the impact of such uncertainty on their own tasks and each workstation. This awareness of the interdependence of workstations should influence the way employees deal with the uncertainty of quality and delivery performance.

As we have just noted, a relevant advantage of job rotation is that is that it creates a lateral communication network across the company by developing relationships in the various departments (Galbraith, 1977). This network can be of great importance in finding adequate solutions to face any input disruptions related to product quality and delivery performance. Combined with the knowledge acquired through various job rotations, the induced communication network is expected to enhance employees' assessment of the appropriate action to be taken, the appropriate person to be contacted, and the appropriate function of each business unit. Therefore, the following hypothesis is stated:

Hypothesis 1g: In a higher supply-uncertainty environment, job rotation enhances return on sales.

The expected effectiveness of job rotation is related to what is expected through cross-functional interface. Yet again, we reiterate that higher demand uncertainty is defined by Li and Lin (2006) as the extent of change and unpredictability of the customers' demands and tastes. The business unit is more likely to face more unexpected situations, such as the variation of market price and demand. Internally, that means that in order to face market demand and price variations, close cooperation between marketing department and production department is necessary in order to adjust product and services

according to changing demand and preferences. That calls for collaborative and synchronized processes across functions as suggested by Ganbold and Matsui (2017). Both cross-functional interface and job rotation are expected to contribute to the decision process. Cross-functional interface is expected to break down functional barriers, while job rotation is expected to bring relevant information to the decision process through the acquired knowledge and expertise. As we have noted, lateral transfer of employees between jobs should not only increase their knowledge and expertise on different jobs, but should also introduce them to a constant learning process (Jansen et al. 2005). Therefore, the following hypothesis is stated:

Hypothesis 2g: In a higher demand-uncertainty environment, job rotation enhances return on sales.

Concerning technology uncertainty, defined as the extent of change and unpredictability of technology development in an organization's industry (Ganbold & Matsui, 2017), it was hypothesized previously that cross-functional interface is congruent in a higher technology-uncertainty environment, considering the impact of the liaison role. As seen previously, if the liaison personnel have been involved in job rotation inside the business unit, they have developed expertise regarding different jobs. Therefore, job rotation supports the use of liaison personnel to face technological uncertainty in terms of production technology. As job rotation reinforces the proximity of interdependent department, and that proximity allows them to adjust more efficiently to potential change in terms of production technology (Galbraith, 1977), the following hypothesis is stated:

Hypothesis 3g: In a higher technology-uncertainty environment, job rotation enhances return on sales.

III.3.3. Interdepartmental connectedness

The preceding hypothesis was grounded on the argued significance of building a common-value orientation among the business units in order to create a common perception of the environmental uncertainty and common behaviors in response to it. However, there are situations where goal accomplishments require behaviors that go beyond specific role requirements and involve other units (Galbraith, 1977). This brings us to the discussion of another socialization mechanism apart from sequential socialization tactics discussed earlier—interdepartmental connectedness. Let us recall that socialization mechanisms in general create broad and tacitly understood rules for appropriate action (Volberda, 1998). At the business unit level, interdepartmental connectedness is defined as the degree of formal and informal direct contact among employees across departments (Jaworski & Kohli, 1993). The concern of information dispersion was discussed in an earlier hypothesis, and a system mechanism—hierarchy of authority—was suggested to address the concern in lower uncertainty environments. In this section, the socialization mechanism of interdepartmental connectedness is suggested.

The relevant information to face a given uncertainty is dispersed at different level of the interdependent departments of a business unit. These degrees of formal and informal direct contact are expected to be effective when facing the information dispersion in a lower uncertainty environment. The investigated interdepartmental connectedness consists of social relations between departments of the same business unit. More precisely, we investigate the extent to which individuals in a department networked to various levels of the hierarchy in other departments through informal means. Extant research provides social relation concepts that could be adopted for our investigation. The original items from Jaworski and Kohli (1993) are adopted; they found that the market

orientation of a business unit is an important determinant of its performance, regardless of environmental characteristics.

In an uncertain environment, one of the expected roles of socialization mechanisms is mentioned by the extant research. Business units create broad and tacitly understood rules for appropriate action through socialization mechanisms (Volberda, 1998). These tacit rules allow individuals in a department to network with various levels of the hierarchy in other departments. The direct contact among employees in this network may be formal or informal according to the degree of interdepartmental connectedness. The availability of the network influences the collaboration between departments, as it facilitates communication of relevant information with minimum distortion. In fact, the information relevant to a decision to be made inside one department of the business unit may be available in another department of the business unit. In that case, the participants in the decision-making process, where such relevant information is needed, should include employees or managers from the related department. Galbraith (1977) describes this as knowledge influence on decision-making, instead of hierarchical influence. As we argued previously, sequential socialization tactics teaches newcomers a unit-specific language that facilitates the comprehension of background knowledge and communication with other members in the business unit (Chao et al. 1994). Making decisions in unexpected situations requires the most accurate possible information on the situation under consideration. Then, let us consider the context under which such decisions are made.

In higher supply-uncertainty environments, when supplies' product quality and delivery performance are uncertain, Ganbold and Matsui (2017) found support for the proposition that coordination and information-sharing among purchasing and manufacturing departments can mitigate such supply uncertainty. It is expected to not

only connect the relevant departments but also to allow transmission of relevant information to facilitate modification of product or services. Therefore, the following hypothesis is stated:

Hypothesis 1h: In a higher supply-uncertainty environment, interdepartmental connectedness enhances return on sales.

As supported by extant research, in a higher demand-uncertainty environment, collaboration across product design, procurement, production, sales and distributions takes place to fulfil; customer requirements at a lower cost (Flynn et al., 2010). Moreover, the positive impact of this collaborative work environment on the integration process is supported by Swink (1999) as enhancing information transmission. The following hypothesis is stated:

Hypothesis 2h: In a higher demand-uncertainty environment, interdepartmental connectedness enhances return on sales.

One of the considered contexts is lower technology uncertainty. Technology uncertainty is defined as the extent of change and unpredictability of technology development in an organization's industry (Ganbold & Matsui, 2017). Let us recall that the focus on technology uncertainty here refers to uncertainty in sources from the subset of knowledge that is applied. In other words, technology uncertainty is related to the uncertainty in terms of production technology. Business units that operate in more turbulent markets are likely to have to modify their products and services continually in order to respond to customers' changing preferences (Jaworski & Kohli, 1993). This implies that in more stable markets, such modification of products and services are less frequent. If we assume that modifying products and services is also associated with

modification of the production technology, then the team integration process is as important than the speed of decision-making related to production technology in more turbulent markets. As we have stated before, in uncertain environments, collaboration across product design, procurement, production, and sales and distributions takes place to fulfill customer's requirement at a lower cost (Flynn et al., 2010).

Previous research suggests the impact of a collaborative work environment to enhance the team integration process (Swink, 1999), in order to enhance information transmission. At the business unit level, interdepartmental connectedness is expected to not only connect the relevant departments but also to allow transmission of the relevant information. Therefore, the following hypothesis is stated in higher technology uncertainty environment:

Hypothesis 3h: In a higher technology-uncertainty environment, interdepartmental connectedness enhances return on sales.

III.4. Hypotheses on the impact of potential absorptive capacity in higher environmental uncertainty

III.4.1. Relationship between potential absorptive capacity and higher environmental uncertainty

The congruence hypothesized in investigating our first research question is achieved considering a static state of the environment. As mentioned previously, the organizational mechanisms implemented to face a given environment might not be adapted when such environment changes in terms of uncertainty. If so, the organizational mechanisms should be converted dynamically or adjusted continuously to face the uncertain environment. In this situation, we propose that potential absorptive capacity can impact the ability to achieve congruence after a change in the environment. This proposition is supported in extant literature examining absorptive capacity. Patel et al. (2012) noted that absorptive capacity allows the unit to rapidly analyze and interpret information about changes in the

environment, and initiate necessary reconfiguration, realignment, and renewal of operational capabilities. This affirmation is supported by Tu et al. (2006) who stated that when it comes to change, absorptive capacity of an organization is perhaps the most critical factor in determining whether a planned change can be implemented successfully.

In the present research, this planned change is represented by the set of organizational mechanisms to be implemented to enhance new product introduction. As stated by Fry and Smith (1987), achieving congruence in the short term may be the most efficient, but in the long run, it may hinder the organization's ability to adapt. Thus, potential absorptive capacity is proposed to play a role in anticipating the context calling for a new state of congruence.

This expectation initially begins with coordination mechanisms and socialization mechanisms contributing to a long-term and strategic goal when pursuing that strategic goal, e.g., improving long-term competitiveness, requires explorative activities such as search, discovery, experimentation, and innovation (Villena et al., 2011). Moreover, it would involve a longer time horizon compared to when trying to attain operational benefits, as argued by Villena et al. (2011). Considering our definition of uncertainty, a longer time horizon is associated with higher uncertainty.

Concerning the second research question investigating the impact of potential absorptive on congruence, extant research can support the expected relationship. Villena et al. (2011) argue: "The strategic benefits usually require explorative activities such as search, discovery, experimentation, and innovation that involve risk-taking with implications for long-term results within the buyer-supplier relationship" (p. 565). This argument is consistent with March (1991) and Sanders (2008), who found that targeting profitability on a long-term target includes a higher-uncertainty environment and would require experimentation and discovery. Therefore, it could be expected that in a higher

uncertainty environment, achieving long-term goals requires knowledge acquisition and assimilation activities to enhance congruence with coordination mechanisms and socialisation mechanisms.

III.4.2. Relationship between potential absorptive capacity and congruence

In the short term, managers could find a congruent set of organizational mechanisms in a given environment. However, in the long run, the environment will change. Managers need to readjust, reconfigure the resources, and find a new set of organizational mechanisms congruent in the new environment. This decision to readjust needs a trigger that not only provides the organization with the ability to sense the relevant change in the environment, but allows managers to anticipate the new congruent organizational mechanisms. Therefore, a trigger is the ability to create congruence. The present research conceptualizes this ability to create congruence as the potential absorptive capacity of the business unit. That conceptualization is in part supported by Patel et al. (2012) who noted that absorptive capacity allows the unit to rapidly analyze and interpret information about changes in the environment, and initiate necessary reconfiguration, realignment, and renewal of operational capabilities.

To understand the link between potential absorptive capacity and congruence suggested by this study, let us refer to an essential characteristic of absorptive capacity mentioned by Cohen and Levinthal (1990) clarifying that absorptive capacity is an organizational learning concept and is the cumulative effect of continuous learning. Moreover, Doll and Vonderembse (1991) noted that firms strive to enhance their absorptive capacity so they can respond to a dynamic external environment. Dess and Beard (1984) mentioned that dynamism is change that is hard to predict and that increases uncertainty. All these affirmations provide us insight into the existence of a relationship between potential absorptive capacity and congruence. Galbraith (1977) introduced the

role of the integrator in the lateral process for coordination between functions. The author emphasizes the importance of this role for knowledge acquisition and introduces an illustration where what might appear as an interesting but useless fact to a marketing manager may be a valuable piece of information to the technical unit.

In a more specific context of higher supply uncertainty, relevant findings are found in Patel et al. (2012) referring to Zacharia et al. (2011) in mentioning that absorptive capacity enhances business units' capabilities to collaborate with supply chain partners and adopt supply chain technology. That implies a relationship between absorptive capacity and collaboration among the business unit's partners. Te context under which such collaboration is required is found in Zacharia et al. (2011) referring to Handfield and Bechtel (2002): "Organizations perceive they are interdependent when neither organization entirely controls all of the conditions necessary to achieve desired outcomes" (p. 593). Considering the higher supply uncertainty, we hypothesize:

Hypothesis 1i: In a higher supply-uncertainty environment, enhancing return on sales requires the use of knowledge acquisition and assimilation activities to enhance congruence with coordination mechanisms and socialization mechanisms.

Jansen et al. (2005) found that units with well-developed potential absorptive capacity improved their performance in dynamic environments, using a unit's financial performance as dependent variable. Jansen et al. (2005) conducted a survey of 462 organizational units of a large European multi-unit financial services firm offering asset management, insurance, leasing, equity participation, corporate banking, and investment banking. The measurement items related to organizational mechanisms are widely used for conducting surveys in existing literature. The targeted respondents were general managers of 769 organizational units in 220 branches in one country. Setia and Patel

(2013) mention that potential absorptive capacity enables the acquired knowledge to be assimilated; that allows the business units to recognize shifts in the operational environment, changes in customer demands and opportunities for innovation. Moreover, a business unit with higher levels of absorptive capacity can be more efficient and effective in processing information about demand (Cohen & Levinthal, 1989). Therefore, the following hypothesis is stated:

Hypothesis 2i: In a higher demand-uncertainty environment, enhancing return on sales requires the use of knowledge acquisition and assimilation activities to enhance congruence with coordination mechanisms and socialization mechanisms.

In the context of higher technology uncertainty, relevant findings are found in Patel et al. (2012) referring to Cohen and Levinthal (1994), and Narasimhan et al. (2006) that a unit with more extensive absorptive capacity can better respond to technological innovations. The seminal works on absorptive capacity (e.g., Cohen & Levinthal, 1990) argue that absorptive capacity is an organizational learning concept and is the cumulative effect of continuous learning. Extant research (e.g., Huber, 1996) mentions that in highly unpredictable environments, the lack of organizational learning may explain why organizations are less effective at assimilating technology and practices that lead to competitive advantage. A similar view is adopted by Rindova and Fombrun (1999) considering the creation of competitive advantage as a learning process where slow assimilation can seriously undermine a firm's ability to achieve sustainable advantage.

In the context of higher technology uncertainty, the present research hypothesizes that the firm's routines and processes that allow it to analyze, process, interpret, and understand the information obtained from external sources positively impact achieving congruence in uncertain environments. More support is provided by Doll and

Vonderembre (1991) investigating the complex relationship among technology, organizational capabilities and customer requests. They note that in a highly uncertain environment, firms identify primary factors that shape their ability to absorb knowledge and implement technology. We reiterate that the scope of this research is not on the antecedent of absorptive capacity, but the factors that shape the firm's ability to implement technology. Regarding this focus, concern, business units adjust implementation efforts as they learn more about the technology and how it can be used to meet customer needs. Cohen and Levinthal (1994) added that firms with an adequate base of prior knowledge have the ability to proactively envisage future technological advances. Despite the fact that prior relevant knowledge is not among the dimensions of absorptive capacity in our conceptualization, clarifying the terms provides some insight. Brown (1997) provides such clarification by defining prior relevant knowledge as the understanding of job skills, technology, and management practices possessed by the workers and managers in the organization. The dimension we adopted is knowledge acquisition, which is the firm's capability to identify and acquire externally generated knowledge that is critical to its operation, consistent with Zahra and George (2002). Considering the similarity between prior relevant knowledge and knowledge acquisition, under the assumption that what is possessed was earlier acquired, Cohen and Levinthal (1994)'s affirmation is relevant here.

Therefore, considering our dimension and under these assumptions, firms with an adequate knowledge acquisition are expected to have the ability to proactively envisage future technological advances. Lane and Lubatkin (1998) also noted the importance of an appropriate knowledge base to achieve success. Therefore, the following hypothesis is stated:

Hypothesis 3i: In a higher technology-uncertainty environment, enhancing return on sales requires the use of knowledge acquisition and assimilation activities to enhance congruence with coordination mechanisms and socialization mechanisms.

Considering the stated hypotheses grounded on the contingency view and resource-based view, and considering higher uncertainty environment, the following research framework is built in Figure 2.

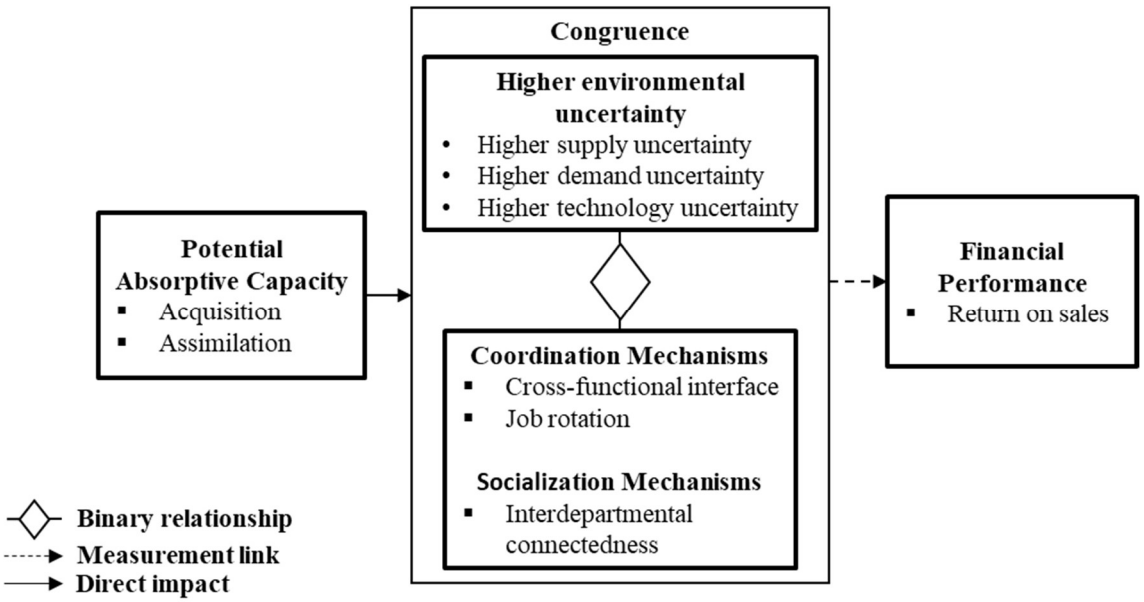

*Figure 2.*_Research framework in a higher uncertainty environment

IV. Research methodology

IV.1. Introducing the survey to the targeted respondents

Philips (1981) aimed to assess the reliability and validity of measurements of organizational concepts obtained by key informants. He argues that survey respondents assuming the role of key informants provide information at the aggregate or organizational unit of analysis by reporting on group or organizational properties rather than personal attitudes and behavior. When introducing the survey details to the respondents, we specify the desired key informants: chief executive officers, chief operating officers, and managers of business units. We describe a business unit in the questionnaire's introduction letter. A business unit may be an entire company, a division or a plant, depending on the organization of the targeted informant's company. It may include both the head office and the factory.

