

FUNDAÇÃO GETULIO VARGAS  
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**CULTURAL STRATEGIES: HOW DO NATIONAL CULTURES IMPACT THE  
OPERATIONS STRATEGY?**

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Unisinos

*To my Husband, my support and best friend.*

*To my Father, my first professor in life. May he rest in peace.*

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## ABSTRACT

Through the assessment of the fourth round of the High Performance Manufacturing (HPM) project and the introduction of Hofstede's Cultural Classification, the present work aims to deepen the comprehension of the impact of National Cultures on firms' Operations Strategy. The ANOVA comparisons of four Operations Strategy elements in countries with different industrialization and development backgrounds (e.g. Germany, China, Brazil and South Korea) suggest that while Integrating Leadership and Implementation of Manufacturing Strategy are affected by the cultural levels of Power Distance, Individualism vs. Collectivism and Uncertainty Avoidance, the other two elements of Operations Strategy, Functional Integration and Formal Manufacturing Strategy, show effects of the degree of Individualism vs. Collectivism and Long-Term Orientation. The results of the study are expected to offer new perspectives on the planning and implementation of strategic and operations management for both practitioners and academics. More specifically, the analysis of cross-cultural influence over operations strategy may contribute to a better understanding of how cooperative behavior may lead firms to generate higher rents through the strengths and weaknesses of their relations, particularly in terms of global supply chains.

**Key Words:** National Culture, Operations Strategy, Hofstede



## RESUMO

Pela análise da quarta rodada do projeto High Performance Manufacturing (HPM) e com a introdução da Classificação Cultural de Hofstede, o presente trabalho objetiva aprofundar a compreensão do impacto de Culturas Nacionais nas Estratégias de Operações das empresas. As comparações de ANOVA de quatro elementos de Estratégia de Operações em países com diferentes passados de industrialização e desenvolvimento (e.g. Alemanha, China, Brasil e Coréia do Sul) sugerem que enquanto Liderança Integrativa e Implementação de Estratégia de Produção são afetadas por níveis culturais de Distância de Poder, Individualismo vs. Coletivismo e Aversão à Incerteza, os outros dois elementos de Estratégia de Operações, Integração Funcional e Estratégia Formal de Produção, mostram efeitos do grau de Individualismo vs. Coletivismo e Orientação de Longo-Prazo. Espera-se que os resultados do estudo ofereçam novas perspectivas no planejamento e na implementação da gestão estratégica e de operações tanto para práticos quanto para acadêmicos. Mais especificamente, a análise da influência multi-cultural na estratégia de operações pode contribuir para um melhor entendimento de como o comportamento cooperativo pode levar organizações a gerar maiores rendas através de forças e fraquezas de suas relações, particularmente em termos de cadeias de suprimentos globais.

**Palavras-chave:** Cultura Nacional, Estratégia de Operações, Hofstede

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# 1 Introduction

Cross-cultural studies have been considered increasingly important for the Operations Management (OM) literature as some of the current central questions of the field rely on operations between different countries. Issues of great practical impact such as Internationalization, Global Supply Chains, International Outsourcing, among others, involve a level of decisions that are inevitably beyond traditional management strategic choices. Idiosyncrasies of countries, if not properly recognized, might represent a source of additional unpredictability to international trade, seriously compromising the reliability of these arrangements. The delimitation of eventual variances within countries attributable to geographic, historical, sociological or to any other national factor would certainly be of great importance not only to management in general, but to empirical academic studies also. In that sense, a further comprehension on how businesses are impacted by the influence of countries (or the specific culture attached to them) may be particularly useful on future OM research.

Within OM, the field of Operations Strategy (OS) comprehends one of the most sensible areas to this issue, as the planning, implementation, coordination and control over Operations may be surrounded by cultural factors. Empirical evidences have already been provided on that direction. The recognition by authors of such social aspects as a possibly relevant explanation for the different patterns observed, allied to their signaling of a promising research field, corroborate the idea of the need for a further step on the comprehension of the human behavior and cultural impact on OS as a whole. In order to fulfill this need, the present work will be guided to answer the following research question: To what extension do national cultures explain the different elements of operations strategy?

As a starting point on that task, this research aims to empirically analyze the causality and the strength of the relation between national cultures and operations strategy. Through the assessment of the fourth round of the High Performance Manufacturing (HPM) project data and the introduction of Hofstede's cultural classification, the present study deepens the comprehension of a so far not well-understood portion of the variances observed on previous empirical research. The intersection between a broad, multicultural, detailed and methodologically rigorous source of information such as the HPM project with one of the most respected works on cultural diversity as Hofstede's research brings the opportunity to properly enlighten the issue.

The theoretical background session presents a discussion over Operations Strategy and the concepts of strategy formulation and implementation, as well as functional integration and leadership. Hofstede's national cultural dimensions are introduced and discussed next, followed by the description of the method. The results are then presented, with its discussion, theoretical and practical implications, and conclusion. Limitations of the study and suggestion for future research are then presented.



## 2 Theoretical Background

The literature review intends to present the main references regarding each theme approached or relevant to the present work. Therefore, this section seeks a valid and building discussion over the research issues concerning Operations Strategy elements and National Cultures. The further assessment of the interaction between these two (apparently) non-related major themes offers promising perspectives for the comprehension of different patterns of operational behavior among countries, as well as around some of the so-far nebulous question present on a relevant part of the literature. Moreover, once decision-making processes ultimately concerns human action, the insertion of the study of cultural patterns capable of influencing strategic choice may be also useful for the prediction of operational performance.

### 2.1. Operations Strategy

A considerable portion of OM literature dedicates to the discussion over different patterns, possibilities or beliefs regarding Operations Strategy (OS) as a whole, or Manufacturing Strategy more specifically. This debate has driven a substantial part of the development of the field since its earliest stages. At the end of this chapter, the reader is expected to understand the importance of the study in order to empirically support the comprehension of different elements of Operations Strategy across diverse cultural scenarios, one of the current sources of misunderstandings related to the issue. To position this work, it is important to discuss the development of the different conceptualizations on Operations Strategy through the OM literature, as follows.

The roots of this discussions leads back to the seminal work of Skinner (1966, 1969) and his understanding on the manufacturing function positioning and alignment in relation to other strategic levels inside a firm. The author questioned the classically assigned view to manufacturing, on which its strategic importance would be solely linked to the reach of cost efficiency. According to his comprehension, manufacturing could contribute to the business strategy through the development of other capabilities, such as quality, dependability and flexibility, in agreement to the strategic direction adopted by corporate management.

Over that statement follows the comprehension that the Operations Strategy shall be projected and implemented in a way that it is capable of fulfilling punctual strategic tasks aligned to the corporate competitive strategy. The next step on Skinner's work regards the presentation and definition of the competitive priorities concept. According to the author, the strategic choice of developing a certain capability would inevitably imply in the renunciation of the development of others. That condition of one choice over all others basically determines the nature of what would be better known as the trade-off model. The main strategic role of manufacturing would be to choose among four generic competitive priorities then: cost efficiency, quality, dependability and flexibility. Examples of such decisions are presented in Chart 1 below, 1 adapted from the author's "Some important trade-off decisions in manufacturing – or 'you can't have it both ways'" (SKINNER, 1969:141).

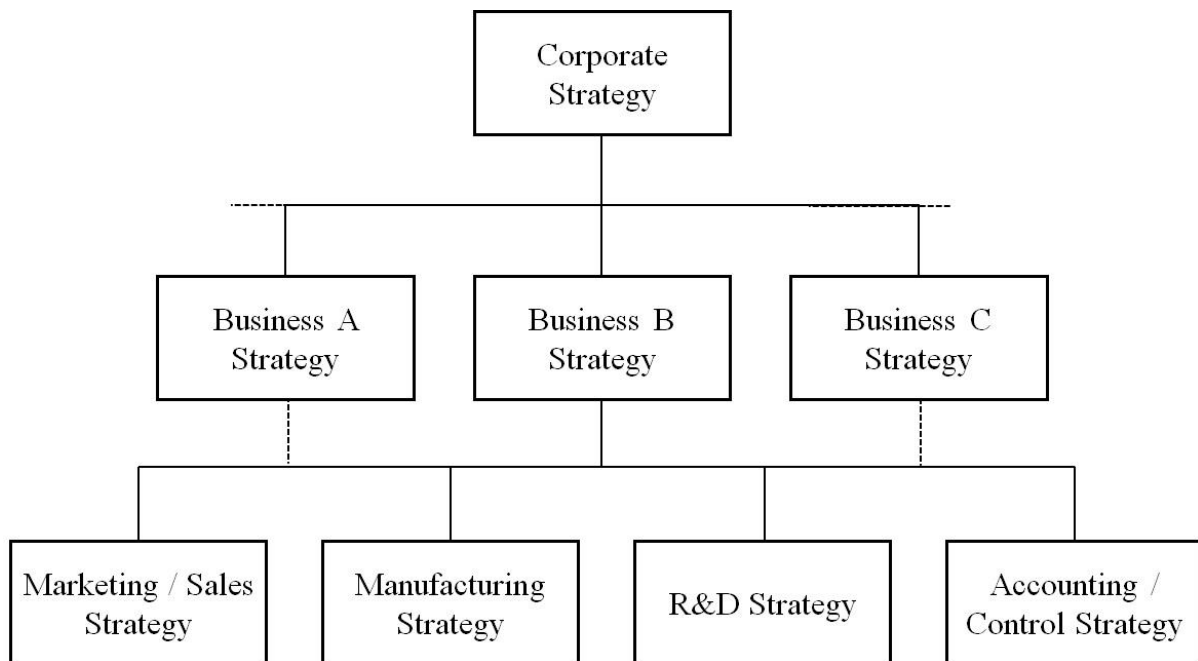
**Chart 1: Examples of Trade-Off Decisions in Manufacturing Strategy**

Decision Area	Decision Category	Nature of Decision	Decision	Alternatives
Plant and Equipment	Vertical Integration	Structural	Span of process	Make / buy
	Facilities	Structural	Plant size	One big plant / several smaller ones
	Facilities	Structural	Plant location	Near markets / near materials
	Facilities	Structural	Investment decisions	Buildings / equipment / inventories / research
	Technology	Structural	Choice of equipment	General- / special-purpose
	Technology	Structural	Kind of tooling	Temporary / minimum / "production tooling"
Production Planning and Control	Quality	Tactical	Frequency of inventory taking	Few / many breaks in production for buffer stocks
	Quality	Tactical	Inventory size	High / low
	Quality	Tactical	Degree of inventory control	Great / less detail
	Quality	Tactical	What to control	Minimize machine downtime / minimize labor cost / minimize process time/ maximize output
	Quality	Tactical	Quality control	High reliability and quality / low costs
	Quality	Tactical	Use of standards	Formal / informal / none at all
Labor and Staffing	Workforce	Tactical	Job specialization	High / none
	Workforce	Tactical	Supervision	Technically / nontechnically trained
	Workforce	Tactical	Wage system	Many / few job grades; incentive / hourly wages
	Workforce	Tactical	Supervision	Close / loose
	Workforce	Tactical	Industrial engineers	Many / few
Product Design / Engineering	Capacity	Structural	Size of product line	Many / few / none customer specials
	Capacity	Structural	Design stability	Frozen / many engineering change orders
	Technology	Structural	Technological risk	Use of new process unproved by competitors / follow-the-leader policy
	Technology	Structural	Engineering	Complete packaged design / design-as-you-go approach
	Technology	Structural	Manufacturing engineering	Many / few
Organization and Management	Organizations	Tactical	Kind of organization	Functional / product focus / geographical / other
	Organizations	Tactical	Executive use of time	Investment / production planning / cost control / quality control / other activities
	Organizations	Tactical	Degree of risk assumed	Decisions based on much / little information
	Organizations	Tactical	Use of staff	Large / small
	Organizations	Tactical	Executive style	Much / little involvement in detail; authoritarian / nondirective style; much / little contact with organization

Source: Adapted from SKINNER (1969) and WHEELWRIGHT (1984)

Other scholars, such as Wheelwright (1984), reinforced the understanding of Operations Strategy under the comprehension of the trade-off model. The author presented a different view on the manufacturing strategic relevance though, positing that it represents the philosophy of

the entire firm. Accordingly, the primary objective of the manufacturing function is the development and the support to lasting competitive advantages, representing a much more relevant role if compared do Skinner’s understanding. The manufacturing function is considered as important as other corporate functions on what regards the business strategic pursuit, as displayed by the author in Figure 1 below. Despite apparently relegated to a secondary discussion, the different comprehensions over the importance and relevance of the manufacturing function for corporate strategy represent one of the first sources of disagreement on the literature, representing what seems to have come to be a pattern in the development of the field. Different approaches kept on emerging, as discussed ahead.

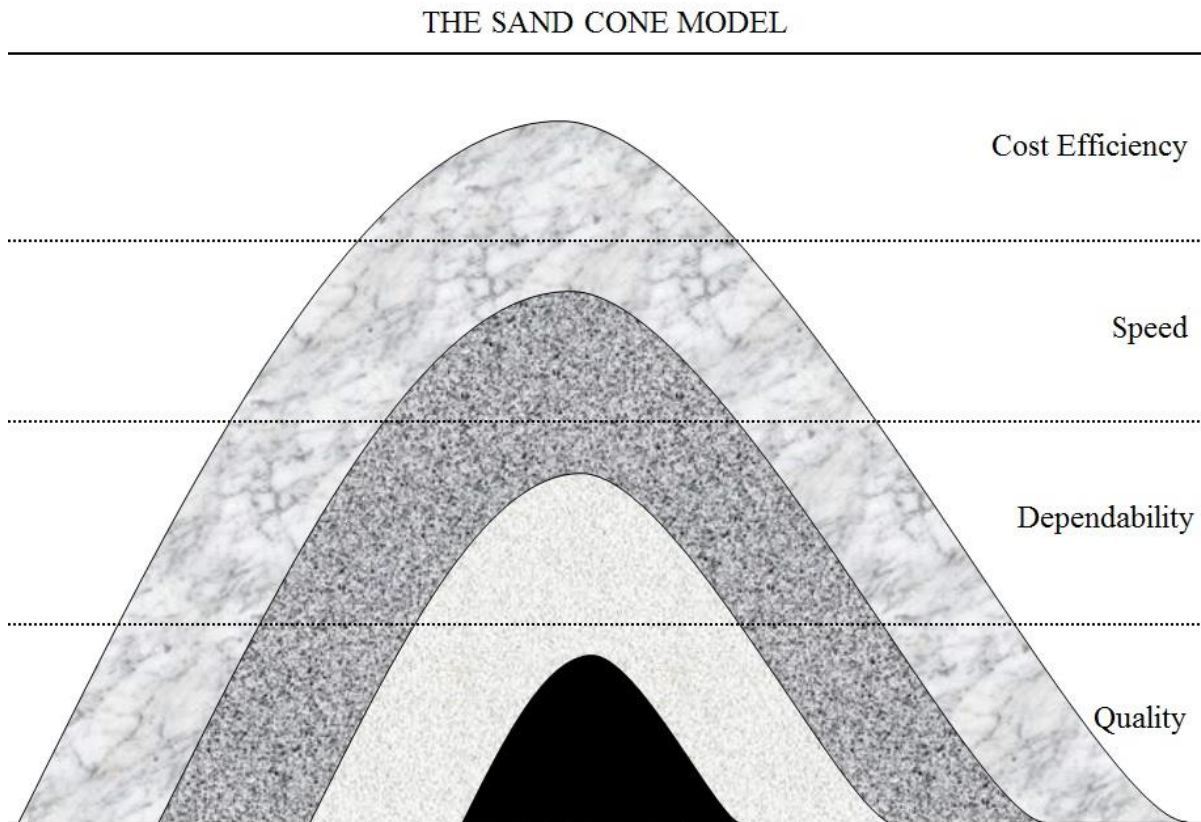


**Figure 1: Levels of Strategy in Wheelwright (1984)**

Source: Adapted from WHEELWRIGHT (1984:83)

Nakane (1986) proposed that the Japanese manufacturing model was not based on trade-offs, but in a pre-determined sequence for the acquisition and development of capabilities instead. According to him, the development of quality would be the basis for the development of other capabilities – dependability, flexibility and cost efficiency. Ferdows and De Meyer’s (1990) empirical study ran with a sample of European companies and, in turn, proposed alternatively a pattern of cumulative capabilities which they named the “sand cone model” (Figure 2), where the development of capabilities would work as a basis to the development of the following. The capabilities development sequence suggested by the authors would then be: quality,

dependability, flexibility and cost efficiency. The different proposed sequences in the models above may have been the first evidence of the influence of cultural aspects on Operations Strategy.



**Figure 2: Development of Lasting Manufacturing Capabilities**

Source: Adapted from FERDOWS; DE MEYER (1990:175)

Whatever the origin of the concept, or the nature of its development, the literature on OM seems to comprehend the development of capabilities as the basic production manager objective and the main performance driver of a plant unit, as observed by Boyer and Lewis (2002). They state that competitive priorities shall be faced as the main decision variable one in charge of a firm's operations may be concerned about. A plant would then be able to reach the desirable levels of performance through the selection of priorities and the strategic emphasis on the development of specifically chosen manufacturing capabilities. Over this comprehension, operational capabilities can be understood as plant competitive priorities, if designed to strengthen a particular weakness. In that sense, authors such as Swink and Way (1995) highlight the relevance of competitive priorities, even as an important factor on empirical studies of OM.

Despite the solid foundation of research over the issue, main questions still remain not properly answered (FLYNN; FLYNN, 2004). According to the authors these lacks mainly comprehend:

“the use of multiple terms for the same concept, operationalization of the cumulative capabilities construct, confusion in definition of specific capabilities, the relationship of cumulative capabilities to performance, optimal sequences of cumulative capabilities and identification of the environmental and structural contingencies under which cumulative capabilities are more likely” (FLYNN; FLYNN, 2004:440)

The latest is normally attributed to different historical development patterns, or more broadly, different cultural aspects. The lack of consensus over capabilities and competitive priorities concepts and patterns and the attribution of its divergences to cultural diversities have also a direct impact on the Operation Strategies comprehension. As pointed by Collis (1994), capabilities are in the center of the process of formulating, choosing and implementing strategies at an organization.

Besides new undertakes of the seminal works, such as the one portrayed in Pagell, Melnyk and Handfield's (2000) argument for the existence and importance of trade-offs, recent research on Operations Strategy links capabilities development to a number of various topics. Frohlich and Westbrook (2001), for instance, developed an international study of 322 manufacturers in 23 countries, linking buyer-supplier integration to the improvement of multiple performance measures. In an extension of this study, Rosenzweig, Roth and Dean Jr. (2003) attest for the mediating effect of manufacturing-based capabilities in the relationship between supply chain integration and business performance.

