ABSTRACT

We build on the concept of ambiculturality to develop hypotheses describing why ambicultural firms both develop innovation capabilities and achieve financial performance. Using data from manufacturers around the world, we develop an index of ambiculturality to show how it emerges from paradoxical cultural forces. We then test and find support for our hypotheses. The results suggest that when firms are able to balance multiple cultural contrasts, they are able to use the best of various perspectives, discover and exploit innovation opportunities, and compete successfully in the marketplace.

KEYWORDS: Culture, Ambiculturality, Ambidexterity, Innovation, Survey research

INTRODUCTION

In the current business environment, which is characterized by a high level of international collaboration and transparency, innovations and practices diffuse at a very high rate, encouraging (and sometimes coercing) organizations to have a high tolerance for change and multiple modes of operations. Many organizations remain successful by simultaneously pursuing multiple strategies, capabilities, and competencies. To achieve this simultaneity in their operations, organizations need to be receptive to competing organizational culture traits.

Dimensions of culture have traditionally been viewed as consisting of two competing contrasts residing on two opposing ends of a unidimensional continuum: autonomy versus control cultures, change-oriented versus stability-oriented cultures, internal versus external orientations, etc. In fact, this is evident in the many examples of classic 2x2 matrices that incorporate at least one dimension of culture; such as Quinn and Rohrbaugh’s (1983) Competing Values Framework (CVF). However, recent thinking considers the orthogonality of the competing contrasts and proposes that many organizations adopt competing cultural contrasts (Hartnell, Ou, & Kinicki, 2011). Ming-Jer Chen (2010, 2014) has described this “dual” cultural orientation as
ambiculturality and describes how individuals and organizations have been able successfully to mix both Western and Eastern business cultures.

We suggest that research should consider a dialectical rather than a unidimensional interpretation of the cultural dimensions, where each cultural contrast can be pursued independently and simultaneously with its opposing counterpart. In the words of Davis (1971), our purpose is to show that: "What seem to be phenomena which cannot exist together are in reality phenomena which can exist together."

Our motivation for this research draws from the congruency between ambiculturality and ambidexterity: "What is the conceptual distinction and connection between ambiculturalism and other related concepts such as, biculturalism, multiculturalism, holistic thinking, and ambidexterity?" (Chen, 2014, p. 21). The innovation development literature has matured from a unidimensional paradigm (explore or exploit) (March, 1991) towards a dialectical “ambidexterity” paradigm (explore and exploit) (Gupta et al., 2006; Raisch et al., 2009).

Because ambiculturality has not been previously measured, we propose a methodology to measure the degree of ambiculturality in organizations, using Detert, Schroeder and Mauriel's (2000) eight dimensions of organizational culture. Subsequently, we test whether ambidexterity is one potential manifestation of ambiculturality, by measuring the effects of ambiculturality on innovation capabilities and performance. Indeed, we find that ambiculturality has a significant effect on innovation capabilities, leading to innovation performance and financial performance. Furthermore, we find that ambiculturality positively influences financial performance in ways beyond innovation enablement.

The following section develops the theoretical framework around ambiculturality and its connection to innovation and firm performance. We follow with a description of our methodology, in terms of measuring ambiculturality and testing our hypothesized relationships. The results are then presented, along with a post-hoc analysis. Finally we close with a discussion and some concluding remarks.

LITERATURE REVIEW

In this section, we briefly review organizational culture literature, define ambiculturality, establish the high-level relationship between ambiculturality and organizational performance. Next, we develop hypotheses for one possible causal mechanism by which ambiculturality improves organizational performance, and that is through innovation performance.

Ambiculturality

Organizational capabilities are tacit processes that gradually emerge by building upon existing firm resources and practices, becoming firm-specific and embedded into the “fabric” of the organization. They can be described as "tacit social processes that emerge gradually over time, so gradually that participants may not even be aware of their existence and ultimately take them for granted" (Wu, Melnyk, & Flynn, 2010, p. 724). It is in the consistent patterns of beliefs and behaviors over time that lead to characteristic decisions, which mold the resources and practices into capabilities. These patterns of beliefs and behaviors have been systematically classified into eight organizational culture dimensions, each consisting of two competing contrasts (Detert et al., 2000).
These cultural dimensions have often been operationalized as unidimensional scales with two opposing contrasts. However, a meta-analysis by Hartnell, Ou and Kinicki (2011) on studies that use the Competing Values Framework revealed that organizations often adopt both cultural contrasts simultaneously. Their findings reveal a high correlation among the four cultural types of the CVF. A generalization of this phenomenon is provided by Chen and Miller (2010), who coin the phrase “ambicultural management” to describe the fusion of two seemingly contradicting cultural values to achieve superior performance. Chen (2014, p. 1) describes ambiculturalism as “extracting the best and culling the worst to produce a better, optimized, and even enlightened result, be it product, service management practice, or human behavior”.