First, we ask the targeted respondents to consider the most representative business unit of their company while considering the statements in the questionnaire. Second, we ask the targeted respondents to make sure that their answers consistently apply to the same business unit for all questions. Third, concerning statements on supplier or customer, we ask the respondents to consider the major supplier or customer with respect to this business unit. Fourth, concerning the statements for which the respondents feel they do not have knowledge, we ask them to redirect, if possible, the statement to the person they think is the most knowledgeable to answer it. If the exact information is not available, we ask the respondents to give their best estimates. Finally, before asking the respondents to provide information on their company, we reassure them that we will not publish the names of their companies, to ensure confidentiality (Forsythe, 1977), as the results and report of the research will be on the industry aggregate and will be sent to the survey participants. The related introduction letter is provided on APPENDIX 1.

IV.2. Issue on expected response rate

Pflughoeft et al. (2003) noted that lower response rate is anticipated due to length of the survey and to the fact that the survey focuses on top-level managers. However, we can compare the sample size to those in respectable empirical studies, e.g., Kulp et al. (2004). Frohlich (2002) provides recommendations for improving response rate in Operations Management research: first, to set up an acceptance sampling plan to test the accuracy of the directory prior to using it; second, if a survey is under four or five pages, then resistance will be lower, and the response rate will be higher; third, the use of pre-paid postage and survey formatting can minimize the respondents' expected effort; and fourth, promising to convey the study's results also encourages participation.

IV.3. Sampling and data collection

The present research uses the survey method to collect data among the targeted companies in Japan. The targeted companies are listed on the first section of the Tokyo Stock Exchange, and include manufacturing, construction, and service industries. Those companies are targeted for their assumed maturity in term of use of practices. This is consistent with Sousa and Voss's (2008) recommendation that the assessment of congruence in Operations Management practices contingency research should concern the match between context and practices when the practices have reached a stable level of development. The mail survey package included the survey instrument, a return envelope with postage pre-paid and an introduction letter to provide a brief description of the research purpose and to ensure the confidentiality of the data collected. The survey instrument was sent to 2024 companies. Reminder e-mails were sent after approximately two months, and a web-survey link was sent to increase responses rate. Ultimately, 126 responses were collected, with four non-valid, yielding 122 usable responses. This corresponds to a response rate of 5.47%. This relatively lower response rate was anticipated due to the fact the survey targeted top-level managers, which is consistent

with Devaraj et al. (2007). Table 1 and Table 2 show the demographic profiles of the sample representing a variety of industries—around 50% in manufacturing, followed by 44.3% in services and 7 % in construction.

Table 1_Sample profile, in terms of number of employees and sales volume

Metrics	Number	%
Number of employees		
<100	2	1.6
100-199	5	4.1
200-499	14	11.5
500-999	24	19.7
1.000-4.999	42	34.4
>5.000	35	28.7
Total	122	100
Sales volume(average of 2016.2017.2018 in million JPY)		
<1000	0	0
1000-4999	10	8.2
5000-9999	6	4.9
10.000-19.999	17	13.9
20.000-99.000	49	40.2
100.000-199.000	15	12.3
200.000-1.000.000	19	15.6
>1.000.000	6	4.9
Total	122	100

Table 2_Sample profile, in terms of industry

Metrics	Number	%
Industry		
chemicals	10	8.2
construction	8	6.6
electric appliances	7	5.7
electric power & gas	1	0.8
financing business	1	0.8
foods	5	4.1
glass and ceramics products	3	2.5
Information and communication	10	8.2
insurance	1	0.8
iron and steel	1	0.8
land transportation	3	2.5
machinery	5	4.1
metal products	3	2.5
nonferrous metals	3	2.5
oil and coal products	1	0.8
other product financial instruments disclosure	1	0.8
other product helmet	1	0.8
other products pencil	1	0.8
other products precision machinery	1	0.8
other products printing mat.	1	0.8
pharmaceutical	5	4.1
precision instruments	2	1.6
pulp & paper	1	0.8
real estate	2	1.6
retail trade	12	9.8
rubber products	1	0.8
services	12	9.8
textiles and apparels	4	3.3
transportation equipment	5	4.1
wholesale trade	11	9
Total	**122**	**100**

IV.4. Data collection period

Regarding the survey conducting period, Jaworski and Kohli (1993) used a three-wave mailing survey method, described as follows. First, a copy of the questionnaire, a personalized letter, and a return envelope were mailed to the two respondents for each strategic business unit. Second, after one week, a reminder postcard was mailed to each

individual targeted respondent. Third, after three weeks, a replacement copy of the questionnaire and a personalized letter were mailed to the informants. For our research, an initial mail survey package was sent in mid-December 2017. Then a first reminder was sent in February 2018 through the inquiry form on the company's homepage. A second reminder including the link to access the survey online was sent on April 2018 through the company's inquiry form. A third reminder including the web link was sent July 2018. Then a fourth reminder was sent December 2018.

Relevant research conducted by Furlan and Vinelli (2018) caught our attention as they obtained reliable results from data collected between 2005 and 2007. They developed and tested a conceptual framework where they conceptualized improvement as a dynamic capability that relies on a bundle of interrelated meta-routines for incrementally improving existing product or processes. They conceptualized innovation as a dynamic capability that relies on a bundle of interrelated meta-routines for developing new products or processes, consistent with Peng et al. (2008).

Furlan and Vinelli (2018) tested their framework on data in the third round of the High-Performance Manufacturing International Research Project, collected between 2005 and 2007 from 266 manufacturing plants located in Finland, Sweden, Germany, Japan, Korea, Austria, Italy, Spain, and the United States. Such data encompass electronics, machinery, and transportation industries. They assessed content validity of the items by including items used in prior studies. The result of confirmatory factor analysis indicates that the items achieve congruence with the data. The construct reliability and convergent validity are verified.

Research by Yee et al. (2008) also caught our attention as their data collection period was for twelve months. Yee et al. (2008) empirically examined the consequences of employee satisfaction in service operations through a survey of 206 shops in Hong Kong. The

targeted organizations were small service organizations with two to five service employees, providing agency services, beauty care services, catering, fashion retailing, optical services, retailing of health care products, and retailing of valuable products. The survey respondents for each shop were two service employees, and a person in charge of the shop. Service employees are defined as customer-contact persons whose major responsibility is serving customers and selling products. The respondents could complete the questionnaire at different times at their convenience. The responses were collected individually. During a period of twelve months, complete responses were received from 206 shops delivering 618 individual usable responses. Yee et al. (2008) conducted Harman's one-factor tests on items for employee satisfaction and firm profitability, and on items for customer satisfaction and firm profitability. The results of both Harman's one-factor tests show that two factors were produced, which suggest that common method bias was not serious in their study. Additionally, the results of the reliability analysis suggested the reliability of the scales used in the research.

IV.5. Non-response bias

Regarding non-response bias, (Richardson, 2000) stated that to ensure the external validity or generalizability of research findings to the target population, the researcher must satisfactorily answer the question of whether the results of the survey would have been the same if a 100% response rate had been achieved. Armstrong and Overton (1977) discussed the extrapolation methods for estimating the response of non-respondents. Pace (1939) affirmed that the extrapolation methods are based on the concept that subjects who respond late are similar to non-respondents. Lindner et al. (2001) recommended that late respondents be defined operationally as those who respond as the last wave of respondents in successive reminders. Pagell and Krause (2004) stated that one method for testing non-response bias is to test for significant differences between the responses of early and late waves of returned surveys, as described by Armstrong and Overton (1977). This method

is based on the assumption that the opinions of late responders are somewhat representative of the opinions of non-respondents (Armstrong & Overton, 1977). They noted that comparisons would be made between early and late respondents on primary variables of interest. Pagell and Krause (2004), for their non-response bias analysis, randomly selected 20 of their survey items used for the analysis. They performed t-tests to compare 50 early respondents with 50 late respondents on their responses to the 20 randomly selected items. Finally, if no differences are found, the sample results could be generalized to the target population (Lindner et al. 2001).

Kawai and Chung (2019), from a knowledge-based view, examined how the utilization of expatriates competent in knowledge transfer affects subsidiary knowledge creation capability across different strategic contexts and performance. They define expatriates as home-country nationals assigned by headquarters to positions in overseas subsidiaries. Their sample consisted of 114 European-based Japanese companies belonging to 82 Japanese multinational corporations. The sample included manufacturing, wholesale, logistics, retail, finance and other service industries. To address non-response biases, Kawai and Chung (2019) performed a two-tailed t-test between early respondents and late respondents (Armstrong & Overton, 1977). As mentioned, this method assumes that the late respondents are representative of the non-respondents. Additionally, they examined differences between the responding firms and non-responding firms concerning subsidiary size and subsidiary age, following Lovett et al. (2009).

Linder (2001) proposed a definition of late respondents as those who respond in the last wave in successive follow-ups to a questionnaire—in our case, the reminder sent via each company's home page. Linder (2001) recommended further that the minimum number of late respondents be 30 and added that if the last wave could not generate that

number, then researchers should only use the responses to the last two waves. Therefore, as non-response bias is a concern for every survey methodology, we examine the differences between the responding companies and non-responding companies by comparing the early and late respondents using an independent t-test, as suggested by Armstrong and Overton (1977). The two groups are compared in terms of size and annual sales, consistent with Stank et al., 2001; Zhao et al., 2011; and Lovett et al., 2009, and also in terms of age, consistent with Kawai and Chung, 2019. The null hypotheses are that the mean scores of the responding and non-responding groups are significantly different in terms of size, annual sales, and age. Concerning size, t-statistics=0.056, p value=0.956. Concerning annual sales, t-statistic =0.683, p=0.496. For age, t-statistic =0.528, p=0.599. Such results suggest rejecting the null hypothesis. Table 3 and Table 4 show that we can assume at 95% of confidence that the mean score of the two groups of respondents are not significantly different. Therefore, the late respondents are representative of the non-respondents, and non-response bias is not a critical concern in our study.

Table 3_ Early and late respondents, group statistics

Grouping variables	Respondents Group	N	Mean	Std. Deviation
Size	early respondents	79	7.546	1.691
	late respondents	43	7.530	1.305
Annual_sales	early respondents	79	259442.266	785358.311
	late respondents	43	166366.372	347820.417
Age	early respondents	79	62.630	35.967
	late respondents	43	59.370	25.180

We further tested for non-response bias between the respondent group and the non-respondent group. The result shown on APPENDIX 6 suggest no significant difference in terms of annual sales (t=.859, p=.391) and total assets (t=-.829, p=.407), while also suggesting potential bias in terms of age (t=.7.759, p=.000) and size (t=4.142, p=.000).

Table 4- Early and late respondents, t-test for equality of means

		t	df	Sig. (two-tailed)	Mean Difference
Size	Equal variances assumed	.056	120	.956	.017
	Equal variances not assumed	.060	106.138	.952	.017
Annual_sales	Equal variances assumed	.738	120	.462	93075.894
	Equal variances not assumed	.903	116.298	.368	93075.894
Age	Equal variances assumed	.528	120	.599	3.261
	Equal variances not assumed	.585	112.424	.560	3.261

We conducted additional test for non-response bias by comparing the different waves of the survey as described in section IV.4. Grouping the respondents by their respective waves yields three groups as the third and fourth waves are combined to allow a reasonable size for comparison. The results shown in APPENDIX 7 show no significant difference between the first wave and second wave's respondent. The highest t-test value was the age but not significant at 95% of confidence (t=1.290, p=.200). On APPENDIX 8, the results show no significant difference between the first wave and the combined third wave and fourth wave's respondents. The highest t-test value was the annual sales but not significant (t=.619, p=.537). The comparison between the second wave's respondent and the combined third wave and fourth wave's respondent did not show any significant difference. The highest t-test value was the total assets but not significant (t=.750, p=.458). Therefore, the results suggest no potential bias among the different waves of respondent.

IV.6. Common method variance

In order to clarify the need to check for potential bias related to common method variance, let us recall the relationship between measures and construct. Bagozzi and Philips (1982) define construct as a conceptual term used to describe a phenomenon of theoretical interest. They stated two features of construct. First, a construct refers to a phenomenon

that is real. Second, although a construct refers to a real phenomenon, which can be observable or not, a construct itself is not real in an objective sense; this is called a latent construct. Therefore, to assess a given construct, measures are required. Edward et al. (2000) define measures as quantified records, or datum, taken as an empirical analogy to a construct. Another definition provided in the extant literature refers to measure as an observed score gathered through self-reporting, interviews, observations, or some other means (De Vellis, 1991). If those are the definitions of construct and measures, the relationship assumed in the present research is consistent with Bollen (1989) who noted that constructs are usually viewed as causes of measures; if so, variations in a construct should lead to a variation in its measures. In other words, covariance follows a predictable pattern for reflective measures, but are indeterminate for formative measures (Bollen and Lennox, 1991). With all those considerations, the present research uses reflective measures.

The choice of using reflective measures is then followed by testing reliability and validity of the measures used. Bagozzi and Philips (1982) stated that reflective measures underlie classical tests of reliability estimation (Nunally, 1998) and factor analysis (Harman, 1976) which treats measures as a function of a latent constructs plus error. As we use reflective measures in collecting perceptual and self-reported data, the concern about common method variance that affects the validity and reliability of the items (Kawai & Chung, 2019) is raised. Podsakoff et al. (2003) recommended procedural methods and statistical techniques to reduce the potential concern of common method variance. Our survey was designed to be answered by a single respondent. Therefore, as procedural methods to reduce the potential of common method variance, first, only limited information is given to the respondent on the constructs investigated. Second, the items are randomized to reduce the likelihood that the respondent will notice the similarity

between items measuring the same construct, and rationally perceive the logic of interrelationships between constructs.

As statistical techniques, Podsakoff and Organ (1986) recommended Harman's one-factor test to check for the presence of common method variance. Harman's one-factor test assumes that common method variance is a critical concern if a single factor accounts for the majority of the covariance in all the variables entered, or if multiple factors emerge but one factor will account for the majority of the covariance in all the variables entered (Podsakoff & Organ, 1986). Therefore, we conducted Harman's one-factor test on all items in the proposed model. First, all the variables of interest are entered into a factor analysis. The unrotated factor solution provides the number of factors that are necessary to account for the variance in all the variables entered. Table 5 shows the result of Harman's one-factor test. Among those factors, one general factor (Podsakoff & Organ, 1986) accounted for 28.38% of the variance of all the variables entered, which is less than the majority of the variance. This suggests that common method variance does not appear to be present in the data.

IV.7. Controlling for size

Pleffer's (1973) investigation of 57 hospitals found a contingent relationship between size and composition of boards and organizational performance. Depending on the organizational external dependence and the context of the task environment, the board size and composition could be predicted by statistical means. Tsai (2001) noted that size can affect a unit's innovation and performance and obtained a composite measure of size by using the average between the natural logarithm of two indicators for each unit: unit's sales and unit's number of employees. Jansen et al. (2005) controlled for size and observed that larger units may have more resources but lack the flexibility to acquire and assimilate new external knowledge. They measured size by the natural logarithm of the number of full-time employees within units. Therefore, considering the constructs

investigated in our research, it is relevant to control for the responding companies' sizes, measured by the natural logarithm of the number of full-time employees and information available online on the company's profiles.

Table 5-Harman's one factor test, total variance explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.36	31.11	31.11	3.89	27.80	27.80
2	1.59	11.35	42.46	0.97	6.95	34.75
3	1.25	8.96	51.42	0.60	4.27	39.01
4	1.05	7.48	58.90	0.55	3.90	42.91
5	0.99	7.04	65.94			
6	0.83	5.95	71.88			
7	0.75	5.35	77.24			
8	0.66	4.68	81.92			
9	0.62	4.44	86.36			
10	0.55	3.89	90.26			
11	0.48	3.46	93.72			
12	0.33	2.39	96.11			
13	0.29	2.09	98.20			
14	0.25	1.80	100.00			

Extraction Method: Principal Axis Factoring.

IV.8. Controlling for age

Autio et al. (2000) aimed to shed light on the effect of time lag on the speed of firm's subsequent international growth. They defined time lag as the difference between the year of first international sale and the year of founding. They developed a knowledge- and learning-based framework to examine the effects of the age of a firm during first international sales, its knowledge intensity, and the imitability of its core technology. Their sample of 59 Finish firms included entrepreneurial, privately-held electronics firms. Autio et al. (2000) justified their focus on this industry as knowledge creation and application have been seen as especially salient in higher-tech sectors. Moreover, limiting the study to a single industry in a single country helped to ensure that variations in age at

entry were more likely associated with strategic choice than with variations in market favorability or industry innovation phase, consistent with Oesterle, 1997.