Organizational knowledge is also argued to impact companies, as Paiva, Roth and Fensterseifer (2008) rely on a Resource-Based View (RBV) approach to understand its effect on Manufacturing Strategy formulation. The authors propose a model in which manufacturing knowledge nurtured by cross-functional practices favors the creation of products with RBV's core characteristics (i.e. rare and valuable), and therefore contributing to competitive advantage. Also under this theme, Aboelmaged (2012) employed a survey method to find that organizational knowledge acquirement, sharing and utilization have positive impacts in Operations Strategy outcomes. Studies have also advanced within innovation and new technologies environment. Silveira (2003) opens an exploratory research on operational distinctive competencies in e-commerce companies, connecting them to business strategy. Rosenzweig, Laseter and Roth (2011) extend Service Operations Strategy literature by

analyzing business-to-business e-service strategy, and Finger, Flynn and Paiva (2014) explore the antecedents and consequences of anticipation of new technologies in a supply chain context.

Regarding the OS literature, Leong, Snyder and Ward (1990) called for the need to properly distinguish research on process and content. We borrow from Rytter, Boer and Koch's (2007) definition, positing that process concerns "how to conduct OS formulation and implementation processes" (RYTTER; BOER; KOCH, 2007:1094). The other major OS approach regards content, or "how operations can create competitive advantage, by providing normative guidelines on what to include when formulating an OS" (RYTTER; BOER; KOCH, 2007:1094), concentrating the largest portion of the literature when it comes to topical focus (BOYER; SWINK; ROSENZWEIG, 2005). Chart 2 below illustrates definitions for each perspective in the literature. The elements selected for this study (i.e. Integrating Leadership, Functional Integration, Implementation of Manufacturing Strategy and Formal Manufacturing Strategy) are comprehended within the processual approach of Operations Strategy, as we understand that they may be more susceptible to behavioral influences such as the ones defined by cultural differences than content ones.

**Chart 2: Operations Strategy Process and Content definitions in the Literature**

Reference	OS Process	OS Content
Schroeder, Anderson and Cleveland (1986:406)	"formulating and implementing manufacturing strategy"	"type of strategies used, the way they are defined, the linkage with business strategies, and (...) whether they help the business gain a competitive advantage"
Leong, Snyder and Ward (1990:110)	"how strategic decisions are reached in an organizational setting"	"specific of what was decided"
Platts, Mills, Bourne, Neely, Richards and Gregory (1998:517)	"process by which strategy can be formed"	linkage between "competitive criteria and manufacturing decision areas"
Boyer, Swink and Rosenzweig (2005:443)	"operations competitive priorities and capabilities as well as structural (e.g., capacity, technology) and infrastructural (e.g., workforce) choices and configurations"	"strategy decision-making and development, communication of strategic decisions within the organization, and strategy implementation"
Rytter, Boer and Koch (2007:1094)	"how to conduct OS formulation and implementation processes"	"how operations can create competitive advantage"

As manufacturing concerns shifted from standard designs and mass production to a global marketplace competition, companies are being forced to develop multiple strategic priorities (PRASAD; BABBAR; MOTWANI, 2001) and scholars are turning to international contexts. Rudberg and West (2008) build on a case study of Ericsson Radio Systems to propose a theoretical model for coordination of international operations and manufacturing network

management. Paiva and Vieira (2011), in their multiple cases study, assess the development of Operations Strategy in global value chains. The authors' findings indicate that strategic choices and changes do contribute to new capabilities development, influencing the companies' value chain. The growing presence of global supply chain management is reinforced by Connelly, Ketchen and Hult (2013), as they borrow from six organizational theories to lay down an investigation path to the theme.

In such international panoramas, cultural interface is constantly arising. As discussed by Carson (2005), organizational success has been increasingly influenced by organizational leadership as the world seeks to adapt to globalization. In that sense, the relation between leadership and national cultures has been addressed in literature through different perspectives. House, Hanges, Javidan, Dorfman and Gupta (2004), for instance, empirically demonstrated the relation in the contexts of international business. Other authors, in turn, focus on shared forms of leadership, departing from the traditional views that accounts for leadership as a top-down process dependent on hierarchical positioning (CARSON, 2005).

According to that perspective, leadership would be comprehended as a process of reciprocal influence within organizations, resulting in leadership tasks, roles and behaviors shared by multiple individuals (BARRY, 1991; SEERS, 1996; PEARCE; SIMS, 1999; PEARCE; SIMS, 2000), with shared leadership being considered as a promising approach to the maximization of workers' effectiveness (AVOLIO; JUNG; SIVASUBRAMANIAN, 1996; PEARCE; SIMS, 2002; SIVASUBRAMANIAN; MURRY; AVOLIO; JUNG, 2002). On that regard, "the intersection of organizational leadership and cultural values represents a fruitful area of understanding for those interested in improving organizational success" (CARSON, 2005:1). For the present study, such intersection is tested by understanding the impact of the national cultures dimensions on Integrating Leadership.

Functional Integration, on the other hand, has been argued to be negatively influenced by geographical distance within and across countries, with differences in national cultures amplifying problems to its implementation (GABARRO, 1992). According to the author, cultural differences would make suspicion festers and miscommunication more routine, presenting additional difficulties to the integration of different functions in an organizational context. The influence of firms' sizes on the awareness of the role of Manufacturing Strategy, as well as on its formulation and implementation has been addressed by several studies through

literature (e.g. WINROTH, 2004; LÖFVING, 2014). The impact of national cultures differences, however, has not received quite the same attention. As discussed by Kalchschmidt and Mazzoleni (2012), the key question assessed in the literature regarding Manufacturing Strategy and national cultures is “whether manufacturing practices are equally effective across different countries” (KALCHSCHMIDT; MAZZOLENI, 2012:1).

Finally, as discussed by Schroeder and Flynn (2001), differences in how Manufacturing Strategy is implemented have been found according to the specific country analyzed. Such finding may suggest the influence of national cultures on this specific issue. The strategic decision process is also argued to be influenced by national cultures, with different countries equally presenting different patterns on that regard (BUILTJENS; NOORDERHAVEN, 1996).

Based on these previous discussions, and advancing the literature to a narrower aspect of Manufacturing Strategy, the present work intends to empirically evaluate the relation of different manufacturing strategies patterns and cultural differences. The following points address specific manufacturing strategy concepts and elements that integrate the proposed study.

### **2.1.1. Integrating Leadership**

Leadership can be defined as “a process of social influence in which the leader enlists the talents and efforts of other group members, (...) in order to accomplish the group’s chosen task” (CHEMERS, 2003:5). Throughout the evolution of organizational fields, the leadership concept has been addressed as a subject of research from diverse perspectives. Studies have demonstrated, for instance, the importance of innovation leadership behaviour in different components of performance outcomes, such as relationship, product and economic (CARMELI; GELBARD; GEFEN, 2010). Other studies concentrate on aspects related to the figure of the chief-executive-officer (CEO) inside organizations, analysing the impact of their leadership role in organizational learning (VERA; CROSSAN, 2004), in diverse strategic outcomes (RESICK; WHITMAN; WEINGARDEN; HILLER, 2009) and in the quality improvement of strategic decisions (CARMELI; TISHLER; EDMONDSON, 2012).



Strategic leadership, in turn, has been linked with business ethics (THOMAS; SCHERMERHORN JR.; DIENHART, 2004), wealth creation (ROWE, 2001), and the capacity to learn and change (BOAL; HOOIJBERG, 2000). Ultimately, once “strategic management is fundamentally a social and political activity”, it is subject to behavioural and environmental components, as “decision makers are informed, influenced, and sometimes constrained by others, both inside and outside the organization” (FINKELSTEIN; HAMBRICK; CANNELLA JR., 2009:5), being affected by individual characteristics of the leaders along with organizational abilities (DAVIES; DAVIES, 2004). Akins, Bright, Brunson and Wortham (2013) define ten qualities that contribute to effective leadership, among which - based in Clawson’s (2006) levels – is the quality of engagement. According to the authors “Leaders must remain fully engaged with all elements of leadership” (AKINS; BRIGHT; BRUNSON; WORTHAM, 2013).

Specifically for the manufacturing function, Wheelwright (1984) asserts for the “critical importance” of leadership “to the overall success and direction of the company” (WHEELWRIGHT, 1984:79). We go back to Skinner’s (1969) argument – the need of what he calls the alignment of the manufacturing function with other strategic levels – made possible by the exercise of an “innovative management”:

“The innovative attitude requires willingness on the part of the people at the top to listen, to encourage, and to go to work themselves at converting crude guesses into understanding, the first glimpse into vision, and excitement into results (...) It is a highly organized, disciplined, and systematic process” (SKINNER, 1969:145).

The author sets the tone for what we understand as *integrating leadership*, demonstrated by the integrative-oriented role of upper management toward subordinates. In a procurement scenario, Trent (1996) highlights the critical impacts of leadership in cross-functional environments, as they nurture collaboration and coordination in multi-boundaries teams. Webber (2002) reports the influence of leadership actions to establish trust within cross-functional teams, with leadership individuals having “primary responsibility for team effectiveness” (ZACCARO; KLIMOSKI, 2002:4).

### 2.1.2. Functional Integration

Functional integration has lately been a trend topic both in academic literature as well as among practitioners. Throughout several studies and business observations the need for clean flows of information and cooperation capable to connect the diverse functions within organizations has been associated with the development of capabilities and with performance. Among others, researches point to the impact of the integration between inter-organizational functions, such as those encountered in buyer-supplier relationships, and logistics total costs (LARSON, 1994), beyond the effect of supply chain integration in organizational performance (KIM, 2006), organizational knowledge creation (PAIVA; ROTH; FENSTERSEIFER, 2008) and transformation (HIRUNYAWIPADA; BEYERLEIN; BLANKSON, 2010). Huang and Newell (2003) analyse cross-functional projects scenarios to find out how knowledge integration practices are built and nurtured, while Pagell (2004) launched an exploratory study to understand the factors that enhance and the ones that retract integration between operations, logistics and purchasing functions.

Other studies have also examined the integration between specific functions integration and areas of related outcomes. The relationship between manufacturing and marketing functional areas, for instance, has been largely accepted to impact organizational performance (O'LEARY-KELLY; FLORES, 2002) and business outcomes (HAUSMAN; MONTGOMERY; ROTH, 2002). Through the cumulative capabilities approach, Paiva (2010) assesses the integration between these two functions suggesting that it is, along with managerial priorities, positively related to business performance. Research by Nakata and Im's (2010), in turn, reveals cross-functional integration as a major contributor to the performance of new products, with the first being co-determined by internal (i.e. social cohesion and superordinate identity) and external (i.e. market-oriented reward programs, formalization of the planning process and managerial risk encouragement) factors. Cross-functional cooperation can also lead to new product development success in certain environments, such as those presenting high technological and market risks (GEMSER; LEENDERS, 2011). Furthermore, the integration between research and development (R&D), marketing and manufacturing functions has also been explored as a predecessor of effectiveness and efficiency in some stages of new product development projects (BRETTEL; HEINEMANN; ENGELEN; NEUBAUER, 2011).

More recent articles continue to explore the impact of cross-functional integration and performance (FOERSTL; HARTMANN; WYNSTRA; MOSER, 2013), although not always finding a positive relation. Turkulainen and Ketovivi (2012) show that such effect depends on the dimension of disaggregated performance and on the environment in which it is being held. Cross-functional cooperation contribution to knowledge sharing practices or behaviour (GHOBADI; D'AMBRA, 2012) and the internal drivers that lead to integration success from a team perspective (DASPIT; TILLMAN; BOYD; McKEE, 2013) also portrait some of the latest topics on this Operations Strategy element.

We borrow from Paiva, Roth and Fensterseifer's (2008) definition of cross-functional integration orientation as "the ability of manufacturing to interact with other functional areas in order to improve a company's strategies and processes" (PAIVA; ROTH; FENSTERSEIFER, 2008:117). The degree of integrative orientation and leadership affects not only the way work is done (i.e. Operations), but also the basis on which it is planned (i.e. Strategy). Hence, integrative leadership and functional integration are expected to be disturbed by differences within the dimensions of national cultures.

### **2.1.3. Implementation of Manufacturing Strategy**

Manufacturing Strategy may be understood as one of the most prominent topics within Operations Management literature, as the discussion around it has addressed several relevant subjects of the field. Such relevance is highlighted by authors as Dangayach and Deshmukh (2001) through the numbering of several themes discussed within Manufacturing Strategy (e.g. manufacturing capabilities, best practices, strategic decisions and performance). Other authors argue in the same direction. In that sense, the relationship between Manufacturing and Competitive Strategy, beyond its influence on firms' performance has been empirically demonstrated by Amoako-Gyampah and Acquah's (2008). Moreover, Thun (2008), based on a former round of the High Performance Manufacturing project, argues that superior outcomes may be reached through the fostering of special manufacturing strategies (i.e. market-based, resource-based, integrated).

Through the comparison of samples from the US, South Korea and Japan, the gap between manufacturing strategy and practice has been discussed by Rho, Park and Yu (2001). The

authors analysed how business performance is affected by such issue, having found significant differences in performance groups for quality, cost and flexibility in the two first countries. Practical relevance is also evident on what concerns the growing number of infrastructural manufacturing strategies such as Just-in-Time (JIT), Total Quality Management (TQM) and Statistical Process Control (SPC) among others, as these strategies are prescribed and implemented in the search of the enhancement of productivity and quality, as well as on cost reduction processes. In that direction, empirical evidences are provided by several studies. Laosirihongthong and Dangayach (2005) for instance discuss the efforts placed by newly industrialized countries on the improvement of competitive priorities through the implementation of such strategies, while Inman, Sale, Green Jr and Whitten (2011) focus on the linkage between manufacturing strategies and firm performance. Tu, Vonderembse, Ragu-Nathan and Sharkey (2006) point to the role that manufacturing strategies play on costumers' perception of value. Barnes (2002) in turn offers a small plants' perspective around the Manufacturing Strategy building process. As discussed by the author, in those cases, Manufacturing Strategy is strongly impacted by political, managerial and cultural factors. The Implementation of Manufacturing Strategy is also argued to be transformed by behavioural issues. As discussed by Marucheck, Pannesi and Anderson (1990) "executives described the implementation process as one of gaining employee acceptance of the strategy through lower level involvement and teamwork" (MARUCHECK; PANNESI; ANDERSON, 1990:101).

Also in line with this current are recent studies such as Zatzick, Moliterno and Fang (2012), about the implementation of TQM in manufacturing firms and its relationship with performance. Mellor, Hao and Zhang (2014) developed a qualitative case study assessing the implementation of additive manufacturing strategies, and Roh, Hong and Min (2014) approach the strategy implementation for supply chain responsiveness in manufacturing companies. The authors uncover size of the firms, industry traits and customer/supplier bases as essential contextual drivers for the success of the strategy implementation.

#### **2.1.4. Formal Manufacturing Strategy**

The relevance of Formal Manufacturing Strategy has been increasingly recognized in Operations Strategy. Pioneer authors such as Cohen and Lee (1985), for instance, argue that "the development of strategies directed towards improving the performance of manufacturing

operations has recently become a critical component of the competitive strategy of many firms” (COHEN; LEE, 1985:153). Acur, Gertsen, Sun and Frick (2003) in turn claim the resurgence of Skinner’s “missing link” as their cross-country empirical data suggests that the formalization of Manufacturing Strategy is strongly related to better fit between improvement goals and action programs to competitive objectives. For Miltenburg (2005), Manufacturing Strategy reflects the pattern of decisions that will be made over time, with the existence of formal or informal rules within this process being dependent on cultural idiosyncrasies. Still accordingly, “when a formal manufacturing strategy exists, decisions follow a neat, logical pattern. When no strategy exists, the pattern is erratic and unpredictable” (MILTENBURG, 2005:2).

In his analysis of Swedish enterprises Tunälv (1992) found that, in organizations that carried a formal strategy plan, the identification of “action programmes for investment” is comprehended as a determinant step in the achievement of significantly higher profitability. Kim and Arnold (1996) corroborate the idea. According to the authors, “action programmes for investment” may be classified as one of the three components of Manufacturing Strategy, along with competitive priorities and manufacturing objectives. Pun (2004) emphasizes the literature that posits the formulation and implementation of such formulated strategy as a skill that might act as a source of competitive advantage. The author goes on to propose a conceptual framework for strategy formulation. Acur and Englyst (2006), by identifying and merging three different strategy evaluation approaches (i.e. goal-centred, comparative and improvement), seek to present a assessment tool to improve quality of strategy formulation processes, taking in account its different stages of strategic thinking, planning and embedding. Terpend, Krause and Dooley (2011) build on a sample of 226 U.S. manufacturing firms and a cluster analysis technique to reach the discovery of purchasing strategy patterns.

From a different undertake of the subject, Gebauer (2009) assesses the extent to which service orientation (i.e. strategy formulation and implementation) is affected by managerial attention, and Ocasio and Joseph’s (2015) work applies the lenses of attention-based view to bridge micro and macro perspectives in the strategy formulation process. For these authors, strategy formulation is considered “a fluid and distributed process” and “a process of guided evolution” (OCASIO; JOSEPH, 2015:39), meaning that it builds on organizational attention at business and corporate levels.

## 2.2. National Cultures and Operations Strategy

Providing a full definition to culture represents a difficult task, once nothing exerts a broader and more relevant influence on several aspects of human behaviour (McCORT; MALHOTRA, 1993). Soares, Farhangmehr and Shoham (2007) also point the difficulty for a definition and the major consequences this brings to studies of market structure and behaviour. According to the authors, due to its complexity, the definition of the construct still lacks of convergence on what regards a common meaning in cross-cultural literature, what by itself presents an additional difficulty to the field and a source of critic to the studies of the area. Beside the discussion over the underdevelopment of the construct, scholars also call for other relevant issue over culture and its relation with the management literature, as discussed by Buzzell (1968) and Usunier (1999). Both authors relate culture as being used as a generic variable, comprising whatever could not be empirically supported or linked to any other “more tangible” variable. The awareness of academics of the indiscriminate use of the construct for such a long period reinforces the arguments of the urgency of enhancing the developments on the real understanding of culture and its consequences on management as a whole.

According to Sojka and Tansuhaj (1995) though, cross-cultural consumer researchers have generally defined culture according to three different approaches: language; artefacts and material goods; and value systems and beliefs. Language alone does not supply enough inputs around ethnic origins or micro culture clusters despite representing a useful interpretative code. Artefacts and material goods in turn are considered good instruments of study, once they contain themselves visible proof of cultural significance. Value systems and beliefs are considered of great importance in the study of cross-cultural studies. Considering business application however, the concept of culture is most commonly surrounded, comprehending the use of proxies that do not necessarily point directly to culture, but bases its definition on similar and arising characteristics, such as nationality (HOOVER; GREEN; SAEGERT, 1978; STEENKAMP; HOFSTEDE; WEDEL, 1999). The notion of National Cultures derives more directly from that late interpretation. Sekaran (1983) points that the words culture, country and nation are commonly used as synonyms. In addition, Steenkamp (2001) stands that empirical evidences of differences between countries support the idea of nationality and culture.