The idea of adopting “incompatible concepts” also presents itself in Weick’s (1976) seminal work about loosely coupled systems. Orton and Weick (1990) describe two views on loosely-coupled systems, the unidimensional view and the dialectical view. The dialectical view explains that loosely-coupled organizations are structured such that they are both responsive and distinctive. Loose coupling of systems within an organization allow for the simultaneous existence of rationality and indeterminacy (Orton & Weick, 1990).

An organizational culture that can assimilate competing values helps firms traverse highly competitive markets and overcome waves of technological and market changes over time (Tushman and O Reilly, 1996). In describing the role of ambiculturality in organizations, Chen (2014) brings forth multiple examples where an ambicultural orientation leads to higher performance, “be it product, service, management practice, or human behavior” (Chen, 2014, p. 1). Ambiculturality can improve supply chain relationship management: “These leaders apply the essence of ambicultural thinking in their integrative, balanced, relational approach to management—a strategy for long-term success” (Chen, 2014, p. 24). Other areas which can ambiculturality can influence includes managing external stakeholders, human resources, competition-collaboration interdependence (Chen, 2008).

H1: An organization's ambiculturality positively relates to firm performance.

Ambiculturality and Ambidexterity

Beyond the establishment of a general relationship between ambiculturality and firm performance, this following section lays out one specific causal mechanism that links ambiculturality to firm performance, and that is by way of developing superior innovation capabilities (the mix of exploratory and exploitative innovation capabilities), which lead to innovation performance and subsequently to firm performance.

In examining how ambiculturality impacts innovation, we propose that ambiculturality represents a cultural form of ambidexterity. The ambidexterity paradigm describes an organization's ability to demonstrate both the exploratory and exploitative capabilities in order to consistently create value in both stable and disruptive market environments (Duncan, 1976; He & Wong, 2004; Tushman & O Reilly, 1996). Exploration and exploitation are firm capabilities from which product or process innovations emerge. One the one hand, exploration leads to the invention of new products, processes, or services (Benner & Tushman, 2003). This capability is characterized by "searching for variance and experimentation… large scale, radical process changes through new knowledge or departures from existing skills" (Wu, Melnyk, & Flynn, 2010, p. 728). On the other hand, the exploitation "focuses on skills, processes, and routines related to refinement, implementation, efficiency, production, and selection" (Wu, Melnyk & Flynn, 2010, p. 728).
Gibson and Birkinshaw (2004), show how the right organizational context supports individuals to engage in both exploitation and exploration actions. They define organizational context as "the systems, processes, and beliefs that shape individual-level behaviors in an organization" (p. 212) and relate it closely to organizational culture. We extend Gibson and Birkinshaw's research by developing hypotheses on the impact of ambiculturality on innovation capabilities and performance outcomes. We do this by first describing how specific cultural norms lead to exploration or exploitation capabilities, and then how the effect of combining cultural contrasts into an ambicultural orientation increases innovation capabilities and performance outcomes.

Ambiculturality can be examined more closely using the eight dimensions of culture presented by Detert et al. (2000), to understand how combining the two cultural contrasts of each dimension can support both exploitation and exploration. While each dimension captures a distinct characteristic of an organization, there are some consistent themes among the dimensions in supporting either exploitation capabilities or exploration capabilities.