Autio et al. (2000) targeted respondents including a firm's president, chairman, and vice president and found that, as firms get older, they develop learning impediments that hamper their ability to successfully grow in new environments; the relative flexibility of newer firms allows them to rapidly learn the competencies necessary to sustain international growth. Moreover, Jansen et al. (2005) controlled for a unit's age, measured by the number of years from its founding, and justified the control as age may influence knowledge acquisition and exploitation, consistent with Autio et al. (2000). Therefore, considering the constructs investigated in our research, it is relevant to control for the age of the responding companies, calculated by the number of years from the company's founding and information available online on the company's profiles.

IV.9. Questionnaire development

For building the survey questionnaire, the original question items were modified with respect to the unit of analysis—the targeted company business units. Moreover, the instruments were designed with respect to consistent respondents, specifically the company's CEO, COO or head of business unit. Finally, with consideration of the measurements scale, all questions in the instruments were designed to be answered on a 7-point Likert scale. The answers range from 1=strongly disagree to 7=strongly agree, with 4=neither agree nor disagree. The use of the 7-point scale instead of a 5-point scale allows us to better capture the middle values between the extremes, which is consistent with the extant literature (Dewar et al., 1980; Jones, 1986; Gupta & Govindarajan, 2000; Jansen et al., 2005; Patel et al., 2012; Ganbold & Matsui, 2017). The modified questionnaire items were translated to Japanese. The obtained translation items were back-translated into English to identify any discrepancies in meaning, as suggested by Mullen (1995). Content validity, or the appropriateness of the question items, are assessed

by academics. The list of the items and their respective sources is provided in Table 6, Table 7, Table 8, Table 9.. The related questionnaire is provided on APPENDIX 2..

Table 6_Environmental uncertainty, measurement items and their sources

Supply uncertainty (SU) items from Ganbold and Matsui (2017)	
SU1	_Our suppliers consistently meet our requirements*
SU2	_Our suppliers provide us with inputs of consistent quality*
SU3	_The price of our raw materials and component part has changed frequently (M)
	_The price of our key inputs has changed frequently (S)
SU4	_We do extensive inspection of incoming critical materials from our suppliers (M)
	_We do extensive inspection of incoming key inputs from our suppliers (S)
SU5	_We have a lower rejection rate for incoming critical materials from our suppliers*(M)
	_We have a lower rejection rate for incoming key inputs from our suppliers* (S)
Demand uncertainty (DU) items from Ganbold and Matsui (2017)	
DU1	_Our master production schedule has a higher percentage of variation in demand (M)
	_Our operation schedule has a higher percentage of variation in demand (S)
DU2	_It has been difficult for us to procure raw materials for our major product (M)
	_It has been difficult for us to procure key inputs for our major product (S)
DU3	_Our demand fluctuates drastically from week to week
DU4	_Customer requirements for our products vary dramatically
DU5	_Our supply requirements vary drastically from week to week
DU6	_The volume of our customers` demand is difficult to predict
Technology uncertainty (TU) items from Ganbold and Matsui (2017)	
TU1	_Our industry is characterized by rapidly changing technology
TU2	_If we don’t keep up with changes in technology, it will be difficult for us to remain competitive
TU3	_Our production technology changes frequently
TU4	_The rate of technology obsolescence in our industry is higher
Cross-functional interfaces (CFI) items from Gupta and Govindarajan (2000)	
CFI1	_ Our units use liaison personnel to coordinate activities
CFI2	_ Our units use temporary task forces to coordinate activities
CFI3	_ Our units use permanent teams to coordinate activities
Job rotation (JR) items from Jansen et al. (2005)	
JR1	_ Employees in our units are regularly rotated between different functions
JR2	_ Employees are regularly rotated between different subunits

Table 7_ Environmental uncertainty, measurement items and their sources(continued)

IDC1	_In this business unit, it is easy to talk with virtually anyone you need to, regardless of rank or position
IDC2	_There is ample opportunity for informal "hall talk" among individuals from different departments in our units

T_Environmental uncertainty, measurement items and their sources (continued)

IDC3	_In our units, employees from different departments feel comfortable calling each other when the need arises
IDC4	Managers here discourage employees from discussing work-related matters with those who are not their immediate superiors or subordinates*
IDC5	_People around here are quite accessible to those in other departments
IDC6	_Communications from one department to another are expected to be routed through "proper channels" *
IDC7	_Junior managers in our department can easily schedule meetings with junior managers in other departments
Job codification (JC) items from Dewar et al. (1980)	
JC1	_ Managers in our units feel they are their own bosses in most matters *
JC2	_A person can make his own decisions without checking with anybody else *
JC3	_How things are done here is left up to persons doing the work *
JC4	_People here are allowed to do almost as they please *
JC5	_Most people here make their own rules on the job *
Rules observation (RO) items from Dewar et al. (1980)	
RO1	_The employees here are constantly being checked for rule violations
RO2	_ People here feel they are constantly being watched to see that they obey all the rules
Hierarchy of authority (HOA) items from Dewar et al. (1980)	
HOA1	_There can be little action taken by workers in our units until their supervisors approve a decision *
HOA2	_A person who wants to make his own decisions would be quickly discouraged*
HOA3	_Even smaller matters have to be referred to someone higher up for a final answer*
HOA4	_ Managers in our units have to ask the head quarter before they do almost anything*
HOA5	_ Managers in our units have to ask the head quarter before they do almost anything*
HOA6	_Any decision unit managers make has to have the head quarter's approval*

Table 8_ Environmental uncertainty, measurement items and their sources(continued)

Sequential socialization tactics (SST) items from Jones (1986)	
SST1	_ There is a clear pattern in the way one role leads to another or one job assignment leads to another-in this organization
SST2	_ Each stage of the training process has, and will, expand and build upon the job knowledge gained during the preceding stages of the process
SST3	_ The movement from role to role and function to function to build up experience and track record is very apparent in this organization
SST4	_ This organization does not put newcomers through an identifiable sequence of learning experiences*
SST5	_ The steps in the career ladder are clearly specified in this organization
ACQ1	_Our units have frequent interactions with corporate headquarters to acquire new knowledge
ACQ2	_ Our units collect industry information through informal means (e.g. lunch with customers and suppliers, trade partners and other stakeholders)
ACQ3	_ Our units organize special meetings with customers, suppliers, or third parties to acquire new knowledge on process, product, logistics and distribution related innovation.
ACQ4	_ Employees in our units regularly approach third parties such as purchasing managers, supply chain institutes, and suppliers to gather information
ACQ5	_Marketing personnel in our units spend time discussing customers' future needs with other functional departments
Assimilation of knowledge (ASM) items from Jansen et al. (2005), Jaworski & Kohli, (1993)	
ASM1	_ Our units are slow to recognize shifts in the market (e.g. competition, regulation, demography) *
ASM2	_ New opportunities to serve our clients are quickly understood
ASM3	_ Our units analyze and interpret changing market demands
ASM4	_ In our units, when one department finds out something important about competitors, it is slow to alert other departments*
Transformation of knowledge (TRS) items from Jansen et al. (2005), Jaworski & Kohli, (1993)	
TRS1	_ Our units regularly consider the consequences of changing market demands in terms of new products and services
TRS2	_ Our units quickly recognize the usefulness of new external knowledge to existing knowledge
TRS3	_ Employees in our units hardly share practical experiences with each other *
TRS4	_ Our units laboriously grasp the opportunities from new external knowledge *
TRS5	_ Our units periodically meet to discuss consequences of market trends and new product development

Table 9_Environmental uncertainty, measurement items and their sources(continued)

Exploitation of knowledge (EXP) items from Jansen et al. (2005), Jaworski & Kohli, (1993)	
EXP1	_ Our units are rarely responsive to customer complaints *
EXP2	_ Our units constantly consider how to better use operational knowledge
EXP3	_ Employees in our units have a common language regarding our products and services
EXP4	_The product line we sell depend more on internal politics than real market *
EXP5	_Our business plans are driven more by technological advances than by market research *
EXP6	_ Employees in our units record and store newly acquired knowledge for future reference

(M) for manufacturing business units
(S) for services business units
* reverse

IV.10. Measurement validation

IV.10.1. Scales unidimensionality and reliability

The measurement instruments were examined in terms of reliability and unidimensionality. This include the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy score. It was calculated for all factor analyses to ensure that the sample size is adequate for factor analysis, and a generally accepted threshold value of 0.5 is adopted for KMO. Then, Cronbach' alpha was used to assess scale reliability. The generally accepted threshold value of 0.60, consistent with Flynn et al., (1990) is adopted for Cronbach's alpha. Items from supply uncertainty (0.521), cross-functional interfaces (0.529), rules observation (0.579), and knowledge exploitation (0.538), marginally reached the threshold value of Cronbach's alpha. Finally, the unidimensionality of the remining items was examined using factor analysis. The value of 0.5 is used as the factor loadings threshold value, which is consistent with Hair et al. (2009). Items with loading lower than 0.5 were discarded as supported by Hair et al. (2009), suggesting that loading in the range of 0.3 to 0.4 is considered to meet the minimum level for interpretation while loading of 0.5 or greater is considered practically significant. After repeated factor

analysis, as the respective items load only on one factor each, and as the loadings range is between 0.510 and 0.899, the factor analysis confirmed the items' unidimensionality for 14 factors. Table 10 and Table 11 show the factor loadings and Cronbach's alpha for the remaining constructs.

Table 10_Factor loadings and reliability values of the measurement items

	Factor loadings	Cronbach's alpha	KMO measure of sampling adequacy	Sig.
revSU1	0.752	0.521	0.612	0.000
revSU2	0.716			
revSU5	0.686			
DU3	0.880	0.699	0.554	0.000
DU4	0.516			
DU5	0.873			
TU1	0.878	0.713	0.604	0.000
TU2	0.751			
TU3	0.760			
CFI1	0.557	0.529	0.568	0.000
CFI2	0.778			
CFI3	0.804			
JR1	0.899	0.760	0.500	0.000
JR2	0.899			
IDC1	0.780	0.782	0.801	0.000
IDC2	0.634			
IDC3	0.704			
revIDC4	0.634			
IDC5	0.743			
IDC7	0.674			
revJC1	0.527	0.636	0.684	0.000
revJC2	0.769			
revJC3	0.689			
revJC4	0.778			
RO1	0.839	0.579	0.500	0.000
RO2	0.839			

Table 11_ Factor loadings and reliability values of the measurement items (continued)

	Factor loadings	Cronbach's alpha	KMO measure of sampling adequacy	Sig.
revHOA1	0.629	0.693	0.734	0.000
revHOA2	0.518			
revHOA3	0.659			
revHOA4	0.785			
revHOA5	0.741			
SST1	0.617	0.694	0.692	0.000
SST2	0.685			
SST3	0.798			
SST5	0.783			
ACQ1	0.739	0.668	0.765	0.000
ACQ2	0.701			
ACQ3	0.688			
ACQ4	0.538			
ACQ5	0.612			
revASM1	0.855	0.823	0.808	0.000
ASM2	0.797			
ASM3	0.777			
revASM4	0.821			
TRS1	0.659	0.676	0.737	0.000
TRS3	0.720			
revTRS4	0.767			
revTRS5	0.510			
TRS6	0.682			
revEXP1	0.586	0.538	0.552	0.000
EXP2	0.797			
TRS2	0.644			
revEXP4	0.562			

IV.10.2. Convergent validity

The measurement instruments were examined in terms of convergent validity by checking the significance of item loadings, and by analyzing the composite reliability (CR) and the average variance extracted (AVE) for each construct. The significance of item loadings is supported, as the loadings of the items measuring each construct are significant and higher than 0.5, following Roussel et al. (2002).

Composite reliability is computed following Joreskog and Wold (1982) as shown in Equation (3). Average variance extracted is computed following Fornell and Larker

(1981) as shown in Equation (4). Table 8 shows the result for the constructs CR and AVE values. As CRs are greater than 0.6 and AVEs are greater than 0.5, the threshold values suggested by Fornell and Larker (1981), this indicates the items' convergent validity.

$$\mathrm{CR} = \frac{(\sum \lambda_i)^2 varF}{(\sum \lambda_i)^2 varF + \sum \varepsilon_i} \quad (3)$$

$$\mathrm{AVE} = \frac{\sum {\lambda_i}^2 varF}{\sum {\lambda_i}^2 varF + \sum \varepsilon_i} \quad (4)$$

λ = factor loadings

F = construct

Ɛ= error variance, obtained as $\varepsilon = 1 - \lambda^2$

Table 12_Constructs values for average variance extracted, composite reliability

	mean	var *F*	AVE	CR	(AVE)^1/2
SU	2.895	1.336	0.588	0.810	0.767
DU	3.210	2.343	0.804	0.921	0.897
TU	4.599	2.306	0.802	0.924	0.896
CFI	4.254	2.592	0.738	0.892	0.859
JR	3.524	2.467	0.912	0.954	0.955
IDC	5.595	1.522	0.590	0.896	0.768
JC	4.664	1.945	0.649	0.879	0.806
RO	4.246	1.963	0.824	0.903	0.907
HOA	4.885	2.032	0.627	0.892	0.792
SST	4.087	1.865	0.673	0.891	0.821
ACQ	4.755	1.833	0.585	0.875	0.765
ASM	4.809	1.841	0.782	0.935	0.884
TRS	4.793	1.687	0.583	0.873	0.764
EXP	5.673	1.269	0.460	0.768	0.678

IV.10.3. Discriminant validity

The measurement instruments were examined in terms of discriminant validity. Following Fornell and Larker (1981), the square root of AVE for a construct should be higher than the correlations between this construct and the other constructs. Table 12 shows the correlation between constructs and the square root of AVE for each construct, in bold on the diagonals. Each construct shows a higher square root of AVE compared to the correlations with other constructs, thus indicating the item's discriminant validity.

Table 13_Constructs correlation, square root of AVE

	SU	DU	TU	CFI	JR	IDC	JC	RO	HOA	SST	ACQ	ASM	TRS	EXP
SU	**0.767**													
DU	-.018	**0.897**												
TU	.011	.278**	**0.896**											
CFI	-.155*	.278**	.245**	**0.859**										
JR	-.130	.231**	.145	.304**	**0.955**									
IDC	-.130	-.065	.258**	.281**	.346**	**0.768**								
JC	-.053	-.129	-.076	-.019	-.030	-.124	**0.806**							
RO	-.246**	.105	.198*	.149	.184*	.112	.005	**0.907**						
HOA	-.027	-.190*	-.001	-.146	.003	.277**	-.076	-.083	**0.792**					
SST	-.186*	.049	.275**	.348**	.496**	.375**	-.018	.211**	.060	**0.821**				
ACQ	-.241**	.063	.485**	.306**	.277**	.481**	-.058	.232**	.064	.444**	**0.765**			
ASM	-.125	-.002	.350**	.285**	.275**	.533**	-.015	.186*	.228**	.437**	.608**	**0.884**		
TRS	-.176*	.024	.369**	.238**	.297**	.518**	.095	.343**	.141	.414**	.572**	.663**	**0.764**	
EXP	-.347**	.089	.272**	.201*	.152*	.490**	.047	.216**	.064	.435**	.424**	.470**	.507**	**0.678**

*. Correlation is significant at the 0.05 level (one-tailed).

**. Correlation is significant at the 0.01 level (one-tailed).

IV.10.4. Construct score assignment

We assign the construct score after checking each measurement item in terms of reliability, unidimensionality, convergent validity, and discriminant validity. For each construct, the average score is computed for the valid and reliable items and assigned as a score for the construct measured by those items.

V. Analytical results

VI.1. Samples specifications for the analyses of congruences

This section provides information on how the initial sample was used for building separate samples in each step of the analysis. The samples were used for the analysis of congruence between organizational mechanisms and environmental uncertainty, and for the analysis of the impact of absorptive capacity on the congruence.

VI.1.1. Specifying samples for higher- and lower- uncertainty environments

The congruence between environmental uncertainty and organizational mechanisms is hypothesized considering a single contextual variable at a time. Different samples corresponding to different sources and levels of uncertainty are built. Therefore, the initial sample is rearranged in descending order, considering each uncertainty variable at a time: supply uncertainty, demand uncertainty, and technology uncertainty. Then, we ordered three samples in terms of decreasing uncertainty: a supply uncertainty sample, a demand uncertainty sample, and a technology uncertainty sample. Under the assumption that there are two levels of environmental uncertainty, we use the mediums as cut-off points to specify the higher uncertainty and the lower uncertainty samples for supply, demand, and technology uncertainties. Then, from the three ordered samples, we obtain the upper halves corresponding to higher supply uncertainty sample, higher demand uncertainty sample, and higher technology uncertainty sample. The lower halves correspond to lower supply uncertainty sample, lower demand uncertainty sample, and lower technology uncertainty sample. In each of the six samples, a calibration sample and study sample are built. Table 14 provide the descriptions of those six initial samples.