To DiMaggio (1994), cultural sociologists interpret national culture as a source of strong influence on the country as a whole, not only on its citizens but on its institutions and

organizations. Business and economic structures would then be considered culturally embedded, assuming different forms according to the specific culture they are in contact with. This notion opposes a view which is common to institutional economists, who argue that organizations would be more likely to be a source of culture to its surroundings than to absorb it, presenting greater levels of rigidity (BIGGART; DELBRIDGE, 2004). Cultural idiosyncrasies, if not properly addressed, represent a potential source of risk to internationalized firms as they gather meanings and perceptions that might considerably diverge from those valid on a firm's original country. The capacity to adapt or adjust firm's strategy to the specific and singular characteristics and behaviours of a given social group may be crucial to the success of its international endeavour.

Studies which have greatly enriched the literature around culture have been listed by Hofstede (2001), as through theoretical or empirical contributions they have presented different cultural dimensions. Chart 3 below summarizes the discussion:

Chart 3: Cultural Dimensions in the Literature

Reference	Basis for Dimensions	Cultural Dimensions
Aberle et al.(1950)	Society's Functional Prerequisites	<ol style="list-style-type: none"> <li>1. Adequate physical / social relationship with the environment</li> <li>2. Role differentiation (age, gender and hierarchy)</li> <li>3. Communication</li> <li>4. Shared knowledge, beliefs and rules of logical thinking</li> <li>5. Shared goals</li> <li>6. Normative regulation of means for achieving those goals</li> <li>7. Regulation of affection expression</li> <li>8. New members' socialization</li> <li>9. Effective control of disruptive forms of behavior</li> </ol>
Parsons and Shils (1951)	Patterns of Human Action	<ol style="list-style-type: none"> <li>1. Affectivity <i>versus</i> Affective neutrality</li> <li>2. Self-orientation <i>versus</i> Collectivity-orientation</li> <li>3. Universalism <i>versus</i> Particularism</li> <li>4. Ascription <i>versus</i> Achievement</li> <li>5. Specificity <i>versus</i> Diffuseness</li> </ol>
Inkeles and Levinson (1954)	Standar Analytic Issues	<ol style="list-style-type: none"> <li>1. Relation to authority</li> <li>2. Conception of self</li> <li>3. Primary dilemmas and ways of dealing with them</li> </ol>
Khuckhohn and Strodtbeck (1961)	Value Orientations	<ol style="list-style-type: none"> <li>1. Evaluation of the human nature</li> <li>2. Relationship of man to the surrounding natural environment</li> <li>3. Orientation in time</li> <li>4. Orientation toward activities</li> <li>5. Relationship among people</li> </ol>
Naroll (1970)	Characteristics of Institutions	<ol style="list-style-type: none"> <li>1. Weak to strong command of the environment</li> <li>2. Generalist to specialist occupation</li> <li>3. Simple to complex organizations</li> <li>4. Rural to urban populational patterns</li> <li>5. Wealth sharing to hoarding distribution of goods</li> <li>6. Consensual to authoritative leadership</li> <li>7. Responsible to exploitative elite behavior</li> <li>8. Vengeance to political function of war</li> </ol>
Driver (1973)	Characteristics of Institutions	<p>(continuation of Naroll)</p> <ol style="list-style-type: none"> <li>9. Populational density</li> <li>10. Gross national product</li> <li>11. Knowledge</li> <li>12. Number of words present in language</li> </ol>
Fiske (1992)	Elementary Forms of Sociability	<ol style="list-style-type: none"> <li>1. Communal sharing</li> <li>2. Authority ranking</li> <li>3. Equality matching</li> <li>4. Market pricing</li> </ol>

Source: Adapted from HOFSTEDE (2001)

Several other cultural factors have also been emphasized as affecting business. Buttery and Leung (1998) for instance have identified core differences in negotiation styles between Western and Chinese managers, while Seock and Lin (2011), based on cultural influences, have opposed Taiwanese consumers' loyalty and brand assessment to those of American ones. Neelankavil, Mathur and Zhang (2000) in turn highlight cross-cultural differences that mostly impact managerial performance. By profiling twelve years of international operations



management literature, Prasad and Babbar (2000) stress its crescent trend and concentration in performance impact. The authors note that “cultural effects of customs, languages, attitudes, motivation, social institutions, status symbols, and religious beliefs have all been documented in international operations literature” (PRASAD; BABBAR, 2000:211).

Within an Operations Management context, Ketkar, Kock, Parente and Verville (2012) have analysed individualism in buyer-supplier relationship. Based on a cross-cultural study comprehending US and Brazilian manufacturing organizations the authors found a negative influence of this particular cultural dimension in suppliers’ involvement in the production process. Still around the buyer-supplier relationship, Liao, Sharkey, Ragu-Nathan and Vonderembse (2012) have assessed autonomy and long-term strategic alignment as antecedents of trust in a supply chain management environment. Studies also bred the classical extensive comparison of automakers in Japan and in the U.S. (DYER, 1996), the understanding of factors that reinforces trust in automaker supplier relationships in U.S., Japan and Korea (DYER; CHU, 2000; DYER; CHU, 2011), and specific case studies on Toyota’s knowledge network with U.S. suppliers (DYER; NOBEOKA, 2000).

Also in the global context, and because of its multi-countries nature, the HPM project derived studies that encompasses several different topics. Bozarth, Warsing, Flynn and Flynn (2009), for instance, propose a model connecting supply chain complexity (i.e. upstream, internal manufacturing and downstream complexity) to manufacturing performance of the plant in negative relationships. Hallgren and Olhager (2009) empirically posit that lean and agile manufacturing are driven by different internal and external antecedents (i.e. competitive intensity of industry; differentiation strategy and competitive intensity of industry, respectively), as well as impact in different operational outcomes (i.e. quality, delivery, cost and flexibility). Paiva, Teixeira, Vieira e Finger (2014), in the other hand, investigate planning and trust in a supply chain management context, finding positive impacts in supply integration and operational performance. More specifically under the cultural assessment, Naor, Goldstein, Linderman and Schroeder (2008) aims to understand the relationship between organizational cultures, infrastructure and quality management practices, as authors state that “culture can provide insight into the context dependence of quality management practices”. (NAOR; GOLDSTEIN; LINDERMAN; SCHROEDER, 2008:671). Cultural importance is also in the core of the authors’ state of empirical proof on the impact of culture in manufacturing performance. In another study, three of these authors reinforce the effects of organizational over

national cultures on manufacturing performance, claiming that organizations should develop “an internal organizational culture consistent with high performance manufacturing” (NAOR; LINDERMAN; SCHROEDER, 2010:194).

Contrary to the latter beliefs, and in order to provide a further comprehension over the impact of cultural aspects in Operations Strategy elements, this study explored Hofstede’s approach on national cultures dimensions, as described in the next section.

### 2.3. Hofstede and the Cultural Classification

Geert Hofstede’s extensive work on cultural classification and cross cultural research (HOFSTEDE, 1980a; 1980b; 1983; 1993; 1994; 2001) is arguably one of the most impacting views on management practices across different cultural environments. Based on a survey applied on 72 IBM national subsidiaries, the author advocates that some management behaviors applicable on a specific cultural environment might not actually be adequate to another. Over his original survey, ran on the 1960’s and early 1970’s, Hofstede initially presented a cultural classification for 40 of the 72 countries accessed, with over 116,000 questionnaires responded. Additional research led to classification of 10 other countries, on regions such as the Arab World and East and West Africa (HOFSTEDE, 2001).

Through the logic of what he calls “mental programs”, Hofstede defines value as “a broad tendency to prefer certain states of affairs over others” (HOFSTEDE, 2001:5), and culture as “the collective programming of the mind that distinguishes the members of one group or category of people from another” (HOFSTEDE, 2001:9). Whether they represent meanings and feelings in an individual and collective context in the first case, or the patterns manifested inside one human group, in the later, they are the core constructs that shape the concept of the mental software we carry. Based on problems commonly identified in societies, four dimensions of culture were originally presented: power distance, uncertainty avoidance, individualism *versus* collectivism, and masculinity *versus* femininity (HOFSTEDE, 2001). Intended to comprehend four major anthropological areas, all dimensions were differently held by different national societies. The objective points measured are: ways of coping with inequality; ways of coping with uncertainty; relationship of the individual with his primary group; and emotional implications of having been born as a boy or a girl.

Between the early 90's and the end of the first decade of the current century, based on the researches of Hofstede and Bond (1988) and Minkov (2007), two additional dimensions were added: long-term orientation and indulgence *versus* restraint. Chart 4 displays the six final dimensions, the basic problem they rely upon and their brief description.

**Chart 4: Hofstede's National Cultures Independent Dimensions**

<b>Dimension</b>	<b>Basic Problem</b>	<b>Description</b>
Power Distance	Human Inequality	"The extent to which the less powerful members of institutions and organizations within a country expect and accept that power is distributed unequally." (pp.98)
Uncertainty Avoidance	Level of Stress in Unknown Future	"The extent to which the members of a culture feel threatened by uncertain or unknown situations." (pp.161)
Individualism, as opposed to Collectivism	Integration of Individuals	"Individualism stands for a society in which the ties between individuals are loose: Everyone is expected to look after him/herself and her/his immediate family only. Collectivism stands for a society in which people from birth onwards are integrated into strong, cohesive in-groups, which throughout people's lifetime continue to protect them in exchange for unquestioning loyalty." (pp.225)
Masculinity, as opposed to Femininity	Division of Emotional Roles	"Masculinity stands for a society in which social gender roles are clearly distinct: Men are supposed to be assertive, tough, and focused on material success; women are supposed to be more modest, tender, and concerned with the quality of life. Femininity stands for a society in which social genders roles overlap: Both men and women are supposed to be modest, tender, and concerned with the quality of life." (pp.297)
Long-Term Orientation, as opposed to Short-Term Orientation	Choice of Focus	"Long Term Orientation stands for the fostering of virtues oriented towards future rewards, in particular, perseverance and thrift. Its opposite pole, Short Term Orientation, stands for the fostering of virtues related to the past and present, in particular, respect for tradition, preservation of 'face' and fulfilling social obligations." (pp.359)
Indulgence <i>versus</i> Restraint	Gratification	Indulgence relates to a society that allows relatively free gratifications of natural and basic human drives regarding having fun and enjoying life. In turn, restraints classify those societies that usually suppress gratification of needs and regulate it by means of strict social norms.

Source: Adapted from HOFSTEDE (2001) and MINKOV (2007)

By assessing the basic problem approached by each national culture dimensions, four of them were selected to integrate this study: Power Distance, Uncertainty Avoidance, Individualism *versus* Collectivism and Long-Term *versus* Short-Term Orientation. Such dimensions are understood as ones that may be related to and present impacts on the Operations Strategy elements, and are discussed next. Masculinity *versus* Femininity and Indulgence *versus*

Restraint, on the other hand, are dimensions that approach emotional and gratification issues, respectively, and are not considered in the present study.

### 2.3.1. Power Distance

Inspired by the work of Mulder (1977), Hofstede defines power distance as “the extent to which a society accepts the fact that power in institutions and organizations is distributed unequally” (HOFSTEDE, 1980b:45) and the distance “between a boss B and a subordinate S in a hierarchy”, as the “difference between the extent to which B can determine the behavior of S and the extent to which S can determine the behavior of B” (HOFSTEDE, 2001:83). Through a reference to the Homer’s *Odyssey* and based on the inequalities observed among both animals and human kinds across evolution, the author discusses how such disparity has concerned societies overtime. A strong correlation between the results of Hofstede’s power distance index (PDI) and the data collected in several other studies led the author to identify social characteristics which also differed accordingly.

In that sense societal norms refer to the “value system shared by a majority in the middle classes in a society. It contains both values as the desirable and values as the desired and is only at some distance followed by reality” (HOFSTEDE, 2001:97). In the power distance dimension, the societal norm is defined by the extremes of dependence and interdependence – for low PDI cultures, the basic problem of inequality is taken as “a necessary evil that should be minimized” (HOFSTEDE, 2001:97), as for in high PDI societies, the presence of hierarchy is part of their existential nature (i.e. “superiors are seen as superior persons”; HOFSTEDE, 2001:97). In this case, less legitimation of power is needed, since respect and fear rules the weak-strong relationship.

As PDI is seen as a continuum<sup>1</sup> – and not a binomial index – countries will float somewhere in between the low and high PDI extremes. As high PDI societies tend to concentrate authority under formal rules, emphasizing hierarchic positions, it is expected that this environment inhibits the development of an integrative-oriented firm. These main traits are exposed in Charts

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<sup>1</sup> All national culture dimensions are treated as a continuum, with countries positions varying from one extreme to the other.

5 and 6, with comparisons for societal norm and key differences in family, in school and in working organizations.

Following Wahjudi, Singgih, Suwignjo and Baihaqi (2014), several authors within the Operations Management literature have reported the implementation of Total Quality Management (TQM) to be influenced by national cultures at the organizational level (e.g. FLYNN; SALADIN, 2006; JUNG; SU; BAEZA; HONG, 2008; KULL; WACKER, 2010), with Power Distance being pointed as the most important culture dimension on that regard. Accordingly, Jung, Su, Baeza and Hong (2008) more specifically found power distance to be supportive to TQM implementation. On the other hand, studies such as Rad (2006) have also shown that the higher PDI levels of a given firm, the more likely it would fail in TQM implementation, due to more centralized decision-making processes. Kull and Wacker (2010) and Lagrosen (2003), in turn, have not found this cultural dimension to be significantly relevant to TQM implementation. Through the application of structural equation modelling (SEM) on data of 152 firms in Indonesia, Wahjudi, Singgih, Suwignjo and Baihaqi (2014) also found no correlation between these two elements.

**Chart 5: The Power Distance Societal Norm**

		Low PDI	High PDI
Power	The use of power	Should be legitimate and is subject to the judgement between good and evil	Power is a basic fact of society that antedates good or evil; its legitimacy is irrelevant
	Power appearance	Powerful people should try to look less powerful than they are	Powerful people should try to look as powerful as possible
	Power values	Stress on reward, legitimate and expert power	Stress on coercive and referent power
	Changing a social system	By redistributing power	By dethroning those in power
Inequality and Hierarchy	Interdependence	All should be interdependent	A few should be interdependent; most should be dependent
	Inequality in society	Should be minimized	Must exist; everyone has his/her rightful place
	Hierarchy means	Inequality of roles, established for convenience	Existential inequality
	Rights	All should have equal rights	Power holders are entitled to privileges
Relationships	Blame	The system is to blame	The underdog is to blame
	View of subordinates	Subordinates are people like me	Superiors consider subordinates as being of a different kind
	View of superiors	Superiors are people like me	Subordinates consider superiors as being of a different kind
	Powerful and powerless	Latent harmony	Latent conflict
	Older people	Neither respected nor feared	Respected and feared

Source: Adapted from HOFSTEDE (2001)

**Chart 6: Key Differences between Low- and High-Power Distance Societies: Family, School, and Work Organization**

	Low PDI	High PDI	
Family	Parents	Treat children as equals; infertility is no reason for divorce	Teach children obedience; infertility may be reason for divorce
	Children's role and obligations	Treat parents and older relatives as equals; should enjoy leisure; respect for rules of civil morality; expected to be competent at a young age; play no role in old-age security of parents	Respect for parents and older relatives is a basic virtue and lasts throughout life; should work hard even if a burden; informal lenience toward rules of civil morality; not seen as competent until a later age; source of old-age security
	Small enterprises	Set up for job reasons	Set up for family interest
School	Teacher / student relationship	Teachers and students are treated as equals; both can initiate communication in class; teachers are experts who transfer impersonal truths; parents may side with students against teachers	Students are dependent on teachers; they treat teachers with respect, even outside class; teachers initiate all communication in class; teachers are gurus who transfer personal wisdom; parents supposed to side with teachers to keep students in order
	Education	Student-centered education; quality of learning depends on two-way communication and excellence of students; lower educational levels maintain more authoritarian relations; educational system focuses on middle levels	Teacher-centered education; quality of learning depends on excellence of teachers; authoritarian values independent of education levels; educational system focuses on top levels
	Awardness	More Nobel Prizes in sciences per capita.	Fewer Nobel Prizes in sciences per capita.
Work Organization	Hierarchy	Decentralized decision structures; less concentration of authority; flat organization pyramids; hierarchy means inequality of roles, established for convenience; openness with information, also to nonsuperiors; manual work same status as clerical work	Centralized decision structures; more concentration of authority; tall organization pyramids; hierarchy reflects the existential inequality; information constrained by hierarchy; white-collar jobs valued more than blue-collar ones
	Superior / Subordinate relationship	Pragmatic relationship; small proportion of supervisory personnel; ideal boss is a resourceful democrat, and sees self as practical, orderly, relying on support; subordinates expect to be consulted; narrow salary range between top and bottom of organization; institutionalized grievance channels in case of power abuse; subordinates influenced by bargaining and reasoning	Polarized and often emotional relationship; large proportion of supervisory personnel; ideal boss is a well-meaning autocrat or good father, and sees self as benevolent decision maker; subordinates expect to be told; wide salary range between top and bottom of organization; no defense against power abuse; subordinates influenced by formal authority and sanctions
	Leadership	Consultative leadership leads to satisfaction, performance, and productivity; managers rely on personal experience and on subordinates; managers involved in relevant purchasing decisions	Authoritative leadership and close supervision lead to satisfaction, performance, and productivity; managers rely on formal rules; managers not involved in relevant purchasing decisions
	Managerial Status	Privileges and status symbols for managers are frowned upon; managers feel adequately paid and increasingly satisfied with career	Privileges and status symbols for managers are expected and popular; managers feel underpaid and dissatisfied with career

Source: Adapted from HOFSTEDE (2001)

On what regards the general structure of organizations, Slepnirov, Waehrens and Katayama (2010) teaches that the Power Distance pattern of a country may be related to the maintenance and strength of hierarchical structures. According to the authors, different (and opposing) societies such as the Japanese and the Danish present very different organizational structures. While the first is very high rated on the Power Distance Index, having managers striving to reinforce the existing hierarchical structure, the second is low-rated, having middle managers enjoying extended autonomy. Such different patterns might directly influence the design and the conduction of Operations Management according to each country.

### 2.3.2. Individualism *versus* Collectivism

Individualism comprehends the basic problem of integration of individuals in societies. While its major variance is attributed to geographic position (i.e. latitude) and national wealth,

Hofstede (2001) understands the remaining portion to derive from historical factors. He introduces the Germanic concepts of *gemeinschaft* (i.e. community) or “result from mutual sympathy, habit, or common beliefs and are ‘willed’ for their intrinsic values to their members”, and *gesellschaft* (i.e. society), that is, “intended by their constituents to be means to specific ends” (HOFSTEDE, 2001:211).