Table 14_Descriptive of the six initial samples

	Sample Size	Minimum	Maximum	Mean	Std. Deviation
higher supply uncertainty	63	3.00	5.00	3.53	0.56
lower supply uncertainty	59	1.33	2.67	2.21	0.42
higher demand uncertainty	65	3.00	6.75	3.91	0.92
lower demand uncertainty	57	1.00	2.75	2.10	0.49
higher technology uncertainty	57	4.67	7.00	5.45	0.70
lower technology uncertainty	65	1.00	4.50	3.63	0.76

VI.1.2. Specifying the calibration sample and the study sample in each environment

Concepts and findings from existing literature are borrowed to operationalize the measure of congruence adequately according to the concept, as suggested by Venkatraman (1989). As mentioned in section II.1.4, the method proposed by Venkatraman and Prescott (1990) lies under the assumption that if an ideal profile is specified for an environment, a business unit deviation from the ideal profile implies a weakness in context-response congruence, resulting in a negative effect on performance. In other words, the greater the deviation, the lower the performance.

The alternative procedure to Venkatraman and Prescott's (1990) profile deviation analysis is used as proposed by Vorhies and Morgan (2003). More details on the analytical scheme is provided in section II.1.4. However, to understand the necessity of building

different samples, let us recall the analytical scheme corresponding to the profile deviation.

In the specification of the calibration sample, each context of supply uncertainty, demand uncertainty, and technology uncertainty are considered separately. In order to do so, each sample is rearranged in descending order of uncertainty. Under the assumption that there are two levels of environmental uncertainty, we use each environmental uncertainty medium as a cut-off point to specify the higher environmental uncertainty groups from the lower ones. For each of the specified lower and higher environmental uncertainty groups, the samples are reordered in terms of return on sales to identify the higher-performer groups. The cut-off points to separate the higher and lower performers are determined by referring to existing research.

Venkatraman and Prescott (1990) suggest the top ten to 15 percent as the higher-performer group. However, this is only suitable if the organizational mechanisms improving return on sales are already known, which is not the case at this stage of the analysis. A second alternative from Vorhies and Morgan (2003) suggests picking among the top-third higher-performers, consistent with Olson et al. (1995). In our case, this portion of the total sample, more precisely 33%, would allow us to determine the significant organizational mechanisms that impact return on sales in each of the higher and lower environmental uncertainty groups. Therefore, a number below 33% of the higher and lower environmental uncertainty samples is used as initial criteria to select the calibration sample from the higher-performer groups. Moreover, there are groups with the same level of performances where one is below the 33% limit, and the other is above it. Because groups with equal performance levels should be ranked equally, we could not consistently retain the 33% limit for each specified environmental uncertainty. This called for additional criteria to separate higher and lower performers. Vorhies and Morgan

(2003) suggest using a simple scatter plot diagram for the performance distribution. They graphically identify the drop-off point to isolate the higher-performer group from the lower-performer group. The higher-performer group will constitute the calibration sample, while the lower-performer group will constitute the study sample. Therefore, performance drop-off points are used as additional criteria to specify the higher-performer groups from the lower-performer ones.

To recapitulate, the use of the profile deviation requires developing separate calibration samples and study samples. Therefore, we start from the six samples obtained previously: higher and lower supply uncertainty samples, higher and lower demand uncertainty samples, and higher and lower technology uncertainty samples. To build the calibration samples and the resulting study samples in the lower uncertainty environments, we arrange the three lower uncertainty samples one by one. First, we reordered the lower supply uncertainty sample in descending order considering return on sales. The top performers are selected among the top third of the initial lower supply uncertainty sample described in Table 14. This choice could be justified as the 10% highest performers as suggested by Venkatraman and Prescott (1990) but is not feasible in our case, considering our relatively small sample size. The remaining lower performers in the lower supply uncertainty sample will be used as the study sample in the corresponding lower supply uncertainty environment. Similar steps are applied for lower demand uncertainty and lower technology uncertainty environments.

Regarding the building of the calibration samples and the resulting study samples in higher uncertainty environment, we arrange the three higher uncertainty samples one by one. First, we reordered the higher supply uncertainty sample in descending order considering return on sales. The top performers are selected with respect to the top third of the initial higher supply-uncertainty sample described in Table 14. The remaining

lower performers in the higher supply-uncertainty sample will be used as the study sample in the corresponding higher supply-uncertainty environment. Similar steps are applied in the higher demand-uncertainty and higher technology uncertainty environments.

Finally, six calibration samples and six study samples are obtained—one calibration sample and one study sample for each of the three sources of environmental uncertainty. Table 15 provides the size for the study sample and the calibration sample from each of the six initial samples described previously in Table 14.

Table 15_ Descriptive of the calibration samples and study samples

		Sample size	Min.	Max.	Mean	Std. Deviation
higher SU	calibration sample	19	3.00	5.00	3.53	0.56
	study sample	44	3.00	5.00	3.53	0.56
lower SU	calibration sample	15	1.50	2.67	2.15	0.42
	study sample	44	1.33	2.67	2.23	0.42
higher DU	calibration sample	17	3.00	5.00	4.10	0.65
	study sample	48	3.00	6.75	3.85	0.99
lower DU	calibration sample	15	1.33	2.75	2.15	0.40
	study sample	42	1.00	2.75	2.08	0.52
higher TU	calibration sample	16	4.67	7.00	5.52	0.73
	study sample	41	4.67	7.00	5.41	0.69
lower TU	calibration sample	17	2.75	4.50	3.86	0.58
	study sample	48	1.00	4.50	3.55	0.79

VI.2. Analytical test of the congruence in lower uncertainty environment

VI.2.1. Testing the congruence between organizational mechanisms and lower supply uncertainty

Table 16 recaps the analysis within the calibration sample in lower supply uncertainty. In the lower supply uncertainty calibration sample, ROS is regressed on job codification, rules observation, hierarchy of authority, and sequential socialization tactics. Size and age are used as control variables. In the reductionistic model, ROS is regressed on each organizational mechanism, one by one. In the holistic model, ROS is regressed on the set of organizational mechanisms, all simultaneously, with age and size as control variables.

Table 16_ Regression result recapitulation, in lower supply uncertainty environment

Reductionistic model					Holistic model				
df		Coeff.	t. value	Sig.	df		Coeff.	t. value	Sig.
13	R Square				8	R Square			
Constant					Constant	0.772	-20.323	-0.356	0.731
Age					Age		-0.481	-2.464	0.039
Size					Size		1.556	0.439	0.672
JC	0.001	-0.498	-0.084	0.934	JC		4.033	0.915	0.387
RO	0.466	15.349	3.370	0.005	RO		4.973	0.709	0.499
HOA	0.017	-2.152	-0.467	0.648	HOA		-3.618	-0.828	0.432
SST	0.164	9.884	1.595	0.135	SST		9.888**	1.916	0.092

Dependent Variable: Return On Sales (ROS)
*** significant at the 0.05 level (one-tailed)*

Following Venkatraman and Prescott (1990), the significant organizational mechanism is used to compute MISALIGN, with the non-standardized coefficient of this particular organizational mechanism as the weight of the MISALIGN distance. The means of this particular organizational mechanism in the lower supply-uncertainty calibration sample is used as a reference. For each business unit in the lower supply-uncertainty study sample, the difference between this reference and the score of the particular business unit in the lower supply-uncertainty study sample is computed. MISALIGN is computed following Equation (1) for all the business units in the lower supply-uncertainty study sample.

The correlation between the MISALIGN score in the lower supply-uncertainty study sample and the ROS score in the lower supply-uncertainty study sample is shown in the following Table 17. Such correlation should be negative and significant to find evidence of congruence.

Table 17_ Correlation result in lower supply uncertainty environment

	Mean	Std. Deviation	N
Return On Sales	4.417	3.044	44
MISALIGN	102.497	147.547	44
Correlation	-0.017	Sig. (one-tailed)	0.456

VI.2.2. Testing the congruence between organizational mechanisms and lower demand uncertainty

Table 18 recaps the analysis within the calibration sample in lower demand uncertainty. In the lower DU calibration sample, ROS is regressed on job codification, rules observation, hierarchy of authority, and sequential socialization tactics. Size and age are used as control variables. In the reductionistic model, ROS is regressed on each organizational mechanism one by one. In the holistic model, ROS is regressed on the set of organizational mechanisms, all simultaneously, with age and size as control variables.

Table 18_ Regression result recapitulation, in lower demand uncertainty environment

Reductionistic model					Holistic model				
df					df				
13	R Square	Coeff.	t. value	Sig.	8	R Square	Coeff.	t. value	Sig.
Constant					Constant	0.256	-42.082	-0.583	0.576
Age					Age		-0.045	-0.121	0.907
Size					Size		6.473	1.055	0.322
JC	0.054	4.181	0.865	0.403	JC		3.451	0.486	0.640
RO	0.019	1.666	0.501	0.624	RO		-2.424	-0.322	0.756
HOA	0.037	3.720	0.703	0.494	HOA		6.547	0.586	0.574
SST	0.002	-1.024	-0.177	0.862	SST		-3.993	-0.461	0.657

Dependent Variable: Return On Sales (ROS)
**** significant at the 0.01 level (one-tailed)*

Following Venkatraman and Prescott (1990), only the significant organizational mechanism should be considered to compute MISALIGN. As shown in Table 23, none of the organizational mechanisms show significant impact on ROS in the lower demand-

uncertainty calibration sample. Therefore, we could not compute MISALIGN in the lower demand-uncertainty study sample.

VI.2.3. Testing the congruence between organizational mechanisms and lower technology uncertainty

Table 19 recaps the analysis within the calibration sample in lower demand uncertainty. In the lower technology-uncertainty calibration sample, ROS is regressed on job codification, rules observation, hierarchy of authority, and sequential socialization tactics. Size and age are used as control variables. In the reductionistic model, ROS is regressed on each organizational mechanisms one by one. In the holistic model, ROS is regressed on the set of organizational mechanisms, all simultaneously, with age and size as control variables.

Following Venkatraman and Prescott (1990), the significant organizational mechanism is used to compute MISALIGN, with the non-standardized coefficient of this particular organizational mechanism as the weight of the MISALIGN distance. The means of this particular organizational mechanism in the lower technology-uncertainty calibration sample is used as a reference. For each business unit in the lower technology-uncertainty study sample, the difference between this reference and the score of the particular business unit in the lower technology-uncertainty study sample is computed. MISALIGN is computed following Equation (1) for all the business units in the lower technology-uncertainty study sample. The correlation between the MISALIGN score in the lower technology-uncertainty study sample and the ROS score in the lower technology-uncertainty study sample is shown in Table 20. Such correlation should be negative and significant to find evidence of congruence.

Table 19_ Regression result recapitulation, in lower technology uncertainty environment

Reductionistic model					Holistic model				
df					df				
15	R Square	Coeff.	t. value	Sig.	13	R Square	Coeff.	t. value	Sig.
Constant					Constant	0.614	5.019	0.114	0.911
Age					Age		-0.486	-3.688	0.004
Size					Size		3.177	1.382	0.197
JC	0.006	1.424	0.291	0.775	JC		2.084	0.534	0.605
RO	0.036	3.726	0.745	0.468	RO		1.092	0.245	0.812
HOA	0.000	-0.327	-0.086	0.932	HOA		-4.490	-1.074	0.308
SST	0.041	5.667	0.803	0.435	SST		8.063"	1.252	0.239

Dependent Variable: Return On Sales (ROS)
" marginally significant at the 0.12 level (one-tailed)

Table 20_ Correlation result in lower technology uncertainty environment

	Mean	Std. Deviation	N
Return On Sales	10.547	13.575	48
MISALIGN	4.001	3.297	48
Correlation	-.383***	Sig. (1-tailed)	0.004

***. Correlation is significant at the 0.01 level (1-tailed).

VI.3. Analytical test of the congruence in higher uncertainty environment

As introduced earlier, the profile deviation approach is used to test for the congruence between environmental uncertainty and organizational mechanisms. To show evidence of congruence between a given environmental uncertainty and a set of organizational mechanisms, the correlations of the MISALIGN and the financial performance measure, i.e., return on sales, should be negative and significant.

VI.3.1. Testing the congruence between organizational mechanisms and higher supply uncertainty

Table 21 recaps the analysis within the calibration sample in higher supply uncertainty. In the higher supply-uncertainty calibration sample, ROS is regressed on cross-functional interface, job rotation, and interdepartmental connectedness. Size and age are used as control variables. In the reductionistic model, ROS is regressed on each organizational

mechanism one by one. In the holistic model, ROS is regressed on the set of organizational mechanisms, all simultaneously, with age and size as control variables.

Table 21_ Regression result recapitulation, in higher supply uncertainty environment

Reductionistic model					Holistic model				
df					df				
17	R Square	Coeff.	t. value	Sig.	13	R Square	Coeff.	t. value	Sig.
Constant					Constant	0.260	9.090	0.155	0.879
Age					Age		-0.495	-1.764	0.101
Size					Size		2.749	0.557	0.587
CFI	0.037	4.119	0.805	0.432	CFI		1.211	0.218	0.831
JR	0.057	4.830	1.013	0.325	JR		7.102"	1.248	0.234
IDC	0.001	0.755	0.105	0.918	IDC		-1.250	-0.159	0.876

Dependent Variable: Return On Sales (ROS)
" marginally significant at the 0.12 level (one-tailed)

Following Venkatraman and Prescott (1990), the significant organizational mechanism is used to compute MISALIGN, with the non-standardized coefficient of this particular organizational mechanism as the weight of the MISALIGN distance. The means of this particular organizational mechanism in the higher supply-uncertainty calibration sample is used as a reference. For each business unit in the higher supply-uncertainty study sample, the difference between this reference and the score of the particular business unit in the higher supply-uncertainty study sample is computed. MISALIGN is computed following Equation (1) for all the business units in the higher supply-uncertainty study sample. The correlation between the MISALIGN score in the higher supply-uncertainty study sample and the ROS score in the higher supply-uncertainty study sample is shown in Table 22. Such correlation should be negative and significant to find evidence of congruence.

Table 22_ Correlation result in higher supply uncertainty environment

	Mean	Std. Deviation	N
Return On Sales	4.469	3.843	44
MISALIGN	78.095	84.748	44
Correlation	-0.044	Sig. (1-tailed)	0.390

VI.3.2. Testing the congruence between organizational mechanisms and higher demand uncertainty

Table 23 recaps the analysis within the calibration sample in higher demand uncertainty. In the higher demand-uncertainty calibration sample, ROS is regressed on cross-functional interface, job rotation, and interdepartmental connectedness. Size and age are used as control variables. In the reductionistic model, ROS is regressed on each organizational mechanism, one by one. In the holistic model, ROS is regressed on the set of organizational mechanisms, all simultaneously, with age and size as control variables.

Table 23_ Regression result recapitulation, in higher demand uncertainty environment

Reductionistic model					Holistic model				
df					df				
15	R Square	Coeff.	t. value	Sig.	11	R Square	Coeff.	t. value	Sig.
Constant					Constant	0.504	2.773	0.067	0.947
Age					Age		-0.375	-2.201	0.050
Size					Size		-1.402	-0.345	0.736
CFI	0.214	9.278	2.021	0.061	CFI		7.772*	1.589	0.140
JR	0.141	6.881	1.571	0.137	JR		6.166	1.156	0.272
IDC	0.089	8.556	1.211	0.245	IDC		-0.389	-0.047	0.963

Dependent Variable: Return On Sales (ROS)

** significant at the 0.10 level (1-tailed)*

Following Venkatraman and Prescott (1990), the significant organizational mechanism is used to compute MISALIGN, with the non-standardized coefficient of this particular organizational mechanism as the weight of the MISALIGN distance. The means of this particular organizational mechanism in the higher demand-uncertainty calibration sample is used as a reference. For each business unit in the higher demand-uncertainty study sample, the difference between this reference and the score of the

particular business unit in the higher demand-uncertainty study sample is computed. MISALIGN is computed following Equation (1) for all the business units in the higher demand-uncertainty study sample. The correlation between the MISALIGN score in the higher demand-uncertainty study sample and the ROS score in the higher demand-uncertainty study sample is shown in the following Table 24. Such correlation should be negative and significant to find evidence of congruence.

Table 24_ Correlation result in higher demand uncertainty environment

	Mean	Std. Deviation	N
Return On Sales	4.533	3.592	48
MISALIGN	178.101	167.067	48
Correlation	-0.199*	Sig. (1-tailed)	0.088

* Correlation is significant at the 0.10 level (1-tailed)

VI.3.3. Testing the congruence between organizational mechanisms and higher technology uncertainty

Table 25 recaps the analysis within the calibration sample in higher technology uncertainty. In the higher technology-uncertainty calibration sample, ROS is regressed on cross-functional interface, job rotation, and interdepartmental connectedness. Size and age are used as control variables. In the reductionistic model, ROS is regressed on each organizational mechanism one by one. In the holistic model, ROS is regressed on the set of organizational mechanisms, all simultaneously, with age and size as control variables.

Table 25_ Regression result recapitulation, in higher technology uncertainty environment

Reductionistic model					Holistic model				
df					df				
14	R Square	Coeff.	t. value	Sig.	10	R Square	Coeff.	t. value	Sig.
Constant					Constant	0.531	93.215	1.481	0.169
Age					Age		-0.348	-1.677	0.124
Size					Size		-2.195	-0.408	0.692
CFI	0.124	7.135	1.409	0.181	CFI		10.743*	1.693	0.121
JR	0.145	6.576	1.543	0.145	JR		7.771*	1.766	0.108
IDC	0.011	-4.140	-0.394	0.700	IDC		-17.593	-1.652	0.130

Dependent Variable: Return On Sales (ROS)

** significant at the 0.10 level (one-tailed)*

Following Venkatraman and Prescott (1990), the significant organizational mechanism is used to compute MISALIGN, with the non-standardized coefficient of this particular organizational mechanisms as the weight of the MISALIGN distance. The means of this particular organizational mechanism in the higher technology-uncertainty calibration sample is used as a reference. For each business unit in the higher technology-uncertainty study sample, the difference between this reference and the score of the particular business unit in the higher technology-uncertainty study sample is computed. MISALIGN is computed following Equation (1) for all the business units in the higher technology-uncertainty study sample. The correlation between the MISALIGN score in the higher technology-uncertainty study sample and the ROS score in the higher technology-uncertainty study sample is shown in Table 26. Such correlation should be negative and significant to find evidence of congruence.

Table 26_ Correlation result in higher technology uncertainty environment

	Mean	Std. Deviation	N
Return On Sales	5.191	3.801	41
MISALIGN	357.974	305.903	41
Correlation	-0.025	Sig. (1-tailed)	0.439

VI.4. Sample specifications for the analyses of the impact of absorptive capacity on congruence

In order to analyze the impact of absorptive capacity on the congruence achieved in each environment, the MISALIGN scores for each environment are considered. Therefore, the six study samples used previously for the measure of congruence will be used for the measure of the impact of absorptive capacity on congruence. For example, to analyze the impact of absorptive capacity on congruence in a higher supply uncertainty environment, the study sample for higher supply uncertainty will be used.

VI.4.1. Analytical test of the impact of realized absorptive capacity on congruence in lower uncertainty environment

To test for the direct impact of realized absorptive capacity on the congruence between organizational mechanisms and lower environmental uncertainty, hierarchical regression analysis is used. The MISALIGN score is regressed on the two dimensions of realized absorptive capacity, with size and age as control variables.

Previously, in the analytical test of congruence, MISALIGN score was used to find the congruent organizational mechanisms. To find evidence of congruence, the correlation between MISALIGN and the measure of financial performance, i.e., return on sales, should be negative and significant. The same MISALIGN score in each environment is used to analyze the impact of realized absorptive capacity on congruence in this environment.

Regarding lower supply uncertainty, lower demand uncertainty, and lower technology uncertainty, their corresponding MISALIGN scores are introduced as a dependent variable. In the first step of the regression, the control variables size and age are introduced as independent variables. In the second step, knowledge transformation and knowledge exploitation are introduced as independent variables. The regression coefficient of MISALIGN scores on knowledge transformation and knowledge exploitation should be negative and significant to find evidence of a positive impact of realized absorptive capacity on congruence. As no MISALIGN could be computed in lower demand uncertainty calibration sample, the following Table 27 and Table 28 show the results respectively in lower supply uncertainty and lower technology uncertainty.

Table 27_Impact of realized absorptive capacity on congruence, in lower supply uncertainty

	Coefficients	t. value	Sig.
(Constant)	395.519	1.372	0.178
Age	0.369	0.477	0.636
Size	-3.994	-0.274	0.785
Transformation_of_knowledge	-51.463*	-1.481	0.147
Exploitation_of_knowledge	-3.919	-0.080	0.936
R Square	0.071		
Adjusted R Square	-0.024	*df*	39
Sig. F Change	0.297	*F Change*	1.254

Dependent Variable: MISALIGN

** significant at the 0.10 level (one-tailed)*

Table 28_Impact of realized absorptive capacity on congruence, in lower technology uncertainty

	Coefficients	t. value	Sig.
(Constant)	35.434	1.794	0.080
Age	-0.012	-.190	0.850
Size	0.759	0.474	0.638
Transformation_of_knowledge	-3.533*	-1.319	0.194
Exploitation_of_knowledge	-2.273	-0.693	0.492
R Square	0.107		
Adjusted R Square	0.024	*df*	43
Sig. F Change	0.097	*F Change*	2.466

Dependent Variable: MISALIGN

** significant at the 0.10 level (one-tailed)*

VI.5. Analytical test of the impact of potential absorptive capacity on congruence in higher uncertainty environment

To test for the direct impact of potential absorptive capacity on the congruence between organizational mechanisms and environmental uncertainty, hierarchical regression analysis is used. The MISALIGN score is regressed on the two dimensions of potential absorptive capacity, with size and age as control variables. Previously, in the analytical test of congruence, MISALIGN score was used to find the congruent organizational mechanisms. And to find evidence of congruence, the correlation between MISALIGN and the measure of financial performance, i.e., return on sales, should be negative and

significant. The same MISALIGN score in each environment is used to analyze the impact of potential absorptive capacity on congruence in such environment.

To proceed, for higher supply uncertainty, higher demand uncertainty, and higher technology uncertainty, their corresponding MISALIGN scores are introduced as a dependent variable. In the first step of the regression, the control variables size and age are introduced as independent variables. In the second step, knowledge acquisition and knowledge assimilation are introduced as independent variables. The regression coefficient of MISALIGN score on knowledge acquisition and knowledge assimilation should be negative and significant to find evidence of a positive impact of potential absorptive capacity on congruence. A negative impact on MISALIGN could be translated as a decrease in the deviation from the ideal profile, therefore enhancing congruence. However, a positive impact on MISALIGN could be translated as hindering the congruence. The following Table 29, Table 30, and Table 31 show the results respectively in higher supply uncertainty, higher demand uncertainty, and higher technology uncertainty.

Table 29_Impact of potential absorptive capacity on congruence, in higher supply uncertainty

	Coefficients	t. value	Sig.
(Constant)	215.934	2.257	0.030
Age	-0.197	-0.374	0.710
Size	-4.579	-0.436	0.665
Acquisition_of_knowledge	-29.712**	-2.094	0.043
Assimilation_of_knowledge	9.074	0.609	0.546
R Square	0.134		
Adjusted R Square	0.045	*df*	39
Sig. F Change	0.101	*F Change*	2.437

Dependent Variable: MISALIGN

*** significant at the 0.05 level (one-tailed)*

Table 30_Impact of potential absorptive capacity on congruence, in higher demand uncertainty

	Coefficients	t. value	Sig.
(Constant)	271.319	1.459	0.152
Age	-1.610	-1.753	0.087
Size	14.117	0.893	0.377
Acquisition_of_knowledge	-12.640	-0.331	0.742
Assimilation_of_knowledge	-9.313	-0.357	0.723
R Square	0.070		
Adjusted R Square	-0.017	*df*	43
Sig. F Change	0.784	*F Change*	0.245

Dependent Variable: MISALIGN

Table 31_Impact of potential absorptive on congruence, in higher technology uncertainty

	Coefficients	t. value	Sig.
(Constant)	526.437	1.170	0.250
Age	-1.982	-1.037	0.307
Size	12.086	0.347	0.731
Acquisition_of_knowledge	-36.457	-0.553	0.583
Assimilation_of_knowledge	6.582	0.116	0.908
R Square	0.038		
Adjusted R Square	-0.069	*df*	36
Sig. F Change	0.855	*F Change*	0.157

Dependent Variable: MISALIGN

VII. Discussion

VII.1. Organizational mechanisms that are congruent in lower environmental uncertainty

This section provides what the results suggested as the set of system mechanisms and socialization mechanisms that are in congruence within a lower uncertainty environment. Among the investigated system mechanisms are job codification, rules observation, and hierarchy of authority. Simultaneously adopting a holistic approach consistent with Koufteros et al. (2002), Koufteros et al. (2005) considered a bundle of practices but examined contextual variables individually. The following socialization mechanism is also considered: sequential socialization tactics.

VII.1.1. Job codification

Job codification borrowed from Hage and Aiken (1967) and Aiken and Hage (1968) is the degree to which job descriptions are specified. They refer to it as the use of rules defining what the occupants of positions are to do. In other words, it represents the degree of work standardization. Unexpected results were found in the context of lower uncertainty environment. Despite the lower uncertainty environment, the business unit's extent of job codification does not contribute significantly to profitability. However, when comparing the impact of job codification under different sources of environmental uncertainty, the most significant impact could be found under lower supply uncertainty (p=.194), not in lower demand uncertainty (p=.320), nor in lower technology uncertainty (p=.303). This could reflect the limited use of job description in Japanese companies.

The results suggesting a slightly significant impact of job description may reveal that a reliable supply, assumed in a lower supply-uncertainty environment, is a necessary condition for job codification to be effective. A possible interpretation could be that job codification is used by business units in addition to socialization tactics and rules observation to maintain the business units' values. The condition of lower supply

uncertainty allows such values to be respected not only internally but also among suppliers. In other words, job codification allows adoption of common values between the business unit and the suppliers. The business unit's relationship with a reliable supplier is more likely to last for a long time. However, it requires time to build stability of a relationship that allows for sharing common values. To find a possible explanation for the necessity of job codification in achieving this goal, let us consider the notion of stability and the notion of values.

Concerning the business unit's values, they provide guidance not only for the relationship between the business unit's members but also between the business unit and its external collaborators. A relevant role of the business unit's core values mentioned in extant literature is to explicitly define how people will behave with each other and with customers (Gigliotti et al., 2018). The same researchers also provide a linkage between the business unit's value and culture. They mention that values should guide the employees in their day-to-day tasks, and the actions based on that must be recognized to foster a culture based on what matters the most to the company (Gigliotti et al., 2018). Regarding culture, Hofstede (1983) defined it as a "collective mental programming" which implies that people are influenced by their experiences throughout life, and this results in differences in perception of the same reality. At the business unit level, Schein (1984) provides the following definition: "Organizational culture is the pattern of basic assumptions that a given group has invented, discovered or developed in learning to cope with its problems of external adaptation and internal integration, and that have worked well enough to be considered valid, and, therefore, to be taught to new members as the correct way to perceive, think and feel in relation to those problems" (p. 3). This relationship between the business unit's values and its culture is relevant, as it provides a

potential explanation of the significance of job codification in establishing long-term relationships between a business unit and its suppliers.

Concerning stability in a long-lasting relationship, Slotegraaf et al. (2011) stated: "In a new product development context, project team stability refers to the extent to which the core members of cross-functional team remain for the duration of the project, from project approval to product launch" (p. 96). This is relevant in interpreting the result if we consider that suppliers are among the new product development teams that bring their knowledge to the earliest stage of the design to assess the appropriateness of the input they could provide. The benefit of the stability, here represented as a long-term relationship between the business unit and its supplier is that it is more likely that a longer collaboration allows them to share common values. This is supported by Schein (1984) arguing: "The longer we live in a given culture, and the older the culture is, the more it will influence our perceptions, thoughts, and feelings" (p. 12). Nevertheless, Slotegraaf et al. (2011) highlighted some conditions required to gain benefits from this stability: "To attain benefits associated with stability, explicit procedures or practices can be included in the new product development process" (p. 104).

Concerning such required explicit procedures, let us recall once again what was introduced in section II.2.2.3 concerning sequential socialization tactics, which is in congruence with lower supply uncertainty. It teaches newcomers a unit-specific language that facilitates the comprehension of background knowledge and communication with other members in the business unit (Chao et al. 1994). And job codification refers to the use of rules defining what the occupants of positions are to do (Hage & Aiken, 1967). Therefore, to achieve stability of the relationship between the business unit and its supplier, and to stimulate collaboration (Pelled et al. 1999), explicit procedures as define through job codification could be used by the business unit. That stability contributes to

a stronger cultural influence on the suppliers, and enables the business unit to share its values with them.

Let us recall that when comparing the impact of job codification under different conditions of environmental uncertainty, the most significant impact could be found under lower supply uncertainty—not in lower demand uncertainty, nor in lower technology uncertainty. As seen previously, the longer such cooperation exists, the more the boundary between the two entity is dissolved; a common boundary defining what is external to them takes place. Although the stability of the relationship between the business unit and its supplier allows them to share common values, this boundary potentially reinforces a negative attitude toward knowledge (ideas, technologies) derived from an external source—the "not-invented here" syndrome as defined by Antons et al. (2015). A possible explanation of the relatively lower impact within lower demand uncertainty and lower technology uncertainty environments could be related to two of the functions of the not-invented here syndrome: the knowledge function and the utilitarian function (Antons et al., 2015).

Regarding the lower demand uncertainty environment, we reiterate that Jaworski and Kohli (1993) noted that an organization's products and services are likely to require relatively little modification in stable markets where the customers' preferences do not change very much. Referring to the knowledge function of the "not invented here" syndrome, Antons et al. (2015) refers to Biyalogorsky et al. (2006): "In organizations, product managers and developers tend to rely on their initial positive assessment of the market potential for a novel product, even when contrary information later becomes available" (p. 201). If so, modification of the existing products and services are not frequent enough to require stability from the relationship with the supplier, or to require sharing common values with the supplier. Therefore, the benefit of stability could be

acquired through establishing job codification, but when the stability itself is not imperative, job codification is then not necessary. This may explain the no-congruence relationship between job codification and lower demand uncertainty environment.

Regarding the lower technology uncertainty environment, we reiterate that Jelinek (1977) noted that under conditions of great technological specificity, we may expect elaboration of structures and administrative devices to protect the technology. It should be clarified that great technological specificity does not necessary imply higher technology uncertainty. Let us recall yet again the definition of technology uncertainty, which is the extent of change and unpredictability of technology development in an organization's industry (Ganbold & Matsui, 2017). As introduced in the hypotheses development, a relevant point in lower technology uncertainty is that, in order to have a common direction of the responses to that environment, building common value orientation among the organization members is necessary (Galbraith, 1977).

Im et al. (2013) argued: "If top management is willing to take risks and accept occasional failures as a part of normal business practice, employees tend to get involved and think tangentially to come up with unique, outside-the-box ideas for new products and marketing programs that are considered novel" (p. 175). Im et al. (2013) added that: "If top management is risk averse and intolerant of failure, employees are less likely to generate new and distinct ideas that involve any appreciable financial risks" (p. 175). Over time, the accumulation of ideas and technological advancements specific to the business unit are a source of pride for the entire business unit. In this situation, it is not necessary to establish clear job codification. The possible reason is that doing so may hinder not only the creativity of the aforementioned employees, but also limit the scope of the potential contributions to only those who are instructed to do tasks according to job codification.

When a larger degree of initiative is left to the employees, some degree of personal commitment is created regarding the business unit. Akgün et al. (2002), referring to a new product development team, stated: "As project teams become more stable, there is an increased shared responsibility for the project goals and greater personal stake in the project outcomes" (p. 98). This affirmation suggests a link between stability and personal stake, likely associated with personal commitment. Therefore, stability is still beneficial to the business unit; however, the job codification which was necessary to reap the benefits from stability in a lower supply uncertainty environment, could be replaced by employee commitment to the business unit in lower technology uncertainty associated with technological specificity. If so, instead of establishing clear job descriptions, the stable relationship implies a strong culture which guides how the business unit's members should act. Schein (1984) stated: "If a stable group has had a long, varied, intense history (i.e., if it has had to cope with many difficult survival problems and has succeeded), it will have a strong and highly differentiated culture" (p. 7).

This affirmation could be interpreted as the cultural influence acquired along with the stable relationship, building a set of values and beliefs shared by members of a group and determining the way people think and act within the group context. This could be supported by referring to the utilitarian function of the not-invented here syndrome. Husted and Michailova (2002) stated that: "One's own ideas may be more prestigious than adapting an external idea, as it fosters intrinsic motivation via peer recognition or social status in organization" (p. 202). Therefore, in a lower technological uncertainty environment, the utilitarian function of the not-invented here syndrome may enhance the personal commitment to the business unit, enabling it to protect the technological specificity instead of establishing clear job descriptions. This may explain the no-

congruence relationship between job codification and lower technological uncertainty environment.

VII.1.2. Rules observation

Rules observation according to Aiken and Hage (1968) is the degree to which job occupants are supervised in conforming to the standards established in job codification. As we have mentioned, one feature of rules observation relates to the latitude of behavior that is tolerated within standards. Despite the lower uncertainty environment, the business unit's extent of rules observation does not contribute significantly to profitability when used simultaneously with job codification, hierarchy of authority, and sequential socialization tactics. Interestingly, the impact of rules observation on profitability is clearly significant (p=.003) in lower supply uncertainty when considered individually from any other organizational mechanisms. However, when comparing the impact of rules observation under different sources of environmental uncertainty, the most significant impact could be found under lower supply uncertainty (p=.249), not in lower demand uncertainty (p=.378), nor in lower technology uncertainty (p=.406).

Such findings could be explained by referring to Ohno (1988), who specified the two pillars of Toyota's production system: Just-in-time (JIT) and autonomation. Ohno (1988) noted: "Just-in-time means that, in a flow process, the right parts needed in assembly reach the assembly line at the time they are needed and only in the amount needed. A company establishing this flow throughout can approach zero inventory" (p. 4). This affirmation could be interpreted as approaching zero inventory which not only requires a reliable supply in terms of quality, but also requires providing each process with a certain visibility for the subsequent one, in order to allow consideration of the entire process. Establishing certain standards for each job and conforming to such standards, through rules observation, is necessary to provide such visibility.

Under higher technological uncertainty, frequent experimentation and failure are necessary to find viable solutions related to the adequate use of technology. During this phase, a safe failing climate as describe by Eisenhardt and Martin (2000) is required to enhance learning: "Small losses, more than either successes or major failures, contribute to effective learning. Success often fails to engage manager's attention sufficiently so that they learn from their experience. Major failures raise defenses that block learning. In contrast, small failures provide the greatest motivation to learn as such failures cause individuals to pay attention to the process, but do not create defensiveness that impedes learning" (p. 1114).