Individualism and collectivism comprehended as opposite concepts draw back then to human beings as gregarious animals, with different degrees of aggregation across different societies (HOFSTEDE, 2001). The relationship one keeps with others will configure also the relationship of the individual with the working organization. Based on comparative terminology proposed by Etzioni’s (1975), Hofstede (2001) argues that individualists may be seen as “calculative” individuals, in opposition to collectivists, portrait as “moral” ones.

The cultural dimensions comprehending Individualism and Collectivism have also been widely addressed in Operations Management literature. According to Wahjudi, Singgih, Suwignjo and Baihaqi (2014), Individualism is reported to present mixed impact on firms’ performance, while Collectivism has been recognized as helpful to the implementation of TQM. Still accordingly, collective organizations are preached to be more dedicated to the implementation of practices of Quality Management (VECCHI; BRENNAN, 2009), arguably focusing on long-term successes, which may be perceived through the higher adoption of strategic planning (FLYNN; SALADIN, 2006; VECCHI; BRENNAN, 2009). Individualism, on the other hand, has been positively correlated to both process management and business performance (JUNG; SU; BAEZA; HONG, 2008). Kessapidou and Varsakelis (2002), in turn, found that Greek firms with associated companies from individualistic countries have presented better performance in comparison to those with association to companies from collectivist cultures. The relation between Individualism and the implementation of TQM has also been empirically assessed for Indonesian firms by Wahjudi, Singgih, Suwignjo and Baihaqi (2014). Unlike the results found in the Power Distance cultural dimensions, the authors argue that Individualism indeed had positive effects in TQM implementation.

**Chart 7: The Individualism Societal Norm**

		Low IDV	High IDV
Individuals	Role in society	Born into extended families or clans, which protect them in exchange for loyalty; expertise, order, duty, security provided by organization or clan	Everyone is supposed to take care of him- or herself and his or her immediate family only; autonomy, variety, pleasure, individual financial security
	Identity	Based in the social system	Based in the individual
	Relationship with organizations	Emotional dependence of individual on institutions and organizations	Emotional independence of individual from institutions and organizations
	Private life	Invaded by institutions and organizations to which one belongs	Everyone has a right to a private life
	Activities	Imposed by context	Self-started
	Emphasis	Belonging; membership ideal	Individual initiative and achievement; leadership ideal
Society	Orientation	"We" consciousness; gemeinschaft (community); collectivity orientation	"I" consciousness; gesellschaft (society); self-orientation
	Values standards	Differ for in-groups and out-groups; particularism	Should apply to all: universalism
	Culture	"Shame" cultures; traditional society	"Guilt" cultures; "modern" or "postmodern" society

Source: Adapted from HOFSTEDE (2001)

**Chart 8: Key Differences between Collective and Individualist Societies: Work Situation and Management Methods**

		Low IDV	High IDV
Work Situation	Employees attitude	Employees act in the interest of their in-group, not necessarily of themselves; low commitment to organization; potential emotional commitment to union; belief in collective decisions	Employees supposed to act as "economic men"; high commitment to organization; calculative relationship to union; belief in individual decisions
	Employees performance	Hiring and promotion decisions take employees' in-group into account; poor performance reason for other tasks; perform best in in-groups; less social mobility across occupations; less control over job and working conditions; fewer hours worked	Hiring and promotion decisions should be based on skills and rules only; poor performance reason for dismissal; perform best as individuals; greater social mobility across occupations; more control over job and working conditions; longer hours worked
	Relationships at work	Relatives of employer and employees preferred in hiring; relationships with colleagues cooperative for in-group members, hostile for out-group; treating friends better than others is normal and ethical	Family relationships seen as a disadvantage in hiring; relationships with colleagues do not depend on their group identity; treating friends better than others is nepotism and unethical
	Superior/subordinate relationship	Employer-employee relationship is basically moral, like a family link; employees and managers report teamwork, personal contacts, and discrimination at work	Employer-employee relationship is a business deal in a "labor market"; employees and managers report working individually
	Training and rewards	Training most effective when focused at group level; preferred reward allocation based on equality for in-group	Training most effective when focused at individual level; preferred reward allocation based on equity for all
	Business	Personal relationships prevail over task and company; organizational success attributed to sharing information, openly committing oneself, and political alliances	Task and company prevail over personal relationships; organizational success attributed to withholding information, not openly committing, and avoiding alliances
	Innovation	Innovation champions in organizations want to involve others; innovations within existing networks; fewer invention patents granted	Innovation champions in organizations want to venture out on their own; innovations outside existing networks; more invention patents granted
Management Methods	Management	Management of groups	Management of individuals
	View of employee	In family and social context	As individual
	Composition of work groups	Keeping ethnic or other in-groups together supports productivity	Based on individual criteria; in-groups unwanted
	Incentives	Given to in-groups	Given to individuals
	Leadership	Inseparable from the context	Property of the leader
Direct appraisal to performance	Threat to harmony	Improves productivity	

Source: Adapted from HOFSTEDE (2001)



### 2.3.3. Uncertainty Avoidance

As discussed by Hofstede (2001), uncertainty is a concept that accompanies human life and which societies manage to avoid through the use of technology, law or religions. Similarly, organizations would also search for means to avoid the possibility of errors in predictions. In that sense, the author borrows the term “uncertainty avoidance” preached by Cyert and March (1963). Accordingly, organization would seek to avoid uncertainty either by valuing short-term consequences or by fabricating what they call a “negotiated environment”. Such actions would be carried in order to allow firms to identify ways with which they may benefit from technology, rules and rituals in dealing with the unknown future. Hofstede (2001) translates this construct by measuring the tolerance for ambiguity in his cross-country survey.

**Chart 9: The Uncertainty Avoidance Societal Norm**

		Low UAI	High UAI
External forces	Life's inherent uncertainty	Relatively easily accepted and each day is taken as it comes	Felt as a continuous threat that must be fought
	Power and influence	Belief in one's own ability to influence one's life, one's superiors, and the world.	Feeling powerlessness toward external forces.
Individuals	Attitude towards future	Ease, lower stress, less anxiety	Higher stress, anxiety neuroticism
	Activities	Being busy is not a virtue per se.	Inner urge to be busy.
	Emotional feelings	Suppression	Expression
	Well-being	Subjective	Less subjective
Change and Diversity	Change and risks	Openness to change and innovation; willingness to take unknown risks	Conservatism, law and order; only known risks are taken
	Diversity	What is different is curious; tolerance of diversity	What is different is dangerous; xenophobia
	Environment	Comfortable with ambiguity and chaos.	Need for clarity and structure.

Source: Adapted from HOFSTEDE (2001)

In high uncertainty avoidance societies, structured rationality is used to minimize ambiguity, along with the powerlessness feeling against external forces. This may be paralleled to the organizational world into formal structured strategies, strictly followed by the functional areas and closely controlled by upper management.

**Chart 10: Key Differences between Low- and High- UAI Societies: Family, School, Motivation, and Work Situation**

	Low UAI	High UAI	
Family	Parents	In control of their emotions; higher satisfaction with home life	Emotional behaviour; lower satisfaction with home life
	Rules and Children	Lenient rules on what is dirty and taboo; truth is relative; few rules - if children cannot obey them, rules should be changed; children learn that the world is benevolent and are exposed to unknown situations; mild superegos developed	Tight rules on what is dirty and taboo; concern for Truth with a capital T; many rules - if children cannot obey them, they are sinners who should repent; children learn that the world is hostile and are protected from the unknown; strong superegos developed
	Relationship and Roles	Undifferentiated, informal ways of address; nontraditional gender roles accepted	Strictly differentiated forms of address; traditional gender roles preferred
School	Students	Expect open-ended learning situations and good discussions; learn that truth may be relative; attribute achievements to own ability; rate self-efficacy high	Expect structured learning situations and seek right answers; learn that Truth is absolute; attribute achievements to effort, context, and luck; rate self-efficacy low
	Teachers	May say "I don't know"; seek parents' ideas	Supposed to have all answers; parents seen as extensions of teachers
	Diversity	Dialect speech positively valued; independence for female students important	Dialect speech negatively valued; traditional role models for female students
Motivation	Traditional children's stories	Strong achievement motivation	Strong security motivation
	Main driver	Hope of success	Fear of failure
	Preferred tasks	Uncertain outcomes, calculated risks, and requiring problem solving	Sure outcomes, no risks, and following instructions
Work Organization	Employees' attitude	Weak loyalty to employer; short average duration of employment; precision and punctuality have to be learned and managed; relationship orientation; flexible working hours not appealing	Strong loyalty to employer; long average duration of employment; precision and punctuality come naturally; task orientation; flexible working hours popular
	Organizations	Preference for smaller organizations but little self-employment; belief in generalists and common sense; tolerance for ambiguity in structures and procedures	Preference for larger organizations but at the same time much self-employment; belief in specialists and expertise; highly formalized conception of management
	Innovation and technology	Innovators feel independent of rules; innovations welcomed but not necessarily taken seriously; skepticism toward technological solutions; many new trademarks granted	Innovators feel constrained by rules; innovations resisted but, if accepted, applied consistently; strong appeal of technological solutions; few new trademarks granted
	Top management and Leadership	Top managers involved in strategy; power of superiors depends on position and relationships; appeal of transformational leader role; superiors optimistic about employees' ambition and leadership capacities	Top managers involved in operations; power of superiors depends on control of uncertainties; appeal of hierarchical control role; superiors pessimistic about employees' ambition and leadership capacities

Source: Adapted from HOFSTEDE (2001)

Slepnirov, Waehrens and Katayama (2010) define this dimension as one “which addresses how a society deals with uncertainty and ambiguity” (SLEPNIOV; WAEHRENS; KATAYAMA, 2010:235). According to the authors, however, despite nations counting on lower ratings of Uncertainty Avoidance are presumably more willing to accept new ideas (which deviate from the established norms), as well as more willing to take risks, the concept shall not be confused with risk avoidance. In that sense, Hofstede’s National Culture Dimensions would offer a powerful framework for the study of the impact of culture in offshoring process. The scholars add that this cultural dimensions is better addressed for the explanation of “the differences in approaches to offshoring in the context of the two countries” (SLEPNIOV; WAEHRENS; KATAYAMA, 2010:235). The perspective offers relevant insights to the study of Operations Management, as companies from countries with low rates of Uncertainty Avoidance may be willing to transfer their operations (partially or even totally) to low-cost countries much more aggressively than companies highly rated on the same criteria. The authors approach such question through the comparison between Japanese and Danish companies. While firms of the

first group present a much higher rate of Uncertainty Avoidance and treated their offshoring processes in a conservative manner, the second geographically moved their production in a more rapid pace, taking higher levels of risk.

Amoako-Gyampah and Meredith (2007), on the other hand, go back to the primordial discussion in Operations Management to provide an empirical support for the cumulative capabilities perspective over the trade-off theory in Ghana, an under-developed economy. The sequence of capability development were found to be different from developed countries though, as the authors state that the importance of cost efficiency (found second to quality) might be explained by a number of factors that characterize Ghana's industrial scenario, such as privatization, elimination of subsidies, flotation of currency and removal of price control mechanisms, which could be understood as uncertainty drivers. A more recent study by Riedl, Kaufmann, Zimmermann and Perols (2013) depicts the linkage between procedural rationality and its effects on managers' uncertainty perception, influencing the performance on supplier decision issues. Results are also influenced by contextual differences between China and the U.S.

#### **2.3.4. Long-Term Orientation *versus* Short-Term**

As a consequence of a later study – the Chinese Value Survey (CVS) - run by Michael Bond in the University of Hong Kong around 1985 and in accordance to values suggested by Chinese scholars, the long- *versus* short-term orientation was added to the original IBM study, comprehending a fifth dimension of national culture. According to Hofstede (2001), the fifth dimension was initially baptized by Bond as “Confucian work dynamism”, since its opposed poles resembled some of Confucius teachings, representing future-oriented items (i.e. long-term) and past- and present-oriented ones (i.e. short-term), regarding to the person's orientation in life. The author reports that long-term orientation poses as a “major explanation of the explosive growth of the East Asian economies in the latter part of the 20<sup>th</sup> century” (HOFSTEDE, 2001:351), as strong correlations between this index and national economic growth have been identified. This also immediately connects with the emblematic case studies of Japanese organizations (e.g. Toyota) and their superior performance over American enterprises, extensively examined from multiple perspectives. A general definition of this dimensions is provided by Slepniov, Waehrens and Katayama (2010), as being “related to the

choice of focus for people's efforts – the future or the present" (SLEPNIOV; WAEHRENS; KATAYAMA, 2010:235).

**Chart 11: The Long-Term Orientation Societal Norm**

		Low LTO	High LTO
Family and Traditions	Gratification	Immediate gratification of needs expected	Deferred gratification of needs accepted
	Traditions	Sacrosanct	Adaptable to changed circumstances
	Family life	Guided by imperatives	Guided by shared tasks
Orientation	Virtues	Short-term virtues taught: social consumption	Long-term virtues taught: frugality, perseverance
	Drivers	Spending; the bottom line	Saving, investing; building a strong market position
Thinking	Thinking	Analytic	Synthetic
	Problem solving	Fuzzy	Structured

Source: Adapted from HOFSTEDE (2001)

**Chart 12: Key Differences between Short- and Long-Term-Oriented Societies**

		Low LTO	High LTO
Family, Social Relations, and Work	Children	Children should learn tolerance and respect for other people; strong need for affiliation in traditional children's stories; gifts to children for their self-concept and love; all siblings are equal	Children should learn thrift; weak need for affiliation in traditional children's stories; gifts to children for their education and finances; differentiation between elder and younger brothers and sisters
	Marriage	Living with in-laws is a problem; couple should share tastes and interests; marriage should last even if love has disappeared; young women expect affection from boyfriend, not husband	Living with in-laws is no problem; shared tastes and interests not a requirement for marriage; if love has disappeared from marriage it is best to make a new start; young women expect affection from husband
	Relationships	Preschool child need not suffer if mother works; "humility" is a feminine virtue; less satisfied with daily human relations; old age seen as coming later	Preschool child need will suffer if mother works; "humility" is a general human virtue; daily human relations (family, neighborhood, friends) satisfying; old age seen as coming sooner but as a satisfying life period
	Business and Society	In business, short-term results: the bottom line; family and business sphere separated; meritocracy - economic and social life to be ordered by abilities; less satisfied with own attempts at correcting social injustice	In business, building of relationships and market position; vertical coordination, horizontal coordination, control and adaptiveness; people should live more equally; no need to contribute more to correcting social injustice
Ways of Thinking	Thinking	Probabilistic thinking; need for cognitive consistency; analytic thinking; lower performance in basic mathematic tasks	Either full or no confidence; opposites complement each other; synthetic thinking; higher performance in basic mathematic tasks
	Values and beliefs	Belief in absolute guidelines about good and evil; short-term virtues taught	What is good and evil depends on the circumstances; long-term virtues taught
	Government	Government by law	Government by men

Source: Adapted from HOFSTEDE (2001)

Several other studies seem to have captured the usefulness of applying Hofstede's cultural dimension on the comprehension of the impact of cultural differences on operations strategy and on strategic management as a whole. Sun (2008) for instance, by applying such view (HOFSTEDE, 1980a; BOND; HOFSTEDE, 1989), explores the negative impacts on cooperative strategy resulting from cultural differences involving Chinese and foreign enterprises. Accordingly, transactional operations of this sort may only be successful through the development of cross-cultural communication and management, stressing the high importance of solving what the author calls "cultural conflicts", especially on a globalized and integrated operational environment. As discussed by the author, the cultural comparison between China and the United States presented by the work of Pan Fan and Zhang Zigang

(2004) and also discussed through Bond and Hofstede's (1989) methodology, several aspects that may affect the way the two countries interact on a business and operational level, such as the general tendency for individualism in Americans in face of a stronger comprehension of the social role of collective groups in China. Multiple consequences would arise from this particular cultural difference, such as the perception of more submissive behavior among Chinese, possibly leading them to avoid public disagreements with other group members and "shift toward the majority position more often than Westerners do" (SUN, 2008:38). This behavior *per se* may possibly lead to communications problems with Americans, who would be expected to act in different manners.

### 3 Hypothesis Development

Based on the discussion above and in the search to answer the research question of the study, four blocks of hypothesis were developed, each of which including four sub-hypothesis. The groups are divided by national culture dimension and its impact on the approached Operations Strategy elements.

The first set of hypothesis refers to the Power Distance dimension and its relationship to the four OS elements. Hope (2004), in her exploratory study on the hospitality sector in Saint Lucia, seeks to understand the influence of national culture in hotels' operations management, represented by "best practices" adoption. She found that practices towards teamwork, empowerment and communication were largely prejudiced by high levels of Power Distance between the staff. Chakrabarty (2009) argues that economies with high PDIs are those where wealth and opportunities are also available in an unequal distribution manner, while Nielsen and Nielsen (2011) found that both international experience and nationality diversity of top managers carry impacts on strategic decision-making, basing their analysis on Hofstede's cultural classification as well. On their study on different leadership styles across six diverse nations - United States, Russia, Germany, Georgia, Kazakhstan and Kyrgyzstan - Ardichvili and Kuchinke (2002) concluded that cultural differences indeed played a strong influence on the perceivable leadership style of each country. Several other studies (e.g. DORFMAN; HOWELL; HIBINO; LEE; TATE; BAUTISTA, 1997, SMITH; PETERSON; SCHWARTZ, 2002) have pointed the prominence of Power Distance over all other cultural dimensions on what regards the influence on leadership styles.

As discussed previously, Power Distance relates to the less powerful members' perspective, and the extent to which they accept hierarchy with relationships ruled by fear and respect. Hence, we argue that in high PDI cultures, it would not be necessary to impose formal rules for them to be followed, as subordinates might feel more inclined or even obligated to accept them. On the other hand, larger PDI levels may affect collaborative efforts negatively, as power distance can hinder teamwork and communication attempts. This suggests that PDI levels would affect Integrating Leadership, Functional Integration, Implementation of Manufacturing Strategy and Formal Manufacturing Strategy negatively.

*Hypothesis 1a.* Integrating Leadership presents higher levels when Power Distance is lower.

*Hypothesis 1b.* Functional Integration presents higher levels when Power Distance is lower.

*Hypothesis 1c.* Implementation of Manufacturing Strategy presents higher levels when Power Distance is lower.

*Hypothesis 1d.* Formal Manufacturing Strategy presents higher levels when Power Distance is lower.