However, under lower technology uncertainty, when technology development has reached a certain maturity, emphasizing the conformance to the standards established in job codification is less effective. The standards then may allow a business unit to store the knowledge acquired through past experimentation, codified through job description, shared through the business unit through rules observation, and introduced to new members through sequential socialization tactics—but do not contribute to the business unit's profitability directly. Rules observation is then probably effective only until the considered technology becomes more stable, when new experimentations will be required. Extant research supports these findings by mentioning that well-designed rules and procedures capture prior experiences that may enable employees to search for new external knowledge (Adler & Borys, 1996). Recognizing the stage where new knowledge and new experimentation are required is more likely to be initiated by a business unit's members who are able to participate actively in decisions involving their work. This leads us to the findings related to another system mechanism—the hierarchy of authority.

VII.1.3. Hierarchy of authority

Among the system mechanisms investigated are those that program behaviors in advance of their execution and provide a memory for handling routine situations (Galbraith, 1973). Hierarchy of authority was more likely to be used by business units in a lower uncertainty environment. However, unexpected results were found in the context of a lower technology uncertainty environment. Despite the hypothesized relationship, the result would suggest that hierarchy of authority could be marginally detrimental to the business unit's profitability respectively in lower supply-uncertainty (p=.216) and lower technology-uncertainty (p=.154) environments. However, when comparing the impact of hierarchy of authority under different sources of environmental uncertainty, the only positive impact is marginal (p=.287) and could be found under lower demand uncertainty.

Considering hierarchy of authority as the degree to which the business unit's members participate in decisions involving the tasks associated with their positions (Hage & Aiken 1967), the results suggest, with marginal significance, that in a lower demand-uncertainty environment, the more similar a business unit's extent of hierarchy of authority is to that of the ideal business units perceiving lower demand uncertainty, the greater is its profitability.

Potential explanations of such findings could be extracted from existing research that found that frequent communication between a focal firm and its customers about product or service feedback enables the firm to respond to market change (Qi et al., 2011; Ganbold & Matsui, 2017). However, Jaworski and Kohli (1993) noted that an organization's product and services are likely to require relatively little modification in stable markets where the customers' preferences do not change very much. Taken together, in lower demand uncertainty where customers' preferences do not change very much, fewer decisions on product and services modification need to be made. More time could be allocated for decisions on product and service modifications. Eisenhardt (1989),

investigated how fast strategic decisions are made in higher-velocity environments: “They seek advice from the best sources but not from everyone, and they develop multiple alternatives but analyze them quickly in comparison” (p. 572). Therefore, it could be said that teams making fast decisions rely on the counselling of experienced executives, and seek multiple alternatives.

While such findings concern decisions made in higher-velocity environments, the significance of the strategic decision itself is assumed to remain even in stable markets, allowing more time for decision-making. If so, considering the significance of decisions on service and product modifications, hierarchy of authority allows a firm to find the relevant person to provide the required information necessary for analyzing multiple alternatives and provide more confidence to decision-makers.

Unexpectedly, the result of the investigated congruence relationship suggests a marginal and negative impact of hierarchy of authority on profitability in a lower technology-uncertainty environment. The findings could find support from Jelinek (1977) who noted that under conditions of great technological specificity, we may expect elaboration of structures and administrative devices to protect the technology. As discussed previously, a condition of lower technology uncertainty could be reached when the technology development has reached a certain maturity. If we assume that the more mature the technology developed for a product and service is, the more specific such developed technology is to that product and service, then hierarchy of authority is among the system mechanisms or administrative devices to protect that technology. As discussed earlier, hierarchy of authority allows the relevant people to provide the required information necessary for analyzing multiple alternatives. Such relevant persons through their expertise and knowledge provide not only the confidence necessary for decision-makers (Eisenhardt, 1989), but also provide more alternatives to the potential applications

of the mature technology. This protects the technology from early obsolescence. However, as suggested by the findings, bringing the relevant persons through hierarchy of authority may incur a cost which is detrimental to the profitability.

Concerning the findings in lower supply uncertainty, despite the hypothesized congruence, it appears that hierarchy of authority has a marginal and negative impact on the business unit's profitability. It was expected that in a lower supply-uncertainty environment, where only limited collaboration with customers is required, hierarchy of authority would enhance conflict resolution. That is expected to positively impact gaining consensus and more effective joint problem-solving, thus contributing to improve financial performance. A possible explanation for this contradictory finding is that a condition of lower supply uncertainty implies that suppliers could provide the business unit with consistent quality and delivery performance. As expected, the supply uncertainty score is relatively lower for this study's respondents. Those companies probably make the investments required to reduce the risk of unexpected events from the supply side. Moreover, these are mature companies with long-term relationships with suppliers. Therefore, abnormal conditions leading to conflicting solutions between interdependent departments are likely avoided. In such a situation, enhancing conflict resolution through hierarchical authority may not have a significant impact on achieving profitability, as suggested by the result.

Another possible explanation could be found by looking at hierarchy of authority as the degree to which the business unit's members participate in decisions involving the tasks associated with their positions (Hage & Aiken 1967). +However, in a more stable environment in terms of supply quality and delivery performance, bringing more people into decision-making related to supply issues may add redundancy and too much

unnecessary information. That would explain the non-effectiveness of hierarchy of authority under the condition of lower supply uncertainty.

VII.1.4. Sequential socialization tactics

Socialization mechanisms create broad and tacitly understood rules for appropriate action (Volberda, 1998). They have structural aspects and cognitive aspects. As stated before, the cognitive aspect investigated here refers to the process by which business units offer newcomers specific information and encourage them to interpret and respond to situations in a predictable way (Jones, 1986). They receive not only the business unit's perpetual tradition and values in terms of social relations, but also explicit information concerning the sequences of activities they will go through (Jones, 1986).The results of the investigated congruence relationship suggest that sequential socialization tactics enhance profitability significantly (p=.046), in lower supply uncertainty, and marginally (p=.120)in lower technology uncertainty.

Concerning the context of lower supply uncertainty, the result of the investigated congruence relationship indicated that H1d is supported: In a lower supply-uncertainty environment, the more similar a business unit's extent of sequential socialization tactics is to that of the ideal business perceiving lower supply uncertainty, the greater is its profitability.

Concerning the context of lower technology uncertainty, the marginally supported congruence relationship would suggest that H3d is supported: In a lower technology-uncertainty environment, the more similar a business unit's extent of sequential socialization tactics is to that of the ideal business units perceiving lower technology uncertainty, the greater is its profitability.

Shibutani (1962) suggested that socialization tactics provide the individual with an ordered view of the work life that guides experience, orders and shapes personal relationships in the work setting, and provide the ground rules for everyday conduct. This ordered view could be beneficial when the risk associated with external threats are to a certain extant minimal, such as a more reliable supply in terms of consistent quality and delivery performance. This reliable supply could facilitate the ordered view. Therefore, a reliable supply in terms of quality and delivery performance allows socialization tactics to be in congruence with the business unit's environment of lower supply uncertainty.

Previous research stated that uncertainty due to technology obsolescence can be alleviated by promoting collaborative coordination between supply chain partners (Truman, 2000). This coordination could be achieved by strengthening personal relationships in the work setting. Therefore, by considering how socialization tactics shape personal relationships in the work setting as mentioned by Shibutani (1962), and how such relationships could enhance collaborative coordination among the supply chain partners as mentioned by Truman (2000), the findings could found a possible explanation, assuming that relationship with suppliers is among the work settings.

VII.2. Organizational mechanisms which are congruent in higher environmental uncertainty

While the previous section focused on the congruence relationships found in lower uncertainty environments, this section suggests the set of coordination mechanisms and socialization mechanisms which are in congruence with higher uncertainty environments. Among the investigated coordination mechanisms are cross-functional interfaces and job rotation. Adopting a holistic approach consistent with Koufteros et al. (2002), Koufteros et al. (2005) considered a bundle of practices but examining contextual variables individually. The following socialization mechanism is also considered: interdepartmental connectedness.

VII.2.1. Cross-functional interface

Among the investigated organizational mechanisms, coordination mechanisms are defined as those associated with coordination capabilities and enhancing knowledge exchange across disciplinary and hierarchical boundaries (Jansen et al., 2005). A specific coordination mechanism, cross-functional interfaces, is the lateral form of communication that deepens knowledge flows across functional boundaries and lines of authority (Gupta & Govindarajan, 2000).

This coordination mechanism is likely to be used by business units facing higher demand uncertainty, where the change and unpredictability of the customers' demands and tastes are of serious concern (Li & Lin, 2006). The results suggest that cross-functional interfaces significantly enhance profitability under higher demand uncertainty (p=.070). Business units may also use cross-functional interface in a context where change and unpredictability of technology development in an organization's industry are of great concern (Ganbold & Matsui, 2017). The result suggest that cross-functional interfaces significantly enhance profitability under higher technology uncertainty (p=.060).

As introduced in the hypotheses development, what differentiates cross-functional interfaces from interdepartmental connectedness is the existence of the integrator, a specific position serving as interface between the interdependent departments. The extant literature could offer a potential explanation by considering the role of the integrator. Lawrence and Lorsch (1967) noted: "The integrator's role involves handling the non-routine, unprogrammed problems that arise among the traditional functions as each strives to do its own job" (p. 142). If so, the results suggest that the non-routine and unusual problems that are more likely to happen in a context of higher demand uncertainty and higher technology uncertainty could be addressed through establishing cross-functional interfaces.

In the context of higher demand uncertainty, Lee et al. (1997) suggested a countermeasure to the bullwhip effect—a system facilitating quick and easy transmission of demand data upstream to the marketing channel. The results suggest that establishing cross-functional interface, such as an integrator, allows the marketing channel to make decisions and find consensus when the interdependent departments could not. This finding echoes Eisenhardt (1989) who noted that conflict resolution is critical for decision speed, but conflict per se is not. Therefore, by enhancing conflict resolution, establishing cross-functional interface through the marketing channel contributes to decision speed. To explain the congruence relationship we found, a potential link should be identified between decision speed and performance. We found support from Eisenhardt (1989) who stated that fast decision-making allows a firm to keep pace with change and is linked to strong performance.

In the context of higher technology uncertainty, the results suggest that the non-routine and unusual problems that are more likely to happen could also be addressed through establishing cross-functional interface, including liaison personnel. The non-routine and unusual problems could be translated as a new production technology enabling product design improvement. Finding a more viable technology that enables product design improvement requires the consideration of multiple development alternatives and frequent experimentation—potentially resulting in failure. However, Eisenhardt (1989) indicated that the process of comparing alternatives helps decision-makers to ascertain the alternatives' strength and weaknesses and build decision-makers' confidence that the most viable ones have been considered. This confidence is also related to the loss that could be incurred from each of the alternatives considered. Eisenhardt and Martin (2000) indicated that major failures raise defenses that block learning. In contrast, small failures provide the greatest motivation to learn, as such

failures cause individuals to pay attention to the process, but do not create defensiveness that impedes learning.

Therefore, the results would suggest that establishing liaison personnel is effective to address non-routine and unusual problems associated with the targets of new production technology development and product design improvement. The liaison personnel not only provide confidence to the decision-makers on the different alternatives that could be considered, but also reduce the significance of the potential failure because all alternatives are evaluated and negative information is available in the early stage. Galbraith (1977) stated that establishing a liaison personnel for process designers who is physically stationed in the product design area could facilitate the design alternatives suggestion to the product designers, which enables a less costly manufacturing process. Therefore, we found support for the congruence relationship with cross-functional interface under the condition of higher technological uncertainty.

Concerning the context of higher supply uncertainty, the results suggest that the lateral forms of communication that deepen knowledge flows across functional boundaries and lines of authority are not efficient. To interpret this finding, werefer to Ferdows (1997) who noted that competitiveness is not solely based on the application of state-of-the-art management techniques in each of the individual plants, but also on the implementation of an integrative strategy on the entire network. From a logistics perspective, this requires the optimization of the company's supply chain. From an organizational perspective, it requires managing the creation and transfer of knowledge in the network.

The result then suggest that in a situation where suppliers could not provide consistent quality, and display weak delivery performance, the optimization of the business unit's

supply chain—an external environment—is more critical than developing knowledge flows across functional boundaries and lines of authority inside the business unit. Ferdows (1997) notes that it requires managing knowledge transfer beyond the business unit itself, which cannot be done by establishing cross-functional interface alone. Moreover, Vereecke et al. (2006) argue that there is a strong link between the position of the plant in the intangible network of ideas, and the tangible network of goods. This implies at the business unit level that optimizing the quality and delivery performance of the suppliers require optimizing the knowledge creation and transfer channel with the supplier.

VII.2.2. Job rotation

Apart from cross-functional interface, an additional coordination mechanism was investigated: job rotation, which is the lateral transfer of employees between jobs (Campion et al., 1994). In order to enhance knowledge exchange across disciplinary and hierarchical boundaries (Jansen et al. 2005), and simultaneously with cross-functional interface, job rotation may be used by business units in a context of higher supply uncertainty. The result suggest that job rotation marginally enhances profitability under higher supply uncertainty (p=.117). Job rotation is also likely to be used with cross-functional interface not only in the context of higher supply uncertainty, but also in a context where the change and unpredictability of technology development in the business unit's industry (Ganbold & Matsui, 2017) is of higher concern. The results suggest that job rotation significantly enhance profitability under higher technology uncertainty (p=.054).

Previous research findings suggest that the extent to which employees receive cross-training impacts operational performance (Ahmad & Schroeder, 2003). Moreover, job

rotation enhances knowledge exchange across disciplinary and hierarchical boundaries (Jansen et al., 2005). This implies that job rotation enhances learning. However, to be effective, such learning should be perceived as a need for business unit members to rotated between functions and positions. Ohno (1988) mentions: "Necessity is the mother of invention" (p. 13). If we assume the acquisition of knowledge related to a new position as a need, then the need requires two conditions: a troublesome situation and the willingness of the business unit member to face that situation. Troublesome situations could include the change and unpredictability of customers' demands and tastes, which refers to demand uncertainty (Li & Lin, 2006) or the change and unpredictability of technology development in the business unit's industry (Ganbold & Matsui, 2017). Nicolini and Meznar (1995) noted that organizational learning is based on the learning of the individual members. Learning is a trial-and-error process that requires an experimental mindset. Therefore, when job rotation is used in conditions such as higher demand uncertainty and higher technology uncertainty, it puts the business unit's members into a troublesome situation, and call for their experimental mindsets to be effective. This may explain the congruence relationship found under higher demand- and higher technology-uncertainty environments.

There may be situations where the business unit's members do not perceive any pressure or do not express any enthusiasm to acquire new knowledge. However, we do not investigate if the job rotation was initiated by internal policy or if it was voluntarily initiated by the business unit's members. This could be among the limitations of this research.

Along the previously described results, it was suggested that business units could use job rotation in almost the same context as where cross-functional interface would be effective.

Therefore, as with cross-functional interface, job rotation is not effective in a context of higher supply uncertainty. It was hypothesized that in higher supply uncertainty, the more similar a business unit's extent of job rotation is to that of the ideal business units perceiving higher supply uncertainty, the greater is its profitability. The result, however, revealed that the lateral transfer of employees between jobs is not efficient when the context emphasis is of higher concern in terms of change and unpredictability of the supplier's product quality and delivery performance. The result might be explained by referring to the aforementioned troublesome situation. Ohno (1988) stated that need cannot be found if you just wait for it. In order to find need, you should go into such a troublesome situation and try to find the source of complexity. In the case of higher supply uncertainty, the troublesome situation may manifest as an unreliable supplier with non-consistent quality and delivery performance. In that case, the source of complexity might not be addressed through internal processes. The quality of the input from the supplier is more likely under the control of the supplier than the business unit. On the other hand, there are cases where the focal company still exerts certain control over the supplier's process, and subsequently the quality of its output. One such case was depicted in Chandler (1977), who observed the integration of parts manufacturing in-house so that parts procurement can be done through a "visible hand". There, the troublesome situation associated with the supplier's non-consistent quality and delivery performance could be controlled as an internal process.

VII.2.3. Interdepartmental connectedness

Socialization mechanisms create broad and tacitly understood rules for appropriate action (Volberda, 1998). As mentioned, a specific socialization mechanism, interdepartmental connectedness, relates to the extent to which individuals in a department networked to various levels of the hierarchy in other departments through informal means.

An unexpected result was found when considering the congruence relationship in a context of higher concern regarding the change and unpredictability of technology development in the business unit's industry. Despite the hypothesized relationship in a higher technology-uncertainty environment, the results would suggest that interdepartmental connectedness could be significantly ($p=.065$) detrimental to the business unit's profitability. Existing research mentioned the benefits of not only the connection between a focal firm to its external environment, but also the connection between the different entities internal to the focal firm. Concerning the first type of connection, frequent communication between a focal firm and its customers about product or service feedback enables the firm to respond to market change (Qi et al., 2011; Ganbold & Matsui, 2017). Concerning the second type of connection, in uncertain environments, collaboration across product design, procurement, production, sales and distributions takes place to fulfill customer requirements at a lower cost (Flynn et al., 2010). Thus, previous findings confirm that establishing networks between different departments, such as marketing department and product design department, impact the effective use of product and service feedback. Doing so facilitates information exchange between departments, allowing them to respond in a timely fashion to any perceived product obsolescence.