Hofstede and Bond (1988) also stated that beyond power distance influence, leadership may also be influenced by Individualism dimension. According to the authors "both Power Distance and Individualism affect the type of leadership most likely to be effective in a country" (HOFSTEDE; BOND, 1988:14). In high individualism cultures, "employed persons (...) are expected to act rationally according to their own interest, and work should be organized in such a way that this self-interest and the employer's interest coincide" (HOFSTEDE, 2001:235). Chen and West (2008) propose a new instrument for the Individualism vs. Collectivism cultural dimension. They argue that Individualism can be assessed in terms of "independence, competitiveness and uniqueness", while collectivism can be defined as "considering of one's decisions on others, sharing of positive outcomes and sharing of negative outcomes" (CHEN; WEST, 2008:259).

By assessing Supply Chain Integration, Zhao, Huo, Flynn and Yeung (2008) link the high level of Collectivism culture in China to its normative relationship commitment orientation (i.e. "a mutual, ongoing relationship over an extended period of time which is based on mutual commitment and sharing"; ELLRAM, 1991; in ZHAO; HUO; FLYNN; YEUNG, 2008:371), based mainly on trust, as opposed to instrumental relationship commitment, which is based on compliance (i.e. "when one party accepts the influence of another in hopes of receiving favorable reactions from the other party"; ZHAO; HUO; FLYNN; YEUNG, 2008:371). Power, Schoenherr and Samson (2010) divided their cross-national plants sample into individualist and collectivist cultural sub-groups (i.e. industrialized western economies and emerging Asian economies), finding significant differences between their levels of investment in Operations Management practices. The study found evidences of collective cultures being more emphatic on developing teamwork-based capabilities "where commitment to group goals are stronger" (POWER; SCHOENHERR; SAMSON, 2010:217).

Following this logic, we posit that, as more individualist cultures emphasize personal leadership as the ideal societal norm, and collectivist cultures hold a normative relationship commitment

orientation, high IDV levels should affect Integrating Leadership and Functional Integration negatively. On the other hand, as high individualism is associated with higher commitment to the organization, meaning that individuals are not locked into a group mentality and tend to align self and organizational goals, and has been positively related to process management, business performance and strategy implementation in previous studies, basing relationships in compliance, we posit that it should impact Implementation of Manufacturing Strategy and Formal Manufacturing Strategy in a positive manner.

*Hypothesis 2a.* Integrating Leadership presents higher levels when Individualism is lower.

*Hypothesis 2b.* Functional Integration presents higher levels when Individualism is lower.

*Hypothesis 2c.* Implementation of Manufacturing Strategy presents higher levels when Individualism is higher.

*Hypothesis 2d.* Formal Manufacturing Strategy presents higher levels when Individualism is higher.

On what regards the two other dimensions – uncertainty avoidance and long-term orientation – it would be possible to suggest that they might be considered two antecedents of manufacturing strategy formulation, as efforts to reduce ambiguity and establish long-term goals and objectives are ultimately related to how individuals perceive and manage risks. On that sense, studies have discussed the relation between cultures with high scores on uncertainty avoidance and their aversion to risk (BAKER; CARSON, 2011). Although Ayoun and Moreo (2008) found that different levels of Uncertainty Avoidance had no or little impact in business strategy development, Kull and Wacker's (2010) study rely on the GLOBE's project extension of Hofstede's cultural classification to conclude that this dimension positively impact Quality Management effectiveness, as "high Uncertainty Avoidance cultures are not uncomfortable with rules and process controls" (KULL; WACKER, 2010:234). Hence, it is reasonable to argue that UAI levels must impact Integrating Leadership and Formal Manufacturing Strategy negatively, as high uncertainty levels pose difficulties on formal processes, but affecting Functional Integration and Implementation of Manufacturing Strategy in a positive relation.

*Hypothesis 3a.* Integrating Leadership presents higher levels when Uncertainty Avoidance is lower.

*Hypothesis 3b.* Functional Integration presents higher levels when Uncertainty Avoidance is higher.



*Hypothesis 3c.* Implementation of Manufacturing Strategy presents higher levels when Uncertainty Avoidance is higher.

*Hypothesis 3d.* Formal Manufacturing Strategy presents higher levels when Uncertainty Avoidance is lower.

As for the impact of Long-Term Orientation vs. Short-Term in Operations Strategy, Voss and Blackmon (1998) draw on data from 600 companies in 20 different countries to study how different attitudes in time orientation impact firms' strategic decisions, specifically in Western and Japanese plants. The authors define corporate strategy as "the overall plan which defines how a company will create competitive advantage in the business in which it competes" (VOSS; BLACKMON, 1998:152), with manufacturing strategy being a "functional level" of such strategy. While Japanese managers emphasize both short- and long-term practices, focusing in instant solution and prevention issues, Western organizations treat this two approaches within a trade-off model. Wang and Bansal (2012), on the other hand, in their study on Corporate Social Responsibility practices, build on the Strategic Reference Point Theory's assertion of "temporal orientation plays a critical role in decision making" (WANG; BANSAL, 2012:1147) to posit that new ventures are more inclined to short-term orientation, neglecting the development of strategic resources or innovation.

As previously discussed, short-term societies are associated to the acceptance of government by law, in opposition to long-term oriented ones, closer related to government by men. Also, as cultures with high LTOWVS index levels are related to lower immediacy, it could be argued that it would lead to less opportunistic behavior, as people would accept deferred gratification for their actions. We therefore posit that cultures with high LTOWVS index levels are expected to be positively connected to the four elements of Operations Strategy.

*Hypothesis 4a.* Integrating Leadership presents higher levels when Long-Term Orientation is higher.

*Hypothesis 4b.* Functional Integration presents higher levels when Long-Term Orientation is higher.

*Hypothesis 4c.* Implementation of Manufacturing Strategy presents higher levels when Long-Term Orientation is higher.

*Hypothesis 4d.* Formal Manufacturing Strategy presents higher levels when Long-Term Orientation is higher.

## **4 Empirical Research and Method**

Data was retrieved from the fourth and latest round of the High Performance Manufacturing project and from Hofstede's Value Survey Module 2013 (VSM 2013). This section will address both projects, as well as Operations Strategy elements, construct measurement tests and the method employed to understand the impact of National Cultures differences in each element.

### **4.1. High Performance Manufacturing (HPM) Project**

The HPM project, previously called WCM (world-class manufacturing) database, has been expanded since its beginning in the mid 1990's. The project seeks to articulate the practices related to world-class manufacturing through the appliance and usage of a proper and comprehensive database (FLYNN; SCHRODER; FLYNN, 1999), specifically designed for this purposes. HPM offers a detailed examination regarding the development and the verification of collected data, encompassing both perceptual and objective information on issues such as Just-in-Time (JIT) practices, technology, strategy, organization characteristics and human resource management. Through the creation of an international network for cooperation, HPM's 4<sup>th</sup> round currently involves researchers in Production and Operations from eleven countries and regions. The project has both academic and applied natures, once the results may be subject to managerial actions directed to improve operational performance, representing also a global benchmark comparison for plants around the world. Chart 13 shows the HPM's 4<sup>th</sup> round overview:

Chart 13: HPM's 4<sup>th</sup> Round Overview

Geographical Characteristics		Respondents' Profile	Measurement Models
Macro Region	Country / Region	Area / Department	Scales
Latin America	Brazil	Upstream Supply Chain Management	Adaptability
Scandinavia	Finland	Downstream Supply Chain Management	Business Services
	Sweden	Environmental	Constraint Management
Latin Europe	Italy	Human Resources	Environment
	Spain	Information System	Human Resources Management
Germanic	Germany	Plant Management	Improvement
Middle Eastern	Israel	Process Engineering	Information System / Technology
China	China	Product Development	Lean / JIT
	Taiwan	Production Control	Manufacturing Strategy
Asia	Japan	Quality Management	New Product Development
	South Korea	Supervision	Performance
		Accounting	Quality Management
			Supply Chain Management
			Sustainability
			Technology
			Total Productive Maintainance

Source: HPM 4<sup>th</sup> Round (2012)

#### 4.1.1. Data Collection

Every participant country in the HPM project has a designated country leader, responsible for its data collection. Measurement instruments were translated into local language and back-translated to assure that each country would work with comparable questionnaires. The project aims to assess companies from the machinery, electronics and transport equipment, holding more than a hundred employees each and with a minimum of 20 companies per country. Data was tabulated and compiled by a database coordinator.

#### 4.1.2. Sampling

Companies were chosen according to the selected industries and sampling relied on each country leaders' efforts and networking, generating a group of respondents willing to participate in the project with the necessary characteristics. The minimum number of employees required assured that each participant enterprise would hold a size that supported the studied areas and practices. Table 1 below shows the number of companies included in the project's 4<sup>th</sup> round per industry and country.

**Table 1: Number of companies in HPM 4<sup>th</sup> Round by Country and by Industry**

Country	Industries			Total
	Machinery	Electronics	Transport Equipment	
Brazil	7	5	9	21
Finland	6	6	5	17
Sweden	4	4	1	9
Italy	17	7	5	29
Spain	7	8	11	26
Germany	13	6	9	28
Israel	5	21	0	26
China	17	10	3	30
Taiwan	19	9	2	30
Japan	7	6	9	22
South Korea	5	8	13	26
<b>Total</b>	<b>107</b>	<b>90</b>	<b>67</b>	<b>264</b>

Source: HPM 4<sup>th</sup> Round

Four countries were selected for this study – Brazil, China, Germany and South Korea – as representatives of diverse economical groups, due also to their different stages of industrialization, yielding in a sample of 105 companies. Germany has a traditional industrialization process and integrates the group of developed countries; South Korea, although with a recent industrialization history, is also considered a developed country; and finally, both Brazil and China are representatives of recent industrializations in countries under developed or emerging economies.

#### 4.1.3. Measurement Instrument and Operationalization: Manufacturing Strategy Scales

HPM's 4<sup>th</sup> round presents 13 manufacturing strategy constructs, composed of multiple dimension items. Each element of Operations Strategy was attributed with items pertaining to one or more constructs from the HPM project's Manufacturing Strategy Scales. General information about the constructs explored for this study are presented in Chart 14 below.

**Chart 14: Operations Strategy Elements and HPM 4<sup>th</sup> Round's Manufacturing Strategy Scales**

Operations Strategy Element	HPM Construct	Description	Respondent	N. of Items
Integrating Leadership	Leadership for Functional Integration	Engagement of upper management for functional integration	Supervision	4
Functional Integration	Achievement of Functional Integration	Coordination of integration among plants' functions and how they can come together to solve problems and implement business strategy without generating conflict	Plant Management	4
	Integration between Functions	The extent to which other functions are integrated with the manufacturing function	Plant Management	8
Implementation of Manufacturing Strategy	Manufacturing-Business Strategy Linkage	Fit between business strategy and the manufacturing function	Plant Management	6
Formal Manufacturing Strategy	Formulation of Manufacturing Strategy	Formal process for manufacturing strategy formulation	Plant Management	4

Source: HPM 4<sup>th</sup> Round (2012) and elaborated by the author

Further assessment of the measurement scales are presented in the Measurement Model Refinement, Unidimensionality, Reliability and Validity section. Charts 15 to 18 display the initial items within the Operations Strategy elements assessed by code, orientation and reference of origin.

**Chart 15: Integrating Leadership initial items (HPM 4<sup>th</sup> Round's Leadership for Functional Integration Items)**

Code	Item	Orientation
LDINTN01	Our top management emphasizes the importance of good inter-functional relationships.	Normally scaled
LDINTN02	Our managers do a good job of solving their inter-functional conflicts.	Normally scaled
LDINTN03	We are encouraged to communicate well with different functions in this plant.	Normally scaled
LDINTN04	Our managers communicate effectively with managers in other functions.	Normally scaled

Source: HPM 4<sup>th</sup> Round (2012)

**Chart 16: Functional Integration initial items (HPM 4th Round's Achievement of Functional Integration and Integration between Functions Items)**

<b>Code</b>	<b>Item</b>	<b>Orientation</b>
INTEGN01	The functions in our plant are well integrated.	Normally scaled
INTEGN02	Problems between functions are solved easily, in this plant.	Normally scaled
INTEGN03	Functional coordination works well in our plant.	Normally scaled
INTEGN04	Our business strategy is implemented without conflicts between functions.	Normally scaled
FUNCIN01	The functions in our plant work well together.	Normally scaled
FUNCIN02	The functions in our plant cooperate to solve conflicts between them, when they arise.	Normally scaled
FUNCIN04	Our plant's functions coordinate their activities.	Normally scaled
FUNCIN05	Our plant's functions work interactively with each other.	Normally scaled
FUNCIN06	The Marketing area knows a great deal about manufacturing in this plant.	Normally scaled
FUNCIN07	The Finance area knows a great deal about manufacturing in this plant.	Normally scaled
FUNCIN08	The Product Development area know a great deal about manufacturing in this plant.	Normally scaled
FUNCIN09	The Human resource management area knows a great deal about manufacturing in this plant.	Normally scaled

Source: HPM 4<sup>th</sup> Round (2012)

**Chart 17: Implementation of Manufacturing Strategy initial items (HPM 4th Round's Manufacturing-Business Strategy Linkage Items)**

<b>Code</b>	<b>Item</b>	<b>Orientation</b>
LINKSN01	We have a manufacturing strategy that is actively pursued.	Normally scaled
LINKSN02	Our business strategy is translated into manufacturing items.	Normally scaled
LINKSN03	Potential manufacturing investments are screened for consistency with our business strategy.	Normally scaled
LINKSN04	At our plant, manufacturing is kept in step with our business strategy.	Normally scaled
LINKSR05	Manufacturing management is not aware of our business strategy.	Reverse scaled
LINKSR06	Corporate decisions are often made without consideration of the manufacturing strategy.	Reverse scaled

Source: HPM 4<sup>th</sup> Round (2012)

**Chart 18: Formal Manufacturing Strategy initial items (HPM 4th Round's Formulation of Manufacturing Strategy Items)**

<b>Code</b>	<b>Item</b>	<b>Orientation</b>
MFGSTN01	Our plant has a formal manufacturing strategy process, which results in a written mission, goals and strategies.	Normally scaled
MFGSTN02	This plant has a manufacturing strategy, which is put into writing.	Normally scaled
MFGSTN03	Plant management routinely reviews and updates a long-range manufacturing strategy.	Normally scaled
MFGSTR04	The plant follows an informal manufacturing strategy, with no written strategy document.	Reverse scaled

Source: HPM 4<sup>th</sup> Round (2012)

#### 4.1.4. Procedures for Data Analysis: Missing Data

Missing data or values represent the lack of data in a given variable's observation and can occur due to a nonresponse (e.g. respondent's refusal to answer a determined question) or errors in the data entry phase (HAIR Jr.; BABIN; MONEY; SAMOUEL, 2003). Various techniques are

advisable to dealing with missing values in a database, such as imputation, deletion and interpolation. In this study, mean substitution was selected and missing values were treated within each country's limits, so that the inputted mean would not capture potential differences between samples. Therefore, missing data were replaced with averages calculated for each item on the measurement scales per country.

#### **4.1.5. Measurement Model Refinement, Unidimensionality, Reliability and Validity**

The measurement models for the Operations Strategy constructs were tested for unidimensionality and reliability through the Confirmatory Factor Analysis (CFA) technique, a statistical variation of structural equation models that specifically addresses measurement models (BROWN; 2006). CFA has been largely utilized in Social research in order to fulfil measurement psychometric assessment, validation of constructs, test of method effects, and test of invariance of measurements (HARRINGTON, 2009). Similarly to Menor and Roth's (2007) study, where they conceptualized the New Service Development competence into five different constructs, the four elements of Operations Strategy are here considered as separate elements, resulting in four different models to be assessed individually, passing through their own refinement, validity and reliability tests processes.

##### **4.1.5.1. Model Refinement**

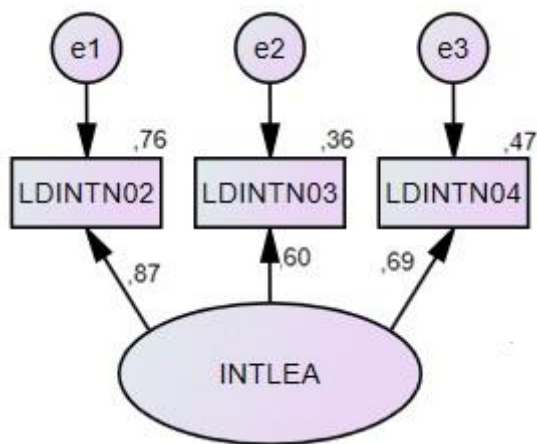
Initial CFAs were ran for the four Operations Strategy construct models, three of which required item refinement before compositing the final data analysis. Items with low standardized factor loadings (i.e. below 0.60 and 0.70 for constructs with a higher number of initial items) were removed and final construct factors were analysed. Tables 2, 3, 4 and 5 present the robustness measurements and indexes for the four constructs. Figures 3, 4, 5 and 6 present the final models and their respective items' factor loadings for Integrating Leadership (INTLEA), Functional Integration (FUNINT), Implementation of Manufacturing Strategy (IMPMST) and Formal Manufacturing Strategy (FMMSTR).



**Table 2: Integrating Leadership Construct Unidimensionality and Reliability Analyses**

<b>Integrating Leadership</b>			
<b>Items</b>	3	<b>CFI</b>	1.000
<b>Average</b>	3.89	<b>GFI</b>	1.000
<b>Standard Deviation</b>	0.56	<b>NFI</b>	1.000
		<b>Composite Reliability</b>	0.768
$\chi^2$ (p-value)	0.000 (n.c.)	<b>Average Variance Extracted</b>	0.53
$\chi^2 / DF$	n.c.	<b>Cronbach's Alpha</b>	0.756

Source: Elaborated by the author

**Figure 3: CFA Model and Factor Loadings for Integrating Leadership**

Source: Elaborated by the author

**Table 3: Functional Integration Construct Unidimensionality and Reliability Analyses**

<b>Functional Integration</b>			
<b>Items</b>	5	<b>CFI</b>	0.979
<b>Average</b>	3.90	<b>GFI</b>	0.955
<b>Standard Deviation</b>	0.55	<b>NFI</b>	0.964
		<b>Composite Reliability</b>	0.898
$\chi^2$ (p-value)	11.379 (0.044)	<b>Average Variance Extracted</b>	0.64
$\chi^2 / DF$	2.276	<b>Cronbach's Alpha</b>	0.895

Source: Elaborated by the author

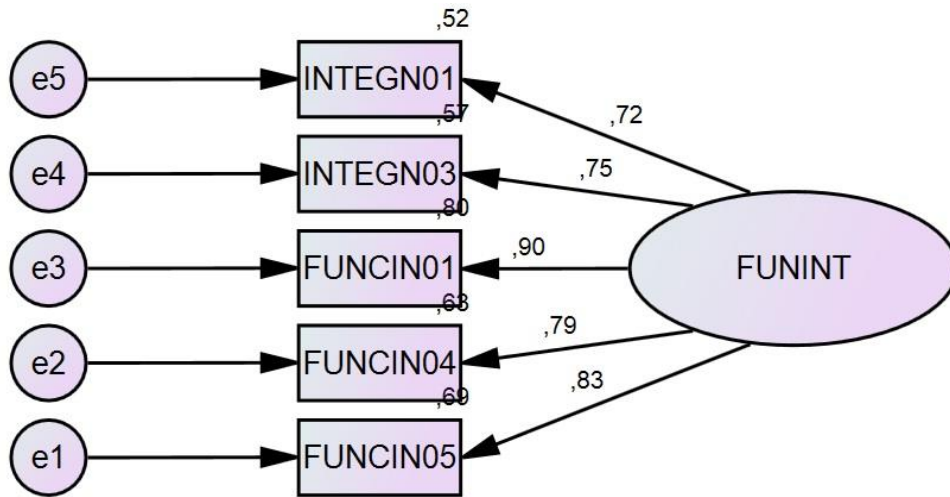


Figure 4: CFA Model and Factor Loadings for Functional Integration

Source: Elaborated by the author

Table 4: Implementation of Manufacturing Strategy Construct Unidimensionality and Reliability Analyses

Implementation of Manufacturing Strategy			
Items	4	CFI	1.000
Average	3.88	GFI	0.993
Standard Deviation	0.63	NFI	0.988
		Composite Reliability	0.796
$\chi^2$ (p-value)	1.532 (0.465)	Average Variance Extracted	0.49
$\chi^2 / DF$	0.766	Cronbach's Alpha	0.792

Source: Elaborated by the author

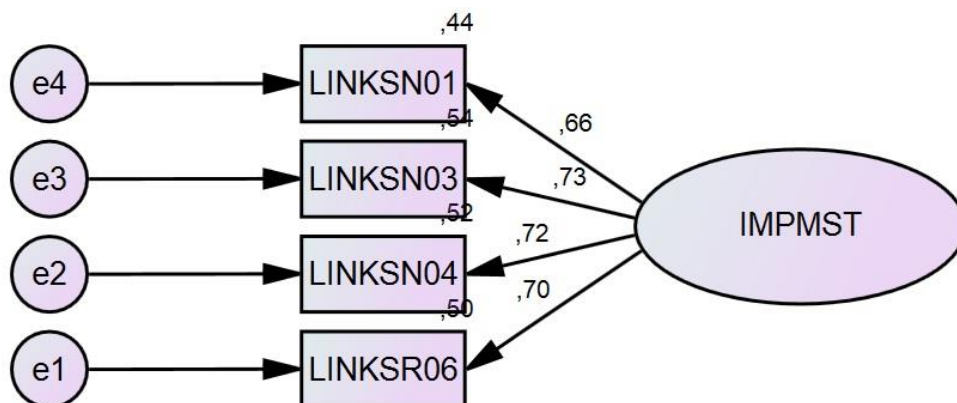


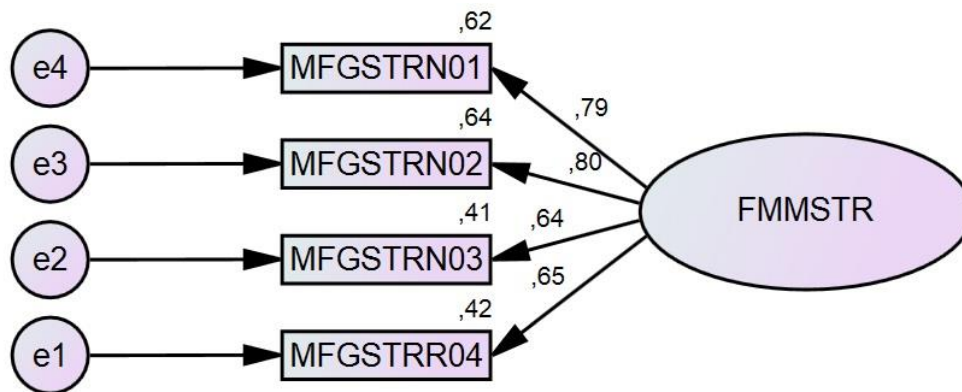
Figure 5: CFA Model and Factor Loadings for Implementation of Manufacturing Strategy

Source: Elaborated by the author

**Table 5: Formal Manufacturing Strategy Construct Unidimensionality and Reliability Analyses**

Formal Manufacturing Strategy			
Items	4	CFI	0.974
Average	3.82	GFI	0.973
Standard Deviation	0.69	NFI	0.961
		Composite Reliability	0.813
$\chi^2$ (p-value)	5.548 (0.062)	Average Variance Extracted	0.52
$\chi^2 / DF$	2.774	Cronbach's Alpha	0.806

Source: Elaborated by the author

**Figure 6: CFA Model and Factor Loadings for Formal Manufacturing Strategy**

Source: Elaborated by the author

#### 4.1.5.2. Unidimensionality and Reliability

Unidimensionality means that the items within a determined scale do measure a single construct and was assessed through overall fit of the models, absolute and comparative or incremental fit indexes. Qui-square values were not significant in three of the four constructs (99% significance) and with probability not computed in the remaining variable. This will not be considered as a sole model fit indicator as one of its limitations regard the test's low power (i.e. "ability to reject the null hypothesis,  $H_0$ , when it is false", FORNELL; LARCKER, 1981:42) and as incremental fit indexes showed strong results. The qui-square per degrees of freedom ratio ( $\chi^2/DF$ ) reveals the relative efficiency of the model, being acceptable under 5 and indicative of good fit under 2. With the exception of the Integrating Leadership construct, which couldn't have its probability or  $\chi^2/DF$  ratio computed, the other three constructs showed acceptable ratios and Implementation of Manufacturing Strategy demonstrated good model fit.

As for the incremental fit indexes – comparative fit index (CFI), goodness-of-fit index (GFI) and normed fit index (NFI) – all values exceed the 0.95 threshold, also reinforcing the strong unidimensionality of the scales.

Composite reliability refers to the internal consistency of a measurement model, that is, whether if the scales represent the operationalized construct in a sufficient manner. It is calculated by dividing the squared sum of standardized loadings by the same sum added to the sum of indicator measurement errors (RAYKOV, 1997), as shown in the equation below:

$$CR = \frac{(\sum \lambda_i)^2}{(\sum \lambda_i)^2 + \sum Var(\epsilon_i)},$$

where  $\lambda_i$  is the standardized loading of each item  $i$  and  $Var(\epsilon_i)$  represents the indicator's measurement error, which can be simplified in terms of standardized loadings  $(1 - \lambda_i)$ . All constructs surpass the suggested 0.70 standard, as displayed in Tables 2 to 5 above. Scales' reliability were also assessed through the Average Variance Extracted, which indicates the variances' portion that is truly captured by the determined construct, in relation to the portion explained by measurement error, also calculated with standardized factor loadings  $\lambda_i$ :

$$AVE = \frac{\sum \lambda_i^2}{\sum \lambda_i^2 + \sum (1 - \lambda_i^2)}$$

Three of the four constructs demonstrated values above 0.50, meaning that a larger part of the variance is due to the operationalized items, and only Implementation of Manufacturing Strategy scored 0.49. Additionally, Cronbach's Alpha (CRONBACH, 1951) were assessed as an estimate of reliability for the measurement constructs, reaching values of good internal consistency (i.e. higher than 0.70) for all four scales.

Convergent and discriminant validity were assessed through the correlation matrix represented in Table 6 below. Correlation values varied within a range of 0.393 to 0.739 for items pertaining to the same Operations Strategy elements constructs and from -0.098 to 0.259 for items of different measurement models.

**Table 6: Correlation Matrix for Operations Strategy Elements Construct Items**

		Integrating Leadership			Functional Integration					Implementation of Manufacturing Strategy				Formal Manufacturing Strategy			
		LDINT02	LDINT03	LDINT04	INTEG01	INTEG03	FUNCI01	FUNCI04	FUNCI05	LINKS01	LINKS03	LINKS04	LINKS06	MFGST01	MFGST02	MFGST03	MFGST04
Correlation Matrix	LDINT02	1,000	,519	,599	,250	,180	,230	,203	,163	,127	,056	,139	,210	,259	,248	,115	,226
	LDINT03	,519	1,000	,410	,184	,261	,145	,224	,154	,110	,059	,199	,161	,085	,106	,152	,153
	LDINT04	,599	,410	1,000	,108	,175	,059	,060	,088	,156	-,098	,070	,075	,095	,099	,107	,057
	INTEG01	,250	,184	,108	1,000	,471	,702	,539	,586	,438	,373	,551	,229	,427	,473	,408	,388
	INTEG03	,180	,261	,175	,471	1,000	,643	,660	,668	,413	,415	,496	,357	,345	,296	,442	,311
	FUNCI01	,230	,145	,059	,702	,643	1,000	,705	,739	,501	,497	,486	,313	,499	,527	,459	,518
	FUNCI04	,203	,224	,060	,539	,660	,705	1,000	,650	,528	,508	,567	,450	,439	,377	,398	,464
	FUNCI05	,163	,154	,088	,586	,668	,739	,650	1,000	,571	,472	,529	,426	,528	,493	,558	,451
	LINKS01	,127	,110	,156	,438	,413	,501	,528	,571	1,000	,486	,447	,503	,503	,472	,625	,442
	LINKS03	,056	,059	-,098	,373	,415	,497	,508	,472	,486	1,000	,556	,490	,491	,363	,507	,410
	LINKS04	,139	,199	,070	,551	,496	,486	,567	,529	,447	,556	1,000	,510	,464	,363	,493	,318
	LINKS06	,210	,161	,075	,229	,357	,313	,450	,426	,503	,490	,510	1,000	,386	,422	,499	,427
	MFGST01	,259	,085	,095	,427	,345	,499	,439	,528	,503	,491	,464	,386	1,000	,629	,568	,461
	MFGST02	,248	,106	,099	,473	,296	,527	,377	,493	,472	,363	,363	,422	,629	1,000	,469	,574
	MFGST03	,115	,152	,107	,408	,442	,459	,398	,558	,625	,507	,493	,499	,568	,469	1,000	,393
	MFGST04	,226	,153	,057	,388	,311	,518	,464	,451	,442	,410	,318	,427	,461	,574	,393	1,000
Significance	LDINT02		,000	,000	,005	,033	,009	,019	,049	,098	,285	,079	,016	,004	,005	,121	,010
	LDINT03	,000		,000	,030	,004	,071	,011	,059	,132	,274	,021	,051	,194	,140	,060	,059
	LDINT04	,000	,000		,137	,037	,275	,270	,185	,056	,161	,238	,223	,168	,158	,139	,283
	INTEG01	,005	,030	,137		,000	,000	,000	,000	,000	,000	,000	,009	,000	,000	,000	,000
	INTEG03	,033	,004	,037	,000		,000	,000	,000	,000	,000	,000	,000	,000	,001	,000	,001
	FUNCI01	,009	,071	,275	,000	,000		,000	,000	,000	,000	,000	,001	,000	,000	,000	,000
	FUNCI04	,019	,011	,270	,000	,000	,000		,000	,000	,000	,000	,000	,000	,000	,000	,000
	FUNCI05	,049	,059	,185	,000	,000	,000	,000		,000	,000	,000	,000	,000	,000	,000	,000
	LINKS01	,098	,132	,056	,000	,000	,000	,000	,000		,000	,000	,000	,000	,000	,000	,000
	LINKS03	,285	,274	,161	,000	,000	,000	,000	,000	,000		,000	,000	,000	,000	,000	,000
	LINKS04	,079	,021	,238	,000	,000	,000	,000	,000	,000	,000		,000	,000	,000	,000	,000
	LINKS06	,016	,051	,223	,009	,000	,001	,000	,000	,000	,000	,000		,000	,000	,000	,000
	MFGST01	,004	,194	,168	,000	,000	,000	,000	,000	,000	,000	,000	,000		,000	,000	,000
	MFGST02	,005	,140	,158	,000	,001	,000	,000	,000	,000	,000	,000	,000	,000		,000	,000
	MFGST03	,121	,060	,139	,000	,000	,000	,000	,000	,000	,000	,000	,000	,000	,000		,000
	MFGST04	,010	,059	,283	,000	,001	,000	,000	,000	,000	,000	,000	,000	,000	,000	,000	

Source: Elaborated by the author

Additionally, discriminant validity between Operations Strategy constructs was assessed, by comparing their average variance extracted against the covariance of every possible pair of constructs (FORNELL; LARCKER, 1981). Table 7 below shows that each individual extracted variance loaded higher than its shared variance with the other constructs, demonstrating that discriminant validity was, in fact, achieved.

**Table 7: Operations Strategy Constructs' Discriminant Validity Analysis**

<b>Operations Strategy Element</b>	<b>Integrating Leadership</b>	<b>Functional Integration</b>	<b>Implementation of Manufacturing Strategy</b>	<b>Formal Manufacturing Strategy</b>
Integrating Leadership	<b>0.5310</b>	0.0064	0.0064	0.0144
Functional Integration		<b>0.6407</b>	0.0676	0.0625
Implementation of Manufacturing Strategy			<b>0.4942</b>	0.1369
Formal Manufacturing Strategy				<b>0.5240</b>

Notes:

Values in bold represent the Average Variance Extracted

## 4.2. Hofstede's National Culture Indexes

This section is meant to present Hofstede's Indexes for each of the national culture dimension to be assessed in this research, obtained through the Value Survey Module 2013 Questionnaire (HOFSTEDE, 2013; see Appendix B). The results are openly available for academic studies. Each of the six dimensions is composed of four items, based on a five-point scale, generating indexes ranging from 0 to 100 and gathering data from 110 countries (HOFSTEDE; MINKOV, 2013). The values for the comprehended countries in HPM's 4<sup>th</sup> round are specified as well.

### 4.2.1. Power Distance Index (PDI)

With three five-point scale questions, Hofstede (2001) elaborates the Power Distance Index (PDI), calculated as follows:

$$\begin{aligned}
 PDI = & 135 - 25(\text{mean score employees afraid}) \\
 & + (\text{percentage perceived manager 1 + 2}) \\
 & - (\text{percentage preferred manager 3})
 \end{aligned}$$

where the constant value of 135 were added to adjust the range of the PDI scale from 0 to 100, representing cultures with low and high PDIs, respectively; the “employees afraid” variable represents the perception of non-managerial employees about others’ fears in disagreeing with their managers; the “perceived manager 1+2” variable refers to the perception of subordinates that their superiors have the tendency to take the decision making process in an autocratic (1) or persuasive/paternalistic (2) manner; and the “preferred manager 3” reflecting the preference that subordinates hold for an autocratic (1), a persuasive/paternalistic (2) or a democratic (4) way of decision making by their boss, that is, anything other than a consultative (3) style.

#### 4.2.2. Uncertainty Avoidance Index (UAI)

For the Uncertainty Avoidance Index (UAI), Hofstede (2001) operationalizes three questions to measure the tolerance for uncertainty from the respondents, as shown in the equation below:

$$\begin{aligned}
 UAI = & 300 - 30(\text{mean score rule orientation}) \\
 & - (\text{percentage intending to stay less than 5 years}) \\
 & - 40(\text{mean stress score})
 \end{aligned}$$

also having the constant value of 300 added to have UAI ranging between 8 and 112, representing cultures with the lowest and highest UAIs; the “rule orientation” variable represents the level of agreement to the statement that the company’s rules should never be broken in any situation; the “intending to stay less than 5 years” variable reflecting the employment stability from the employee intention point of view – taking (1) intention to be in the company for less than 2 years and the negative counterpart (2) intention from 2 to 5 years; and the “stress score” variable referring to the frequency in which the employee feel either nervous or tense at work.

#### **4.2.3. Individualism *versus* Collectivism (IDV)**

The Individualism Index (IDV) is calculated as a simple mathematical transformation of a factor analysis of the variation in importance of work goals questions, among 14 options. This analysis led to two main factors accountable for the differences between answers, the first one deriving the IDV – and the second, producing the fourth dimension, Masculinity measurement, not assessed in this study.

#### **4.2.4. Long-Term *versus* Short-Term Orientation Index (LTOWVS)**

The Long-Term *versus* Short-Term Orientation Index (LTOWVS) is presented in terms of values on the two opposed poles and originally ranged from 0 to 100 after a linear transformation. Chinese answers were received after the scale construction, which positioned the country with a score of 118. The long-term pole is represented by persistence, ordering relationships by status, thrift and sense of shame values; the short-term, by personal steadiness and stability, protecting “face”, respect for tradition and reciprocation of greetings, favors and gifts values (HOFSTEDE; 2001).

#### **4.2.5. National Culture Dimensions Indexes**

Levels of national culture dimensions indexes were created for the assessment of their impact in Operations Strategy elements. Table 8 below presents the national culture dimensions indexes for the HPM 4<sup>th</sup> Round’s participant countries:



**Table 8: Hofstede's National Cultures Indexes for the HPM 4<sup>th</sup> Round's Countries**

Country	PDI	IDV	UAI	LTOWVS
Brazil	69	38	76	44
Finland	33	63	59	38
Sweden	31	71	29	53
Italy	50	76	75	61
Spain	57	51	86	48
Germany	35	67	65	83
Israel	13	54	81	38
China	80	20	30	87
Taiwan	58	17	69	93
Japan	54	46	92	88
South Korea	60	18	85	100

Source: <http://www.geerthofstede.edu>

Each cultural index was classified as Low, Medium Low, Moderate High or High, according to the countries' scores (0 to 25, 26 to 50, 51 to 75 and 76 to 100, respectively), as displayed in Chart 19.

**Chart 19: National Cultures Dimensions Levels for Selected Countries**

Country	PDI	IDV	UAI	LTOWVS
Brazil	Moderate High	Medium Low	High	Medium Low
China	High	Low	Medium Low	High
Germany	Medium Low	Moderate High	Moderate High	High
South Korea	Moderate High	Low	High	High

Source: Elaborated by the author

### 4.3. Data Treatment and Analysis

Analysis of variance (ANOVA) tests were run to assess if National Cultures differences impacted the Operations Strategy elements. Five cultural groupings were formed, according to country, Power Distance Index levels, Individualism vs. Collectivism Index levels, Uncertainty Avoidance Index levels and Long-Term Orientation vs. Short Term Index levels, integrating

the ANOVA factors between which averages of Operation Strategy elements were to be compared.