However previous research also noted that larger plants are likely to adopt new technology earlier yet retain the old technology longer than their smaller counterparts (Nakamura & Ohashi, 2012). Similarly, a bigger business unit may retain the old technology longer. In a higher technology-uncertainty condition, where the technology has reached a certain maturity, a bigger business unit would retain that technology longer. Therefore, any product or service feedback communicated through internal connections such as interdepartmental links and calling for the development of new technology will

have a detrimental impact on the effective use of the mature technology. This could explain the negative impact of interdepartmental connectedness under the condition of higher technology uncertainty.

VII.3. Impact of realized absorptive capacity on achieving congruence in lower uncertainty environment

Dierickx and Cool (1989) argue that in order to sustain competitive advantage when they face different contingencies, organizations continuously recombine their asset stocks and apply them to new market opportunities. This ability to develop sustainable competitive advantage, and to meet the market demand, depends on a firm's ability to convert knowledge into capabilities. According to resource-based theory, the uniqueness of the resources and capabilities of an organization are the means of gaining a competitive advantage. We advocate that even in a lower uncertainty environment, such competitiveness requires not only possessing unique resources but achieving congruence as a dynamic capability which aims to match the organizational mechanisms with the lower uncertainty environment. Considering this conceptualization of congruence, the results suggest that knowledge transformation improves the congruence achieved with sequential socialization tactics in lower supply-uncertainty environments as well as in lower technology-uncertainty environments.

The results suggest that in a lower supply-uncertainty environment, knowledge transformation enhances the congruence achieved with sequential socialization tactics. That means that knowledge transformation probably allows a firm to establish and adjust norms, including social relations. This is supported by Setia and Patel (2013) who noted that realized absorptive capacity enables a firm to exploit knowledge to service customers, meet market demands and launch new products by establishing structures, norms, policies, roles and responsibilities. The impact of knowledge transformation on the

congruence with sequential socialization tactics could be explained if we look back on the role of sequential socialization tactics. Sequential socialization tactics allows to reach a unified context perception among the business units and the suppliers. Sharing common values and social relation norms secures the relationship with the reliable supplier, maintaining a lower supply uncertainty context.

Additional explanation of the impact of knowledge transformation on the congruence could be found by considering that sequential socialization tactics are used simultaneously with system mechanisms: job codification, rules observation, and hierarchy of authority. Although their respective impacts on return on sales are not significant, job codification and rules observation have positive impacts contrary to hierarchy of authority. The impact of knowledge transformation on the congruence under lower supply uncertainty could be explained through a relevant feature of knowledge transformation: it could be accomplished by adding or deleting knowledge or simply by interpreting the same knowledge in a different manner (Zahra & George, 2002). Therefore, by interpreting the same knowledge in a different manner, knowledge transformation could enhance role conflict resolution through adding or deleting roles and processes initially describe through job codification. Simultaneously, in the context of lower supply uncertainty, knowledge transformation enhances the positive impact of rules observation. It could do so by interpreting the same knowledge on the latitude of behavior that is tolerated within the standards, which is initially achieved through rules observation.

Concerning the context of lower technology uncertainty, the results suggest that knowledge transformation enhances the congruence achieved with sequential socialization tactics. We note that the higher performers in the context of lower technology uncertainty are mainly companies in the industries of pharmaceutical, glass

and ceramics, metal products, oil and coal, foods, retail trade, and wholesale trade. A common feature of those companies is that they are less likely to continually modify production technology. Instead, they design organizational mechanisms, such as sequential socialization tactics, to protect their technology specificity. This confirms our expectation that sequential socialization tactics are among the administrative devices used to protect specific technology. This supports the finding of Jelinek (1977) who noted that under conditions of great technological specificity, we may expect elaboration of structures and administrative devices to protect the technology. Moreover, sequential socialization tactics allows firms to share internally the perceived valid way to protect technology. This is supported in Ganbold and Matsui (2017), who found that unlike supply and demand uncertainties, firms are likely to tackle technological uncertainties internally.

A more stable technological environment allows firms to develop well-established social relations norms through knowledge transformation. Setia and Patel (2013) noted that realized absorptive capacity, which includes knowledge transformation, enables firms to exploit knowledge to service customers, meet market demands and launch new products by establishing structures, norms, policies, roles and responsibilities. The impact of knowledge transformation on social relations norms could be accomplished by adding a valid way to cope with lower technology uncertainty or simply by interpreting the same valid way in a different manner (Zahra & George, 2002). In doing so, knowledge transformation allows firms to reinforce the link between a business unit and its partners and relieve the business unit from taking the risk of experimenting with new alternatives by itself. Stock and Tatikonda (2008) noted that when there is a large gap between the information needed to acquire and implement a new technology and the information existing within an organization, the business unit engages in a higher degree of

interorganizational interaction. Knowledge transformation would allow firms to add the new interpretation of the technology alternatives as a valid way to cope with the context of lower technology uncertainty.

Concerning the context of lower demand uncertainty, as the proposed organizational mechanisms unexpectedly did not improve return on sales, the impact of knowledge transformation and knowledge exploitation could not be investigated. A possible explanation is that most of the higher performers in such a context, nearly 80%, are chemical, pharmaceutical, information and communications, and real estate companies. They probably have to follow strict regulations and work procedures to ensure safety of users and customers. Therefore, they designed organizational mechanisms in congruence with the industry regulations rather than the environmental uncertainty.

VII.4. Impact of potential absorptive capacity on achieving congruence in higher uncertainty environment

Achieving congruence corresponds to a specific environment, so there is a need for a trigger to recognize the shift in environment. It was expected that realized absorptive capacity is the trigger for recognizing the shift in day-to-day environment in the short term, while potential absorptive capacity was expected to be the trigger for recognizing an anticipated shift in future environment in the long term. Setia and Patel (2013) mention that potential absorptive capacity enables the acquired knowledge to be assimilated, and thus allows the business units to recognize shifts in the operational environment, changes in customer demands and opportunities for innovation.

From a resource-based theory, we advocate that under higher uncertainty environments, competitiveness requires achieving congruence as a dynamic capability that aims to match organizational mechanisms with the higher uncertainty environment. The results suggest that knowledge acquisition improves the congruence achieved with job rotation in higher supply-uncertainty environments—but unexpectedly, not under

higher demand uncertainty nor under higher technology uncertainty. The results suggest that in higher supply-uncertainty environments, knowledge acquisition enhances the congruence achieved with job rotation. It is possible that knowledge acquisition raises the awareness of rotated employees to find the source of unreliable supplies and unreliable delivery. This supports the finding Campion et al. (1994) that job rotation enhances the awareness of employees' knowledge and skills in other functional areas within a unit. Knowledge acquisition allows firms to make use of the networks built during the job rotation for collaboration with suppliers. As Zacharia et al. (2011) note, absorptive capacity enhances business units' capabilities to collaborate with supply chain partners. This implies a relationship between absorptive capacity and collaboration among the business unit's partners. The context under which such collaboration is required could be found in Zacharia et al. (2011) referring to Handfield and Bechtel (2002): "Organizations perceive they are interdependent when neither organization entirely controls all of the conditions necessary to achieve desired outcomes" (p. 593).

This may explain the impact of knowledge acquisition on the congruence with job rotation, a coordination mechanism. More precisely, it could be explained by the relationship between job rotation and the expectation that business unit managers appoint an integrator role for coordination between functions. Existing research mentions that the integrators should have prior work experience in several functions, as the business unit manager will then regard them as competent (Lawrence & Lorsch, 1967). Zahra and George (2002) note that learning cycles cannot be shortened easily and may depend on the business unit's effort to identify and gather knowledge. That knowledge may enhance the impact of job rotation on profitability under the context of higher supply uncertainty.

In the context of higher demand uncertainty, unexpectedly, neither knowledge acquisition nor knowledge assimilation were found to enhance the congruence achieve

with cross-functional interface. As we have mentioned, Setia and Patel (2013) noted that potential absorptive capacity enables the acquired knowledge to be assimilated, and by doing so, it allows the business units to recognize shifts in the operational environment, changes in customer demands and opportunities for innovation. A possible explanation is that although knowledge acquisition and knowledge assimilation allows firms to recognize the necessary adjustment to face market shifts, they could also hinder fast decision-making. Under higher demand uncertainty, having conflictual alternatives from the perspective of different functions may hinder making the necessary adjustments. Eisenhardt (1989) argued that fast decision-making allows decision-makers to keep pace with change and is linked to strong performance. The impact of knowledge acquisition and knowledge assimilation might be delayed by cross-functional interface under a higher demand-uncertainty context.

Concerning the context of higher technology uncertainty, unexpectedly, neither knowledge acquisition nor knowledge assimilation enhanced the congruence achieved with job rotation and cross-functional interface. Doll and Vonderembre (1991) investigated the complex relationship among technology, organizational capabilities and customer request and observed that in a highly uncertain environment, firms identify primary factors that shape their ability to absorb knowledge and implement technology. Cohen and Levinthal (1994) added that firms with an adequate base of prior knowledge have the ability to proactively envisage future technological advances. Those two findings imply that prior knowledge or primary factors for knowledge acquisition are necessary before envisaging or implementing technology alternatives.

One possible explanation of the absence here of the impact of knowledge acquisition and knowledge assimilation on congruence under higher technology uncertainty is that more than 50% of the higher performers are chemical, pharmaceutical,

information and communications, insurance, and financing business companies. Those industries could not probably afford to risk experimenting with new technology alternatives. To clarify this explanation, consideration should be given to the congruence found under such a context. Previously, congruence was found between this context and job rotation as well as cross-functional interface. Job rotation and cross-functional interface could provide the prior knowledge or primary factors for recognizing new or more viable technology alternatives. However, acquiring such alternatives requires experimentation, and that involves risk-taking (Villena et al., 2011), therefore including mistakes. As Eisenhardt and Martin (2000) argued, mistakes play a role in the evolution of dynamic capabilities. More relevant to us, Eisenhardt and Martin (2000) added that major failures raise defenses that block learning, while small failures provide the greatest motivation to learn. In our case, for the more than 50% of the higher performers in higher technology uncertainty, the cost of any mistake in experimenting with new technology alternatives in those industries would be associated with a major failure, therefore impeding learning and acquisition of new or more viable technology alternative. Instead, they may choose to strengthen their collaboration with partners, such as interorganizational interaction. Stock and Tatikonda (2008) noted that when there is a large gap between the information needed to acquire and implement a new technology and the information existing within an organization, firms engage in a higher degree of interorganizational interaction.

A second possible explanation is related to Ganbold and Matsui (2017) mentioning that technology uncertainty should be addressed internally. Knowledge acquisition that targets externally generated knowledge may not be appropriate to enhance the congruence under a higher technology-uncertainty context.

VIII. Conclusions and limitations

From a contingency view, we sought to answer which set of organizational mechanisms improve return on sales under higher uncertainty and lower uncertainty environments. The contingency view explicitly states that there is no one best way to organize, and any way of organizing is not equally effective under all conditions.

The results suggest that socialization mechanisms should be used in less uncertain environments. Specifically, sequential socialization tactics should be used in lower supply-uncertainty and lower technology-uncertainty environments. Coordination mechanisms should be used in higher uncertainty environments, namely, cross-functional interface and job rotation.

We also sought to find the impact of realized absorptive capacity on achieving congruence within lower uncertainty environments and the impact of potential absorptive capacity on achieving congruence within higher uncertainty environments. We address those questions through the Resource Base Theory lens and by conceptualizing congruence as dynamic capability. We did so with the theoretical support that dynamic capabilities aim at matching internal resource configurations with the environment.

The results suggest that under lower uncertainty environments, specifically lower supply uncertainty and lower technology uncertainty, knowledge transformation improves the congruence achieved with sequential socialization tactics, a socialization mechanism. Under higher uncertainty environments, specifically higher supply uncertainty, knowledge acquisition improves the congruence achieved with job rotation, a coordination mechanism.

With those answers and taking into consideration the corresponding limitations, we make a modest contribution to the academic body of knowledge in Strategy and in Organizational Behaviour. We answered the call of Sousa and Voss (2008) about using

resource-based theory and contingency approach complementarily, allowing us to suggest a way to conceptualize congruence as a dynamic capability. Second, this research extends the findings of Jansen et al. (2005) in two points. One point is by considering the reverse causality between organizational mechanisms and absorptive capacity. Jansen et al. (2005) suggested how to improve absorptive capacity through organizational mechanisms. This research considers the reverse causality by suggesting that absorptive capacity somehow impacts organizational mechanisms through congruence. Jansen et al. (2005) also suggest that coordination mechanisms improve potential absorptive capacity, and socialization mechanisms improve realized absorptive capacity. We contribute by completing the other part of the dynamic relationship, suggesting that knowledge acquisition enhances the congruence achieved with coordination mechanisms, and knowledge transformation enhances the congruence achieved with socialization mechanisms. Moreover, by showing another aspect of the dynamic relationship between absorptive capacity and organizational mechanisms, we bring into consideration the context under which such organizational mechanisms are effective.

For practitioners, this research may provide some insights on the internal actions of companies listed on the first section of the TSE (Dec. 2017- Dec. 2018) in parallel with their significant investments in R&D, as described by the National Institute of Science and Technology Policy report (NISTEP-RM283) in 2017. The trends show us that relatively higher investment, nearly 72% of national R&D expenditure, may be required but are not enough to face multiple environmental uncertainties at once. In addition to the investment in R&D, a business unit may seek collaboration between functions; this is one way, yet not the only way, to face a relatively higher uncertain market and technology. This may explain the constantly increasing amount of industry investment in joint projects with academia in Japan. Moreover, business units may choose to secure social relations

with reliable partners by establishing commonly accepted norms. This may be one way, again not the only one, to anticipate the evolution of production technology in a more stable market. This way of valuing social relations with reliable partners may be one of the reasons why companies remain listed on the Tokyo Stock Exchange for an average of eighty-nine years.

This research is also subjected to some limitations which should be addressed in future research. First, the study focuses only on Japanese companies listed on the first section of the Tokyo Stock Exchange. The ability to generalize findings across countries, and across SMEs, is somewhat limited. Further insight may be gained from the replication of this study in a wider range of countries and in a wider range of companies, as suggested by Voss et al. (2005). Second, although the questionnaire was designed to reduce the possibility of bias, and further measurement validation was conducted, the possibility of having such bias could not be totally removed when using perceptual measures. An alternative to perceptual measures is the use of objective measures, archival measures of environment that does not rely on managers' perceptions, as suggested by Dess and Beard (1984). Third, the use of cross-sectional data makes it difficult to empirically test causality. Further longitudinal research should empirically establish the causal claim of our model, as suggested by Jansen et al. (2005). Fourth, other non-observed factors may have impact on the constructs. Although our empirical analyses provide a certain support for our theoretical model, a proportion of the variance remains unexplained. Future research may incorporate additional type of organizational mechanisms. Fifth, although the respondents are somewhat balanced between manufacturing and service industries, the limited sample size implies that the methodology proposed by Venkatraman and Prescott (1990) could not be fully applied. Future research may extend the targeted population. Sixth, all of the perceptual measures were collected using single informants,

therefore relationships among variables might be inflated by common method variance. Although several steps in both questionnaire design and testing phases to limit such concerns were conducted, the issue of key informant bias cannot be totally ruled out. Future research may extend the targeted respondents to multiple respondents at different levels of the hierarchy.

APPENDIX 1. Introduction letter for the survey

調査研究へのご協力のお願い

企業経営者の皆様

拝啓　時下、益々ご清栄のこととお慶び申し上げます。

私どもは横浜国立大学大学院国際社会科学研究院、学府科の経営学専攻におきまして、オペレーションズ•マネジメントやサプライチェーン•マネジメントの研究に従事しているものです。

この度、これまでの研究対象をいくらか拡張させていただき、日本企業の経営環境、組織メカニズム、ダイナミック•ケイパビリティ、柔軟性などに関わる調査研究を実施する運びとなり、東証一部上場企業の経営者の皆様に本調査へのご協力をお願いさせていただいております。ご協力いただいた皆様には、研究成果がまとまり次第、フィードバックさせていただく所存でございます。

本調査でご提供いただきましたすべての情報は、統計的に処理され、研究目的にのみ使用されます。
ご回答いただいた個別情報の機密は完全に保持されますよう、万全の体制を取らせていただきますので、ご安心ください。

各質問にご回答いただく際には、御社を代表するビジネスユニットを念頭に置いていただき、御社のお客様に係わる場合には、主要なお客様を対象としてご回答ください。ビジネスユニットの形態は、会社全体、事業部門、事業子会社様など、それぞれのご事情により異なるものと存じますが、すべての質問に対しまして、同じビジネスユニットにつきご回答いただきますようお願いいたします。ご回答は、社長様、代表取締役様、CEO 様、COO 様、またはビジネスユニットの責任者の方にお願いいたします。もしも特定の質問につきましてご不明という場合がございましたら、可能な限りで結構ですが、それらの質問に関しまして熟知されておられる方にお答えいただけますようご配慮いただけますと幸いに存じます。

お忙しいところ誠に恐縮ですが、ご回答いただきました調査票を同封いたしました返信用封筒をお使いいただき、ご返送いただきますようお願いいたします。

何卒よろしくご協力ください。

敬具

横浜国立大学国際社会科学研究院教授
松井 美樹
〒240-8501 横浜市保土ヶ谷区常盤台 79-4
e-mail: **ymatsui@ynu.ac.jp**

なお、ご質問やご不明なことがございましたら、本調査を担当しております下記のものまでお問い合わせください。

イリアス ラザフィンドラザカ（Ylias Razafindrazaka）
e-mail: **razafindrazaka-ylias-wh@ynu.jp**
電話:　045-339-3708
FAX: 045-339-3707

APPENDIX 2. Questionnaire for the survey, page 1/4

I- 御社名およびご回答者についてお答えください

会社の名前			
回答者のお名前			
職位			
e-mail アドレス		電話番号	

II- 質問にたいするご回答は、7段階で構成されるスケールからあなたが同意するレベルに丸をつけてください、1:「**全く同意しない**」 から、7:「**強く同意する**」まで、4:「**どちらともいえない**」。

質問に対する回答方法の例：

質問	お答え						
当社製品に対するお客様の要求は劇的に変化している	1	2	3	4	(5)	6	7

(5) を選ぶ意味は、1から7までのスケールで、1=全く同意しない、7=強く同意する。あなたは5の同意するレベルでこの質問「当社製品に対するお客様の要求は劇的に変化している」を評価する。

メモ：

- 御社の質問を考えている時に、貴社の中で、最も代表としての事業部門を参照してください。
- もし御社が製造業か建設業であれば、M マークのある質問に答えてください。
- もし御社がサービス業であれば、S マークのある質問に答えてください。

質問	お答え 全く同意しない			どちらともいえない			強く同意する
当社の人々は、すべての規則に従がっているかどうかを常に監視されていると思っている	1	2	3	4	5	6	7
当社では、顧客、サプライヤー、あるいは第三者との特別な会合を開いて、プロセスや製品、物流、流通などのイノベーションに関する新しい知識を得ている	1	2	3	4	5	6	7
従業員にはそれぞれ異なる仕事が割り当てられている	1	2	3	4	5	6	7
当社では、キャリア開発の段階が明確に規定されている	1	2	3	4	5	6	7
当社の事業計画は、市場動向調査よりも技術開発をより重視している	1	2	3	4	5	6	7
自分で意思決定をしたい人はすぐに出鼻をくじかれる	1	2	3	4	5	6	7
M サプライヤーからの重要な材料に対する返品率は低い S サプライヤーからの主要なインプットに対する返品率は低い	1	2	3	4	5	6	7
当社では、どのように仕事を行うかは、その仕事をする人に任せられている	1	2	3	4	5	6	7
当社の業界の技術陳腐化率は高い	1	2	3	4	5	6	7
当社では、いろいろな部署の人たちが非公式な立ち話をする機会が十分にある	1	2	3	4	5	6	7
当社では、役割や職務の異動に関する明確なパターンがある	1	2	3	4	5	6	7
新入社員は、自分たちが仕事のこつを習得している最中であると社内で見られていることを非常によく分かっている	1	2	3	4	5	6	7

APPENDIX 3. Questionnaire for the survey, page 2/4

メモ：

- 御社の質問を考えている時に、貴社の中で、最も代表としての事業部門を参照してください。
- もし御社が製造業か建設業であれば、(M)マークのある質問に答えてください。
- もし御社がサービス業であれば、[S]マークのある質問に答えてください。

質問	お答え 全く同意しない			どちらともいえない			強く同意する
当社の管理者は、既存製品の改良に関する意思決定に参加する	1	2	3	4	5	6	7
当社では、必要な時に、いろいろな部署の従業員がお互いに気軽に話ができる雰囲気がある	1	2	3	4	5	6	7
急速に変化する技術が私たちの業界を特徴付けている	1	2	3	4	5	6	7
当社では、ほとんどの人が自分たちの仕事について独自のルールを作っている	1	2	3	4	5	6	7
もし我々が技術の変化に追いつけなければ、競争力を保つことは難しい	1	2	3	4	5	6	7
当社の管理者は、ほとんどの問題について、自分が自分自身のボスだと思っている	1	2	3	4	5	6	7
サプライヤーは、一貫した品質のインプットを当社に提供してくれる	1	2	3	4	5	6	7
当社では、新しい外部知識から生ずるビジネス機会を捉えるのに苦労している	1	2	3	4	5	6	7
当社の生産技術は頻繁に変化する	1	2	3	4	5	6	7
(M) 当社の最終製品に対する生産計画では、需要の変動割合が高い [S] 当社のオペレーション計画では、需要の変動割合が高い	1	2	3	4	5	6	7
新入社員は、配属部署の諸手続きや仕事のやり方に精通するまでは、正規の職務義務を負うことはない	1	2	3	4	5	6	7
当社では、市場の変化（競合状態、規制、人口統計など）を認識するのが遅い	1	2	3	4	5	6	7
他の部署の人たちがわれわれの部署の人と会うのはとても簡単だ	1	2	3	4	5	6	7
当社では、常設チームを用いて、異なる事業単位間の活動を調整している	1	2	3	4	5	6	7
当社では、ある部署が競合企業に関する重要な動きを見い出しても、他の部署に警告を発するのが遅い	1	2	3	4	5	6	7
当社では、新入社員に決められた順序で学習経験を積ませることはない	1	2	3	4	5	6	7
当社の従業員は、購買担当者管理者やサプライチェーン関連学会、サプライヤーなどの第三者と定期的に会って、情報を収集している	1	2	3	4	5	6	7
サプライヤーは一貫して当社の要件を満たしてくれる	1	2	3	4	5	6	7
ある事業ユニットに属する従業員は、定期的に異なるサブユニット間を異動する	1	2	3	4	5	6	7
お客様にサービスを提供する新しい機会を素早く捉えている	1	2	3	4	5	6	7
当社に対する需要は週ごとに大幅に異なる	1	2	3	4	5	6	7
当社では、一時的なタスクフォースを用いて、異なる事業単位間の活動を調整している	1	2	3	4	5	6	7
どんな状況になっても、それに対処するための手続きが決まっている	1	2	3	4	5	6	7
当社製品に対するお客様の要求は劇的に変化している	1	2	3	4	5	6	7
当社の管理者は、新製品の導入に関する意思決定に参加する	1	2	3	4	5	6	7
当社の従業員は、当社の製品およびサービスに関する共通言語を使っている	1	2	3	4	5	6	7
どんな些細な問題でもその解決のためには上司の誰かに相談しなければならない	1	2	3	4	5	6	7

APPENDIX 4. Questionnaire for the survey, page 3/4

メモ：

➤御社の質問を考えている時に、貴社の中で、最も代表としての事業部門を参照してください。

➤もし御社が製造業か建設業であれば、Mマークのある質問に答えてください。

➤もし御社がサービス業であれば、Sマークのある質問に答えてください。

質問	お答え 全く同意しない			どちらともいえない			強く同意する
改良製品の開発と導入に要する時間は短い	1	2	3	4	5	6	7
当社では、自分の好きなようにほとんど何でもすることができる	1	2	3	4	5	6	7
他の誰かの確認を得ることなしに、誰でも自分自身で意思決定をすることができる	1	2	3	4	5	6	7
当社では、従業員全員の職務成果を記録している	1	2	3	4	5	6	7
当社では、新しい知識を得るために本社と頻繁に交流している	1	2	3	4	5	6	7
M 当社では、サプライヤーからの重要な材料に対して、広範な検査を行っている S 当社では、仕入先からの主要なインプットに対して、広範な検査を行っている	1	2	3	4	5	6	7
新入社員は、仕事上のスキルに関する完璧な知識を習得できるように特別に設計された一連の研修を受けている	1	2	3	4	5	6	7
当社の部署の下級管理者は、他の部門の下級管理者との会議を簡単に設定することができる	1	2	3	4	5	6	7
改良製品が生産システムに導入されても、既存製品の品質に影響はない	1	2	3	4	5	6	7
生産開始される新製品の数は、毎年、多い	1	2	3	4	5	6	7
当社の管理者が下すいかなる決定も本社の承認を得なければならない	1	2	3	4	5	6	7
当社の管理者は、既存製品を止める意思決定に参加する	1	2	3	4	5	6	7
新製品が生産システムに導入されても、既存製品の品質に影響はない	1	2	3	4	5	6	7
当社の事業部門管理者はほとんど何をするにも本社に相談しなければならない	1	2	3	4	5	6	7
新製品の開発と導入に要する時間は短い	1	2	3	4	5	6	7
新入社員の業務知識の多くは、試行錯誤的に非公式に取得されている	1	2	3	4	5	6	7
当社のマーケティング担当者は、お客様の将来のニーズについて他の職能部門と話し合うために時間を費やしている	1	2	3	4	5	6	7
新入社員研修は、通常、正規の当社の従業員からは隔絶された場所で行われる	1	2	3	4	5	6	7
当社の従業員は規則違反のチェックを常に受けている	1	2	3	4	5	6	7
監督責任者が決定を承認するまで、当社の従業員はほとんど何もすることができない	1	2	3	4	5	6	7
お客様からの需要量を予測するのは困難だ	1	2	3	4	5	6	7
当社では、定期的に会合を持ち、市場動向や新製品開発の結果について議論している	1	2	3	4	5	6	7
当社では、ランクやポジションに関係なく、必要に応じてほぼ誰とでも容易に話すことができる	1	2	3	4	5	6	7
当社の従業員は、お互いに実践的な経験をほとんど共有していない	1	2	3	4	5	6	7
当社では、変化する市場需要を分析し、理解している	1	2	3	4	5	6	7

APPENDIX 5. Questionnaire for the survey, page 4/4

メモ：

➤御社の質問を考えている時に、貴社の中で、最も代表としての事業部門を参照してください。

➤もし御社が製造業か建設業であれば、M マークのある質問をおこたえください。

➤もし御社がサービス業であれば、S マークのある質問をおこたえください。

質問	お答え						
	全く同意しない			どちらともいえない			強く同意する
当社が販売している製品ラインは、実際の市場動向よりも社内の政治力学の影響をより強く受けている	1	2	3	4	5	6	7
当社では、顧客の苦情にはほとんど対応していない	1	2	3	4	5	6	7
当社では、形式ばらないやり方で業界の情報を収集している（例えば、顧客やサプライヤー、取引先、その他の利害関係者とのランチなど）	1	2	3	4	5	6	7
当社の需要は週ごとに大幅に変動する	1	2	3	4	5	6	7
当社の従業員は、定期的に異なる職能間を異動する	1	2	3	4	5	6	7
当社では、どんな時でも常に厳しい作業手順に従うべきと考えている	1	2	3	4	5	6	7
新製品は既存製品とは大きく異なる	1	2	3	4	5	6	7
当社では、どんな時でも常に厳しい作業手順に従うべきと考えている、新製品や新サービスに対する市場需要の変化がもたらす結果について定期的に検討している	1	2	3	4	5	6	7
M 主要製品の原材料を調達するのは困難だ S 主要製品の重要なインプットを調達するのは困難だ	1	2	3	4	5	6	7
ある部門から別の部門へのコミュニケーションは、「適正なチャンネル」を通じて行われることが期待される	1	2	3	4	5	6	7
当社では、既存の知識に対する新しい外部知識の有用性を素早く認識している	1	2	3	4	5	6	7
生産開始される改良製品の数は、毎年、多い	1	2	3	4	5	6	7
当社の従業員は、新たに取得した知識を、将来、参照できるように、記録し、保存している	1	2	3	4	5	6	7
当社の管理者は、従業員が直属の上司や部下でない人と仕事に関する問題について話し合うことには反対だ	1	2	3	4	5	6	7
改良製品は既存の製品とは大きく異なる	1	2	3	4	5	6	7
M 原材料および部品の価格は頻繁に変更されている S 主要なインプットの価格は頻繁に変更されている	1	2	3	4	5	6	7
当社では、業務経験を積み、実績を高めるための役割間あるいは職能間の異動が極めて明確である	1	2	3	4	5	6	7
研修の各段階において、前段階の研修で得られた職務知識が更に発展、拡大される	1	2	3	4	5	6	7
当社では、オペレーションに関する知識のより良い使い方を常に考えている	1	2	3	4	5	6	7
当社では、連絡担当者を使って、異なる事業単位間の活動を調整している	1	2	3	4	5	6	7

私たちの調査にお時間を割いていただきましてありがとうございました。

回答していただきましたこのアンケート用紙は同封いたしました封筒にてご返送ください。

APPENDIX 6. Comparison between respondents and non-respondents

Group Statistics				
Grouping variables	**Respondents' group**	**N**	**Mean**	**Std. Deviation**
Annual_sales	respondents	122	234093.033	676682.118
	non-respondents	1898	186159.929	592196.109
Total_assets	respondents	122	306648.665	675046.454
	non-respondents	1901	1121187.967	10851889.838
Age	respondents	122	7.540	1.560
	non-respondents	1898	6.416	1.551
Size	respondents	122	69.156	41.287
	non-respondents	1786	58.097	27.457

Independent Samples Test: t-test for equality of means					
		t	**df**	**Sig. (two-tailed)**	**Mean Difference**
Annual_sales	Equal variances assumed	.859	2018	.391	47933.104
	Equal variances not assumed	.764	133.186	.446	47933.104
Total_assets	Equal variances assumed	-.829	2021	.407	-814539.302
	Equal variances not assumed	-3.178	2020.676	.002	-814539.302
Age	Equal variances assumed	7.759	2018	.000	1.124
	Equal variances not assumed	7.718	136.825	.000	1.124
Size	Equal variances assumed	4.142	1906	.000	11.059
	Equal variances not assumed	2.915	128.414	.004	11.059

APPENDIX 7. Comparison between the 1st and the 2nd waves' respondents

Group Statistics				
Grouping variables	**Respondents' group**	**N**	**Mean**	**Std. Deviation**
Annual_sales	1st_wave	79	268379.620	799380.408
	2nd_wave	34	189317.176	394069.616
Total_assets	1st_wave	79	327171.672	712500.396
	2nd_wave	34	304798.059	675263.645
Age	1st_wave	79	72.456	45.728
	2nd_wave	34	61.471	29.193
Size	1st_wave	79	7.546	1.691
	2nd_wave	34	7.466	1.243

Independent Samples Test: t-test for equality of means					
		t	**df**	**Sig. (two-tailed)**	**Mean Difference**
Annual_sales	Equal variances assumed	.548	111	.585	79062.444
	Equal variances not assumed	.703	108.893	.484	79062.444
Total_assets	Equal variances assumed	.155	111	.877	22373.614
	Equal variances not assumed	.159	65.808	.874	22373.614
Age	Equal variances assumed	1.290	111	.200	10.985
	Equal variances not assumed	1.530	94.778	.129	10.985
Size	Equal variances assumed	.250	111	.803	.080
	Equal variances not assumed	.281	83.938	.779	.080

APPENDIX 8. Comparison between the 1st wave and the combined 3rd&4th waves' respondents

Group Statistics				
Grouping variables	**Respondents Group**	**N**	**Mean**	**Std. Deviation**
Annual_sales	1st_wave	79	268379.620	799380.408
	3r_and_4th waves	9	102286.222	123006.486
Total_assets	1st_wave	79	327171.672	712500.396
	3r_and_4th waves	9	133493.444	154261.951
Age	1st_wave	79	72.456	45.728
	3r_and_4th waves	9	69.222	38.986
Size	1st_wave	79	7.546	1.691
	3r_and_4th waves	9	7.771	1.573

Independent Samples Test: t-test for equality of means					
		t	**df**	**Sig. (two-tailed)**	**Mean Difference**
Annual_sales	Equal variances assumed	.619	86	.537	166093.398
	Equal variances not assumed	1.680	80.069	.097	166093.398
Total_assets	Equal variances assumed	.809	86	.421	193678.228
	Equal variances not assumed	2.034	58.624	.047	193678.228
Age	Equal variances assumed	.204	86	.839	3.233
	Equal variances not assumed	.231	10.677	.821	3.233
Size	Equal variances assumed	-.380	86	.705	-.225
	Equal variances not assumed	-.402	10.226	.696	-.225

APPENDIX 9. Comparison between the 2nd wave and the combined 3rd&4th waves' respondents

Group Statistics				
Grouping variables	**Respondents' group**	**N**	**Mean**	**Std. Deviation**
Annual_sales	2nd_wave	34	189317.176	394069.616
	3r_and_4th waves	9	102286.222	123006.486
Total_assets	2nd_wave	34	304798.059	675263.645
	3r_and_4th waves	9	133493.444	154261.951
Age	2nd_wave	34	61.471	29.193
	3r_and_4th waves	9	69.222	38.986
Size	2nd_wave	34	7.466	1.243
	3r_and_4th waves	9	7.771	1.573

Independent Samples Test: t-test for equality of means					
		t	**df**	**Sig. (two-tailed)**	**Mean Difference**
Annual_sales	Equal variances assumed	.649	41	.520	87030.954
	Equal variances not assumed	1.101	39.621	.278	87030.954
Total_assets	Equal variances assumed	.750	41	.458	171304.614
	Equal variances not assumed	1.352	40.760	.184	171304.614
Age	Equal variances assumed	-.660	41	.513	-7.752
	Equal variances not assumed	-.557	10.495	.589	-7.752
Size	Equal variances assumed	-.619	41	.539	-.305
	Equal variances not assumed	-.539	10.792	.601	-.305

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