Previous assessment of several assumptions necessary to define the type of test and *post-hoc* tests were made. For this stage, six different assumptions were considered (ANDERSON; SWEENEY; WILLIAMS, 2010), as explained in Chart 20 below:

**Chart 20: Analysis of Variance Six Assumptions**

Assumption	Topic	Description
Assumption 1	Continuous dependent variable	The dependent variable should be measured as continuous variables, within an interval or a ratio level
Assumption 2	Independent groups	The independent variable must be formed with two or more categorical independent groupings of data
Assumption 3	Independence of observations	Observations needs to be independent from each other, with no influence of one respondent over another
Assumption 4	No significant outliers	No significant outliers should be detected in the data set
Assumption 5	Normal distribution	The dependent variable data set must be approximately normally distributed, considering each category of factors
Assumption 6	Homegeneity of variances	Homogeneity or heterogeinity of variances have to be tested in order to define the ANOVA and <i>post hoc</i> test types

Source: Adapted from Anderson, Sweeney & Williams (2010)

The first assumption was fulfilled at the design of the HPM project surveys in the selected constructs, with respondents asked to answer within a five-point Likert scale. The second assumption is attended by the creation of independent groups in each of the analysed categories – by country, resulting in four different groups; by Power Distance Index levels, Individualism vs. Collectivism Index levels and Uncertainty Avoidance Index levels, with three different groups each; and finally, by Long-Term Orientation vs. Short-Term Index levels, forming two different groups of respondents.

The fourth assumption, regarding significant outliers, was assessed by analysing each group's boxplot. Although some outliers were in fact detected, it was chosen not to remove them from the data set, since this would lower the sample size. Regarding the test of normality of independent variables in assumption five, Q-Q graphs for the four variables were assessed, presenting distributions very approximately normal in every case. Finally, Levene's tests defined if variances were homogeneous or heterogeneous between the different groups of

factors. Two constructs, Integrating Leadership and Implementation of Manufacturing Strategy, presented homogeneous variances according to their Levene's p-values, significant at the 99% confidence level, and therefore One-Way ANOVAs with Tukey's *post hoc* tests were performed. For the other two constructs, Functional Integration and Formal Manufacturing Strategy, which did not present homogeneity in their variances at the same level of confidence, Welch's ANOVA and Games-Howell *post hoc* tests were conducted, as they do not require that compared groups carry equal standard deviations.

## 5 Results

A total of 20 ANOVAs and 20 *post hoc* tests were ran, with each Operations Strategy element construct being assessed for the five distinct groupings of data. Results suggest that there are significant relationships that indicate the interference of National Cultures dimensions differences in all studied Operations Strategy elements present in the organizational context, though the dimensions that affect each one of them may vary. This chapter is dedicated to the presentation of the evidences found in each set of analysis.

The first set pertains to the grouping of data in the four studied countries. As shown in Table 9 below, there are strong evidences of differences in Integrating Leadership (ANOVA p-value = 0.041), and more specifically in the Germany / China pair (*post-hoc* Tukey's test p-value= 0.029). Strong differences are also present in Functional Integration (ANOVA p-value = 0.050), between Brazil and South Korea (*post-hoc* Games-Howell's test p-value = 0.009). The other two Operations Strategy elements (i.e. Implementation of Manufacturing Strategy and Formal Manufacturing Strategy) carry evidences that they may be affected but with significance surrounding the acceptable level (ANOVA p-values = 0.180 and 0.128, respectively).

**Table 9: ANOVA Results for grouping in Countries**

Operations Strategy Element	Factor - Countries				Total N = 105	Statistics P-value
	1 - GER N = 28	2 - CHI N = 30	3 - BRA N = 21	4 - KOR N = 26		
	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)	
Integrating Leadership	3.68 (0.36)[2]	4.09 (0.69)[1]	3.97 (0.53)	3.85 (0.54)	3.89 (0.57)	0.041 *
Functional Integration	3.91 (0.50)	3.85 (0.68)	4.16 (0.43)[4]	3.71 (0.49)[3]	3.89 (0.55)	0.050 **
Implementation of Manufacturing Strategy	4.07 (0.47)	3.71 (0.88)	3.92 (0.59)	3.84 (0.42)	3.88 (0.63)	0.180
Formal Manufacturing Strategy	3.92 (0.74)	3.64 (0.80)	4.06 (0.64)	3.71 (0.48)	3.82 (0.69)	0.128

Notes:

\* p < 0.05

\*\* p < 0.10

The number in parentheses are sample standard deviations.

The number in brackets indicate the group means from which this group is significantly different at the 0.10 significance level as indicated by the Tukey's or Games-Howell pairwise comparison test.

The second set of analysis held three different groups of Power Distance Index Levels (i.e. Medium low, Moderate High and High). Strong evidences of differences between these groups suggest that Integrating Leadership (ANOVA p-value = 0.021) and Implementation of Manufacturing Strategy (ANOVA p-value = 0.094) are affected by differences between Medium low (Germany) and High (China) levels of Power Distance Index (*post-hoc* Tukey's

test p-values = 0.015 and 0.076, respectively). Contrary to initial expectations, results point out to a positive relationship between Power Distance and Integrating Leadership. This result is counter intuitively. Evidences suggest that Functional Integration is not related to Power Distance Levels, neither Formal Manufacturing Strategy (ANOVA p-values = 0.888 and 0.260, respectively). Table 10 displays the results for this analysis:

**Table 10: ANOVA Results for grouping in Power Distance Index Levels**

Operations Strategy Element	Factor - Power Distance Index Levels				Total N = 105	Statistics P-value
	1 - L N = 0	2 - ML N = 28	3 - MH N = 47	4 - H N = 30		
	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)	
Integrating Leadership		3.67 (0.35)[4]	3.90 (0.53)	4.08 (0.69)[2]	3.89 (0.56)	0.021 *
Functional Integration		3.91 (0.50)	3.91 (0.51)	3.85 (0.68)	3.89 (0.55)	0.888
Implementation of Manufacturing Strategy		4.06 (0.47)[4]	3.87 (0.50)	3.70 (0.87)[2]	3.88 (0.63)	0.094 **
Formal Manufacturing Strategy		3.92 (0.74)	3.87 (0.58)	3.64 (0.80)	3.82 (0.69)	0.260

Notes:

For Power Distance Index levels, ML (Medium-Low) = Germany, MH (Moderate High) = Brazil and South Korea, and H (High) = China

\* p < 0.05

\*\* p < 0.10

The number in parentheses are sample standard deviations.

The number in brackets indicate the group means from which this group is significantly different at the 0.10 significance level as indicated by the Tukey's or Games-Howell pairwise comparison test.

Data were separated into three groups of Individualism vs. Collectivism Index Levels in the third set (Table 11), demonstrating strong evidences of impact when it comes to Integrating Leadership (ANOVA p-value = 0.061) and Formal Manufacturing Strategy (ANOVA p-value = 0.062). Evidences are also strong when it comes to the impact of this cultural dimension in Functional Integration (ANOVA p-value = 0.031), but showing that it has a positive impact rather than our hypothesized negative relation. While strong differences were detected between Low (China and South Korea) and Moderate high (Germany) Individualism vs. Collectivism levels in Integrating Leadership (*post-hoc* Tukey's test p-value = 0.060), the other two Operations Strategy levels showed relevant differences between Low (China and South Korea) and Medium low (Brazil) levels (*post-hoc* Games-Howell's and Tukey's test p-values = 0.011 and 0.064). There are some evidence that can imply that Implementation of Manufacturing Strategy is affected also (ANOVA p-value = 0.117), more specifically between Low (China and South Korea) and Moderate high (Germany) Individualism vs. Collectivism levels (*post-hoc* Games-Howell's test p-value = 0.102).

**Table 11: ANOVA Results for grouping in Individualism vs. Collectivism Index Levels**

Operations Strategy Element	Factor - Individualism vs. Collectivism Index Levels				Total	Statistics
	1 - L	2 - ML	3 - MH	4 - H		
	N = 56	N = 21	N = 28	N = 0	N = 105	P-value
Integrating Leadership	3.97 (0.63)[3]	3.96 (0.53)	3.68 (0.56)[1]		3.89 (0.56)	0.061 **
Functional Integration	3.78 (0.59)[2]	4.16 (0.42)[1]	3.91 (0.50)		3.89 (0.55)	0.031 *
Implementation of Manufacturing Strategy	3.76 (0.70)	3.92 (0.59)	4.06 (0.47)		3.88 (0.63)	0.117
Formal Manufacturing Strategy	3.67 (0.67)[2]	4.06 (0.64)[1]	3.92 (0.74)		3.82 (0.69)	0.062 **

Notes:

For Individualism vs. Collectivism Index levels, L (Low) = China and South Korea, ML (Medium-Low) = Brazil, and MH (Moderate High) = Germany

\*  $p < 0.05$

\*\*  $p < 0.101$

The number in parentheses are sample standard deviations.

The number in brackets indicate the group means from which this group is significantly different at the 0.10 significance level as indicated by the Tukey's or Games-Howell pairwise comparison test.

For the fourth set, data was aggregated in three different groups of Uncertainty Avoidance Index Levels. Similarly to the Power Distance grouping, evidences suggest strong differences in Integrating Leadership (ANOVA  $p$ -value = 0.021) and Implementation of Manufacturing Strategy (ANOVA  $p$ -value = 0.094), as displayed in Table 12, both with significant distinctions between Medium low (China) and Moderate high (Germany) levels of Uncertainty Avoidance (*post-hoc* Tukey's test  $p$ -values = 0.015 and 0.076). On the other hand, there are strong suggestions that Functional Integration and Formal Manufacturing Strategy are not affected by this National Culture dimension.

**Table 12: ANOVA Results for grouping in Uncertainty Avoidance Index Levels**

Operations Strategy Element	Factor - Uncertainty Avoidance Index Levels				Total	Statistics
	1 - L	2 - ML	3 - MH	4 - H		
	N = 0	N = 30	N = 28	N = 47	N = 105	P-value
Integrating Leadership		4.08 (0.69)[3]	3.68 (0.36)[2]	3.90 (0.53)	3.89 (0.56)	0.021 *
Functional Integration		3.85 (0.68)	3.91 (0.50)	3.91 (0.51)	3.89 (0.55)	0.888
Implementation of Manufacturing Strategy		3.70 (0.87)[3]	4.06 (0.47)[2]	3.87 (0.50)	3.88 (0.63)	0.094 **
Formal Manufacturing Strategy		3.64 (0.80)	3.92 (0.74)	3.87 (0.58)	3.82 (0.69)	0.260

Notes:

For Uncertainty Avoidance Index levels, ML (Medium-Low) = China, MH (Moderate High) = Germany, and H (High) = Brazil and South Korea

\*  $p < 0.05$

\*\*  $p < 0.10$

The number in parentheses are sample standard deviations.

The number in brackets indicate the group means from which this group is significantly different at the 0.10 significance level as indicated by the Tukey's or Games-Howell pairwise comparison test.

The fifth and final set of analysis carried groups with Medium low (Brazil) and High (China, Germany and South Korea) levels of Long-Term Orientation vs. Short-Term (Table 13), with strong evidences pointing to the influence of this levels in Functional Integration (ANOVA p-value = 0.014) and Formal Manufacturing Strategy (ANOVA p-value = 0.070), but again contrary to our hypothesized positive relations. *Post-hoc* tests were not ran, since this set only had two groups being compared. For the other two elements of Operations Strategy, Integrating Leadership and Implementation of Manufacturing Strategy, there are strong evidences that suggest that they do not present impact of Long-Term Orientation vs. Short-Term Index levels.

**Table 13: ANOVA Results for grouping in Long-Term Orientation vs. Short-Term Index Levels**

Operations Strategy Element	Factor - Long-Term Orientation vs. Short-Term Index Levels				Total N = 105	Statistics P-value
	1 - L N = 0	2 - ML N = 0	3 - MH N = 21	4 - H N = 84		
	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)	
Integrating Leadership		3.96 (0.53)		3.87 (0.57)	3.89 (0.56)	0.514
Functional Integration		4.16 (0.43)		3.82 (0.56)	3.89 (0.55)	0.014 *
Implementation of Manufacturing Strategy		3.92 (0.59)		3.86 (0.64)	3.88 (0.63)	0.737
Formal Manufacturing Strategy		4.06 (0.64)		3.75 (0.70)	3.82 (0.69)	0.070 **

Notes:

For Long-Term Orientation vs. Short-Term Index levels, ML (Medium Low) = Brazil, and H (High) = China, Germany and South Korea

\*  $p < 0.05$

\*\*  $p < 0.10$

The number in parentheses are sample standard deviations.

## 6 Discussion

Evidences suggest that every approached element of Operations Strategy is in fact affected by cultural differences, though in distinct dimensions. This section aims to discuss the impact of such differences in each OS construct, along with possible explanations. Table 14 below summarizes the hypothesized relationships and the significant relationships encountered, with (+) representing positive impacts and (-), negative ones, grouped by National Cultures dimensions and by Operations Strategy elements.

**Table 14: Summary of Results and Relationships between National Cultures Dimensions and Operations Strategy Elements**

Hypothesis	National Cultures Dimensions	Operations Strategy Elements	Hypothesized Relations	Empirical Relations	Empirical Evidences
H. 1a	Power Distance	Integrating Leadership	-	+	Confirmed
H. 1b	Power Distance	Functional Integration	NS	NS	Not confirmed
H. 1c	Power Distance	Implementation of Manufacturing Strategy	-	-	Confirmed
H. 1d	Power Distance	Formal Manufacturing Strategy	NS	NS	Not confirmed
H. 2a	Individualism vs. Collectivism	Integrating Leadership	-	-	Confirmed
H. 2b	Individualism vs. Collectivism	Functional Integration	-	+	Confirmed
H. 2c	Individualism vs. Collectivism	Implementation of Manufacturing Strategy	NS	NS	Not confirmed
H. 2d	Individualism vs. Collectivism	Formal Manufacturing Strategy	+	+	Confirmed
H. 3a	Uncertainty Avoidance	Integrating Leadership	-	-	Confirmed
H. 3b	Uncertainty Avoidance	Functional Integration	NS	NS	Not confirmed
H. 3c	Uncertainty Avoidance	Implementation of Manufacturing Strategy	+	+	Confirmed
H. 3d	Uncertainty Avoidance	Formal Manufacturing Strategy	NS	NS	Not confirmed
H. 4a	Long-Term Orientation vs. Short-Term	Integrating Leadership	NS	NS	Not confirmed
H. 4b	Long-Term Orientation vs. Short-Term	Functional Integration	+	-	Confirmed
H. 4c	Long-Term Orientation vs. Short-Term	Implementation of Manufacturing Strategy	NS	NS	Not confirmed
H. 4d	Long-Term Orientation vs. Short-Term	Formal Manufacturing Strategy	+	-	Confirmed

Note:

NS = Not significant

The first Operations Strategy element, Integrating Leadership, was the most impacted one, carrying strong evidences in four of the five groupings. Hypothesis were confirmed for Individualism vs. Collectivism and Uncertainty Avoidance levels, with negative impacts (hypothesis 2a and 3a, respectively); but not for Long-Term Orientation vs. Short-Term levels. Contradicting initial expectations, significant differences were found for Power Distance levels in a positive relationship, rather than the negative impact hypothesized in 1a. The most significant differences are shown between Germany and China (i.e. Medium low and High Power Distance Index levels and Medium low and Moderate high Uncertainty Avoidance Index levels).



Several authors have attributed a great deal of importance to social networking and indigenous management concepts or approaches, stating that they are a fundamental basis to comprehend the development of managerial practices in emerging economies; yet, the majority of literature so far holds its attention to *guanxi*, in China, and *blat*, in Russia (MINBAEVA; MURATBEKOVA-TOURON, 2013). As such indigenous concepts can be understood as “informal influence processes that are salient within organizations” (SMITH; TORRES; LEONG; BUDHWAR; ACHOUI; LEBEDEVA, 2012:334), other examples can be also found in Brazil’s *jeitinho*, India’s *dharma*, South Africa’s *Ubuntu*, Kazakhstan’s *clanism*, Arab countries’ *wasta*, and South Korea’s *yongo* (HORAK; KLEIN, 2015; MINBAEVA; MURATBEKOVA-TOURON, 2013; MOTTA; ALCADIPANI, 1999; SMITH; TORRES; LEONG; BUDHWAR; ACHOUI; LEBEDEVA, 2012), to name a few, each of which holding its own traits in what regards social interactions.

Such understanding could also be helpful in trying to explain the main differences found between China and Germany regarding Operations Strategy. *Guanxi* has been portrayed in the literature as a “pervasive relationship lubricant that helps to increase the efficiency and effectiveness of daily business operations” (LUO; HUANG; WANG, 2011:140), and as carrying “implicit mutual obligation, assurances, and understanding, and it governs Chinese attitudes toward long-term social and business relationships” (TORRES; ALFINITO; GALVÃO; TSE, 2015:82). Moreover, the latter research also posits that “broadly, *guanxi* means interpersonal linkages with the implication of continued exchange favors”. In this sense, even though China holds high Power Distance Index levels, its indigenous culture is one that favors relationships and networking, what may explain higher values of Integrating Leadership in the country.

There are moderately strong evidences indicating that Integrating Leadership is also negatively affected by Individualism vs. Collectivism Index levels, with differences between Low (China and South Korea) and Moderate High (Germany) IDV countries, demonstrating that a more collective culture can facilitate an integration-oriented leadership. Following the same logics argued above, China’s *guanxi* practices reflect the country’s high Collectivism culture, also nurturing Integrating Leadership efforts.

Functional Integration, the second assessed OS element, demonstrated strong evidences of differences between Brazil and South Korea, along between countries with Low and Medium

low Individualism vs. Collectivism Index levels (i.e. China and South Korea; Brazil), yet not confirming hypothesis 2b, but carrying an opposite relationship. Although Brazil presents a more individualistic culture inside Hofstede's dimensions model, it yielded in higher levels of Functional Integration when compared to China and South Korea. Once again, we turn to an interdisciplinary approach, basing our discussion on one of the most prominent Brazilian historians and authors, Sérgio Buarque de Holanda, and his work "Raízes do Brasil" (literally translated into "Roots of Brazil") to search for an understanding of this research findings.

Holanda (1936) goes back from the country's colonization process to its urban revolution in the end of the XIX century to draw the cultural characteristics that are rooted on Brazil's society. To the author, the until then present family structured agricultural model was profoundly defied by the urban emancipatory movement of the industrial revolution. The state forced its control by institutionalizing a number of patriarchal measures, which culminated in a profound "aversion for social ritualism" (HOLANDA, 1936:147, our translation), possibly explaining the individualistic traits reported by Hofstede's studies. On the other hand, such dichotomous forces, present in the Brazilian culture up until today, gave birth to what Holanda (1936) denominated "the cordial man". This characteristic relates to the fact that Brazilians tend to behave within an apparent affection dynamic toward external elements, even when they do not mean what they show. Hence, it could be argued that the measurement instrument of Functional Integration did not capture the real individualism, but instead the apparent collectivism present in the cordiality of relationships inherent to this cultural background.

Still under Functional Integration's assessment, although hypothesis 1b and 3b, relating this construct to Power Distance and Uncertainty Avoidance, were not confirmed by empirical evidences, the two groups of Long-Term Orientation vs. Short-Term Index levels (Medium low – Brazil, and High – Germany, China and South Korea) also resulted in statistically significant differences. Similarly to the analysis above, it did demonstrate a negative relationship between Long-Term Orientation and Functional Integration, rather than the positive relation hypothesized in 4b. Again, Holanda's (1936) insights may be helpful to understand this result. The author defines two distinct and opposing principles that regulate the human activity, typified in two basic sorts of people on what regards human relation to personal initiatives. Accordingly, while adventurers "see the fruit" (i.e. their personal goals and objectives) as an ultimate end of their efforts, workers firstly project the difficulties to be overcome in achieving of their targets. Inherent to the second type is the ethics of work, on which persistent hard efforts

shall be employed in the search of personal goals. The first one, in turn, is embedded in an adventure ethic, according to which fast and immediate compensations, disconnected to the necessary work to build them, are highly valued.

Both concepts would be fundamental in the comprehension of the roles played by each group in Brazil's conquering and colonization processes. As discussed by the author, on that regard, workers offered very limited or practically no contribution. The task was addressed by adventurers, the group that contains most of the Portuguese reasoning that work would not be an attractive activity, as it carried no near compensation. Instead, the will to reach prosperity without the cost of labor would be the main driver in the Portuguese's actions, resulting in their major efforts in the direction of new lands. In such adventure, the author states that the Portuguese definitely searched for wealth, not at cost of work, but at cost of boldness instead.

That would have also been the reason for the high level of adaptation presented by them. In the name of a major objective, the Portuguese installed in Brazil were capable to fit their habits and costumes to the possibilities offered by the environment, what may have decisively contributed to the implementation of their own culture in the country. Such contrast between adventurers' short-term orientation and high adaptability may also offer a contribution to understanding Brazil's low Long-Term Orientation, and yet higher Functional Integration scores. Such trait can also be observed within the country's organizational context. In their study on Brazilian multinational companies and the effects of cultural dimensions and global mindedness on their foreign subsidiaries, Reis, Fleury, Fleury and Zambaldi (2015) point out to the "search of reactive and adaptive (short-term) solutions" (REIS; FLEURY; FLEURY; ZAMBALDI, 2015:61) as a culturally shared characteristic.

Thirdly, Implementation of Manufacturing Strategy was significantly impacted by Power Distance (Medium low and High, i.e., Germany and China) and Uncertainty Avoidance (Medium low and Moderate high, i.e. China and Germany), supporting hypothesis 1c and 3c. For Individualism vs. Collectivism Index levels (Low and Moderate high, i.e. China and Germany), evidences for differences between the countries rest in the limit of significance levels, while its relation to Long-Term Orientation vs. Short-Term could not be proven. These findings strengthen the idea first proposed by Hermann Simon in 1992, and his then groundbreaking term, "hidden champions". Hidden champions initially related to German companies, holding market leadership in a global scope, which were midsized and usually with

a low profile in what regards media and consumers' attention (SIMON, 1992, 1996, 2009). As his study on these companies evolved, the author moved on his search all over the world. Although he did encounter a number of them in various countries and cultures, he states that "the majority of this company breed could still be found in the German-Scandinavian countries. I estimate that 80% of all midsize world market leaders come from this region" (SIMON, 2009:xiv).

In his first study on the subject, Simon (1992) identified 89 hidden champions in Germany, 39 of which agreed to participate in his research. The author enlists five practices that were common to all of them – "combine strategic focus and geographic diversity"; "emphasize factors like customer value"; "blend technology and closeness to customers"; "rely on their own technical competence"; and "create mutual interdependence between the company and its employees" (SIMON, 1992:116), adding that "the hidden champions consistently follow a strategy that combines technical competence with worldwide marketing and sales" (SIMON, 1992:117). These characteristics culminate in a narrow focus on a highly technical expertise demanding niche, meaning also that these companies converge the entirety of their resources to maintain the top position in the chosen niche. As they perceive "any deviation from their focus as simply a distraction" (SIMON, 1992:117), such level of determination, allied with Germany's lower Power Distance and higher Uncertainty Avoidance could explain the country's adherence to strategies, that is, its success in the Implementation of Manufacturing Strategy. In that sense, the latter may also advocate for the high performance levels of such firms.

Finally, moderate evidences of differences between Brazil, South Korea and China, and between countries with Low and Medium low Individualism vs. Collectivism Index levels (i.e. China and South Korea; Brazil) were found for Formal Manufacturing Strategy, supporting hypothesis 2d. This could also be understood by a social networking perspective. As discussed above, China's *guanxi* relates to the exchange of favors or obligations within social networks, reflected on its low scores on the Individualism vs. Collectivism Index. The Korean *yongu*, in turn, refers to diverse networks which individuals pertain to and are formed by town origin, school attendance and family or blood ties, configuring exclusive trusting relationships (HORAK; KLEIN, 2015). Although these concepts share both similarities and differences, their contribution for collectivism is perceptible. Along with this trait, they are also reported to be more influential to people's behavior than formal rules and prescriptions, which would lend a

better comprehension as to why these two countries scored lower on Formal Manufacturing Strategy than the others.

The findings for Brazil, on the other hand, could be explained by its sociological roots. As discussed by Holanda (1936), the Portuguese attempt to implement an European culture in Brazil may be considered the most relevant conditioner of Brazilian society, as it decisively shaped the developments of human relations in the country. According to the author, the implementation of a distant culture, out of its original contexts, resulted in an imposition of institutions, costumes and even ideas, artificially building the country's identity. Consequently to this forced "culturization", instead of configuring the result of a natural development of human relations, Brazilian society would be the outcome of an imported set of social rules that led to a lack of adherence between Brazilian people and the social norms they are inserted in. In expressing the condition experienced by Brazilians, the author states that: "*somos ainda hoje desterrados em nossa própria terra*" (i.e. "we are still today ungrounded in our own ground", HOLANDA, 1936:31, our translation). The quote would illustrate the idea that the enforcement of the European culture relegated Brazilian people to live within an environment that is strange to its own nature, as an external culture does not necessarily adapt to new environments or to the necessities of those inserted in it.

It is possible that the incompatibility between Brazilian people and the social environment artificially built resulted in a permanent conflict on what regards the acceptance and adequacy to norms and rules, or the "aversion for social ritualism" mentioned above. In that sense, it could be expected that Brazilians present a natural tendency to deviate from the codified behavior (i.e. social norms), what would be remedied by a stronger imposition of formal rules, possibly explaining the need for higher adoption of Formal Manufacturing Strategy, if the same shall be extrapolated to the adoption of norms and rules by firms. Also in line with this perspective are studies produced by management scholars, such as Castor (2004). The author highlights the formation of Brazilian's State based on the imposition of rules, as for maintaining the country's society under a submissive position. Alcadipani and Rosa (2011), in turn, observe the almost colonialist pulverization of north-american management knowledge in Latin American countries, including the fostering of business schools in locations such as Argentina and Brazil. The latter is also approached by Alcadipani and Bertero (2012), in their analysis of they call the "americanisation of business teaching in Brazil".

Empirical evidences also point to relevant differences between the two groups of Long-Term Orientation vs. Short Term levels (Medium high – Brazil, and High – China, Germany and South Korea), although within a negative relation than posited by hypothesis 4d. Brazil, although carrying a less long-term oriented culture in comparison to the other three assessed countries, scored higher in Formal Manufacturing Strategy scales. Besides the comprehension argued above over the imposition of norms and rules in Brazilian society, the country's economic characteristics may also offer an explanation. As Brazil represents an emerging economy, even though it has a shorter-term orientation linked to opportunistic behavior, it relies in traditionalist industries and sectors (e.g. agribusiness, consumer goods manufacturing, retail). While innovative environments tend to foster the development of more dynamic strategies, suited to adapt in rapid changes scenarios, less innovative ones (i.e. traditionalist environments) are more inclined to find support in formal and structured planning, here represented by Formal Manufacturing Strategy. Hypothesis 1d and 3d (linking Formal Manufacturing Strategy to Power Distance and Uncertainty Avoidance) did not find confirmation.

## 7 Conclusion

Beyond analyzing the extent to which National Cultures explain the differences on diverse elements of Operations Strategy, from a more generalist perspective the present study aimed to deepen the understanding of the relationship between these two apparently disconnected fields. In that sense, as discussed throughout the text, the relevance of the research relies on providing empirical evidences in the fulfilling of the gap around how human behavior may come to play a major impact on the formulation, implementation and maintenance of OS. Such effort was conducted through the assessment of the High Performance Manufacturing (HPM) project's fourth round data and Geert Hofstede's cultural classification.

Four Operations Strategy elements (Integrating Leadership, Functional Integration, Implementation of Manufacturing Strategy and Formal Manufacturing Strategy) and five groupings of culture (country, Power Distance, Individualism vs. Collectivism, Uncertainty Avoidance and Long-Term Orientation vs. Short-Term) were discussed in the theoretical background. The interpretation of the main issues that emerged from the literature review addressed allowed for the hypothesis development for the empirical research. On that regard, four sets of hypothesis were then presented, each one relating to one specific National Culture dimensions mentioned above and its impact on the Operations Strategy elements. In the attempt of answering the research question, ANOVA comparisons of these four Operations Strategy elements were ran for countries with diverse industrialization stages (e.g. Germany, China, Brazil and South Korea) and for cultural dimensions.

Significant differences were found for Integrating Leadership between Germany and China, and for Functional Integration between Brazil and South Korea. Evidences confirmed negative relationships between Power Distance and Implementation of Manufacturing Strategy, Individualism vs. Collectivism and Integrating Leadership, and Uncertainty Avoidance and Integrating Leadership; positive relations were confirmed for Individualism vs. Collectivism and Formal Manufacturing Strategy, and Uncertainty Avoidance and Implementation of Manufacturing Strategy (supporting hypothesis 1c, 2a, 3a, 2d and 3c, respectively). Contrary to initial expectations and counter intuitively, positive impacts were found between Power Distance and Integrating Leadership, and Individualism vs. Collectivism, as well as negative relations between Long-Term Orientation vs. Short-Term and both Functional Integration and

Formal Manufacturing Strategy, proving opposite relationships than the ones hypothesized in 1a, 2b, 4b and 4d.

The assessment of Operations Strategy from a cultural approach can bring a new light over different choices and decisions, as global supply chains emerge as a model for competitiveness, implying in different cultures interacting in a cooperative behavior to gain better performance and competitive advantage. The empirical work highlights strong relationships between culture and OS, indicating their importance and contributing with new perspectives both for theory and practice in what regards the planning and implementation of strategic and operations management.

Our main theoretical contribution relies on the fact that the results reinforce that human behavior may have greater impact in Operations Management than given credit for in the field. Major issues might find answers through the assessment of motivations and patterns embedded in cultural characteristics. Since behavioral patterns might be comprehended as a result of the social environments individuals are embedded in (at least partially), explanations of human actions were also searched within the Sociology literature. Social relations such as *guanxi* and *yongo* were brought to the discussions, along with historical backgrounds, offering additional and complementary views on how the expectations and interactions among employees may influence their relation to firms'. Within this reasoning, Hofstede's National Cultures classification were contextualized, helping to build the logics behind general behaviors observed in each analyzed society, and more specifically on how they can affect the planning, implementation and results of OS.

As for practical implications, the comprehension of the impact of National Culture dynamics in Operations Strategy can enlighten its formulation, implementation and maintenance processes. Managers involved in internationalization processes might encounter ways to deal with different cultures if they understand their relevance when it comes to OS. The study may also contribute to the understanding that successful OS shall be conditioned to its adaptation to specific scenarios. By doing so, companies could explore the maximum potential of their strategies, avoiding wastes from the eventual lack of adherence between national and organizational cultures. That is particularly relevant to firms inserted in global supply chains and / or stronger internationalization processes, as the better understanding of supply chain partners' social elements may lead to a more efficient Operations Management.



## 8 Limitations and Future Research

The present study does not come without limitations. The HPM project, although very consolidated and known for its cross-cultural nature and multiple respondents within the involved plants, is based on a cross-sectional investigation. The observation of the longitudinal evolution of Operations Strategy elements may elucidate other issues that were not captured by this data collection.

Moreover, the scales utilized in this study reflect measurement models that were design and implemented as a part of the bigger project, meaning that they may not be exactly suited for this research's purposes. It is also centered in the plant as the basic unit of analysis, instead of the whole supply chain, and relies on the respondents' perceptions. Future research could encompass other sources of information (i.e. documental research, open-ended interviews) to fill the gaps left from the survey technique and possibly involve other supply chain partners.

Additionally, our study presumes that Hofstede's national cultures dimensions levels has intra-country homogeneity and inter-country heterogeneity, meaning that each plant would reflect its country's cultural behavior. Future study could also consider administering cultural dimensions questionnaires along with Operations Management ones, confirming such behavior or capturing external influences that may emerge from cross-cultural transactions.

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## 10 Appendix A: Manufacturing Strategy and Performance Scales for the assessed constructs

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### Manufacturing Strategy Scales Items

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#### Achievement of Functional Integration

- The functions in our plant are well integrated
- Problems between functions are solved easily, in this plant
- Functional coordination works well in our plant
- Our business strategy is implemented without conflicts between functions

#### Formulation of Manufacturing Strategy

- Our plant has a formal manufacturing strategy process, which results in a written mission, goals and strategies
- This plant has a manufacturing strategy, which is put into writing
- Plant management routinely reviews and updates a long-range manufacturing strategy
- The plant follows an informal manufacturing strategy, with no written strategy document

#### Integration between Functions

- The functions in our plant work well together
- The functions in our plant cooperate to solve conflicts between them, when they arise
- Our plant's functions coordinate their activities
- Our plant's functions work interactively with each other
- The Marketing area knows a great deal about manufacturing in this plant
- The Finance area knows a great deal about manufacturing in this plant
- The Product Development area knows a great deal about manufacturing in this plant
- The Human resource management area knows a great deal about manufacturing in this plant

#### Leadership for Functional Integration

- Our top management emphasizes the importance of good inter-functional relationships
- Our managers do a good job of solving inter-functional conflicts
- We are encouraged to communicate well with different functions in this plant
- Our managers communicate effectively with managers in other functions

#### Manufacturing Business Strategy Linkage

- We have a manufacturing strategy that is actively pursued
  - Our business strategy is translated into manufacturing terms
  - Potential manufacturing investments are screened for consistency with our business strategy
  - At our plant, manufacturing is kept in step with our business strategy
  - Manufacturing management is not aware of our business strategy
  - Corporate decisions are often made without consideration of the manufacturing strategy
- 

<sup>a</sup>How often are the leadership tools and techniques listed below used in your plant? (1: never, 5: always)



## 11 Appendix B: VSM 2013 Questionnaire

### INTERNATIONAL QUESTIONNAIRE (VSM 2013)- page 1

Please think of an ideal job, disregarding your present job, if you have one. In choosing an ideal job, how important would it be to you to ... (please circle one answer in each line across):

- 1 = of utmost importance  
 2 = very important  
 3 = of moderate importance  
 4 = of little importance  
 5 = of very little or no importance

01. have sufficient time for your personal or home life	1	2	3	4	5
02. have a boss (direct superior) you can respect	1	2	3	4	5
03. get recognition for good performance	1	2	3	4	5
04. have security of employment	1	2	3	4	5
05. have pleasant people to work with	1	2	3	4	5
06. do work that is interesting	1	2	3	4	5
07. be consulted by your boss in decisions involving your work	1	2	3	4	5
08. live in a desirable area	1	2	3	4	5
09. have a job respected by your family and friends	1	2	3	4	5
10. have chances for promotion	1	2	3	4	5

In your private life, how important is each of the following to you: (please circle one answer in each line across):

11. keeping time free for fun	1	2	3	4	5
12. moderation: having few desires	1	2	3	4	5
13. doing a service to a friend	1	2	3	4	5
14. thrift (not spending more than needed)	1	2	3	4	5

**INTERNATIONAL QUESTIONNAIRE (VSM 2013) – page 2**

15. How often do you feel nervous or tense?

1. always
2. usually
3. sometimes
4. seldom
5. never

16. Are you a happy person ?

1. always
2. usually
3. sometimes
4. seldom
5. never

17. Do other people or circumstances ever prevent you from doing what you really want to?

1. yes, always
2. yes, usually
3. sometimes
4. no, seldom
5. no, never

18. All in all, how would you describe your state of health these days?

1. very good
2. good
3. fair
4. poor
5. very poor

19. How proud are you to be a citizen of your country?

1. very proud
2. fairly proud
3. somewhat proud
4. not very proud
5. not proud at all

20. How often, in your experience, are subordinates afraid to contradict their boss (or students their teacher?)

1. never
2. seldom
3. sometimes
4. usually
5. always

**INTERNATIONAL QUESTIONNAIRE (VSM 2013) – page 3**

To what extent do you agree or disagree with each of the following statements? (please circle one answer in each line across):

- 1 = strongly agree
- 2 = agree
- 3 = undecided
- 4 = disagree
- 5 = strongly disagree

- |   |   |   |   |   |   |
|---|---|---|---|---|---|
| 21. One can be a good manager without having a precise answer to every question that a subordinate may raise about his or her work                              | 1 | 2 | 3 | 4 | 5 |
| 22. Persistent efforts are the surest way to results  | 1 | 2 | 3 | 4 | 5 |
| 23. An organization structure in which certain subordinates have two bosses should be avoided at all cost   | 1 | 2 | 3 | 4 | 5 |
| 24. A company's or organization's rules should not be broken - not even when the employee thinks breaking the rule would be in the organization's best interest | 1 | 2 | 3 | 4 | 5 |

**INTERNATIONAL QUESTIONNAIRE (VSM 2013)- page 4**

Some information about yourself (for statistical purposes):

25. Are you:

1. male
2. female

26. How old are you?

1. Under 20
2. 20-24
3. 25-29
4. 30-34
5. 35-39
6. 40-49
7. 50-59
8. 60 or over

27. How many years of formal school education (or their equivalent) did you complete (starting with primary school)?

1. 10 years or less
2. 11 years
3. 12 years
4. 13 years
5. 14 years
6. 15 years
7. 16 years
8. 17 years
9. 18 years or over

28. If you have or have had a paid job, what kind of job is it / was it?

1. No paid job (includes full-time students)
2. Unskilled or semi-skilled manual worker
3. Generally trained office worker or secretary
4. Vocationally trained craftsperson, technician, IT-specialist, nurse, artist or equivalent
5. Academically trained professional or equivalent (but not a manager of people)
6. Manager of one or more subordinates (non-managers)
7. Manager of one or more managers

29. What is your nationality?

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30. What was your nationality at birth (if different)?

**Thank you very much for your cooperation!**