**Cultural Contrasts for Exploitation and Exploration Capabilities**

*Exploitative Orientation.* Evidence exists to clarify how certain contrasts in the dimensions of culture have exploitative characteristics. Literature describes exploitation capabilities as having a focus on "measurable, short-term benefits" (Wu et al., 2010). Thus, a short-term culture that is results-oriented should be more conducive to exploitation. As well, because a short-term and results-oriented organization is best supported by extrinsic motivational strategies is exploitative in nature (Pink, 2011). Further, Narasimhan and Narayan (2013) theorize that organizations with a high level of control and an internally oriented culture demonstrate innovation efforts focused on efficiency in outcomes and productivity (which are defining characteristics of exploitation capabilities). Incremental improvement capabilities are often knowledge-driven rather than intuition-driven endeavors (Mukherjee, Lapré, & Van Wassenhove, 1998). Managers, engineers and scientists of the organization are expected to be capable of improving upon existing products and processes based on the prior accumulated knowledge (Detert, Schroeder & Mauriel, 2000). This knowledge-based approach, and centralized culture makes working in isolation (or specialized units) more efficient, since the primary drive is the application of existing knowledge rather than the generation and sharing of new ideas. Finally, a culture of stability, or "static efficiency", provides a platform for improvement upon existing processes and dissemination of process innovations into the work environment (Ghemawat & Costa, 1993).

*Exploratory Orientation.* Exploration capabilities, as described by Wu, Melnyk, and Flynn (2010, p.728), focus on "large scale, radical process changes through new knowledge or departures from existing skills". The "new knowledge" and "radical process changes" carry implications of an intuition-based culture, since existing knowledge becomes of little value. Thus, a higher level of cooperation is needed to stimulate creativity and generate new knowledge (Sosa, 2011). This cooperation even extends to an external orientation, where customers and suppliers are invited to partake in the development process (Ahuja, 2000; Jassawalla & Sashittal, 2002; Narasimhan & Narayanan, 2013). The "radical process changes" are naturally better served by a culture with a high tolerance for change (Jassawalla & Sashittal, 2002; Marcoulides & Heck, 1993). In contrast to exploitation, which favors a control culture, extant literature shows that exploration thrives in a culture of flexibility and autonomy (Cheng & Ven, 1996; Narasimhan & Narayanan, 2013; Sethi, Smith, & Park, 2001; M. L. Tushman & O Reilly, 1996). This concept has also been verified at the network level, where Choi et al. (2001) discuss how "emergence" in the supply network leads to a higher level of innovation. A consequence of autonomy and emergence, however, is a loss of some predictability in outcomes. In such circumstances, a process-oriented
culture fits better than a results-oriented culture, and a long-term orientation addresses the uncertainty in the timing of outcomes. Consequently, intrinsic motivators become more valuable in such environment, and have been shown to drive creativity more readily than extrinsic motivators (Ahmed, 1998).

Table 1 summarizes the eight cultural dimensions (Detert, Schroeder & Mauriel, 2000) and how each of their contrasts map onto exploration or exploitation capabilities.

<table>
<thead>
<tr>
<th>Cultural Dimension</th>
<th>Exploitative Orientation</th>
<th>Exploratory Orientation</th>
</tr>
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<tbody>
<tr>
<td>1. Basis of Truth</td>
<td>Fact-based management</td>
<td>Intuition-based management</td>
</tr>
<tr>
<td>2. Nature of time and horizon</td>
<td>Short-term orientation</td>
<td>Long-term orientation</td>
</tr>
<tr>
<td>3. Motivation</td>
<td>Extrinsic</td>
<td>Intrinsic</td>
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<tr>
<td>4. Stability versus change</td>
<td>Stability</td>
<td>Change</td>
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<td>5. Orientation to work</td>
<td>Results-oriented</td>
<td>Process-orientation</td>
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<tr>
<td>6. Isolation versus collaboration</td>
<td>Isolation</td>
<td>Cooperation</td>
</tr>
<tr>
<td>7. Control and coordination</td>
<td>Control, centralized</td>
<td>Flexibility, decentralized</td>
</tr>
<tr>
<td>8. Orientation and Focus</td>
<td>Internal</td>
<td>External</td>
</tr>
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</table>

Simultaneous Adoption of Competing Contrasts

Previous work has acknowledged the potential for an organization to simultaneously have two cultural contrasts. Tushman and O’Reilly (1996, p. 26) discuss the potential for “multiple cultures” to enable ambidextrous organizations. For example, Narasimhan and Narayan (2013) associate exploitative innovation activities with internal focus, and exploratory activities with external focus, while asserting that an innovation culture must encompass both exploratory and exploitative values.

Research has examined the feasibility of utilizing the best characteristics from both the control (integration) and flexibility (differentiation) values. Researchers have also explored combining the two approaches for value creation (Eisenhardt & Martin, 2000). One combination approach examined in the literature is to create an environment where employees can fluidly shift paradigms based on the required task (Adler, Goldoftas, & Levine, 1999). Combining integration and differentiation is another source of tension examined, and while gaining synergy from these two apparent extreme structures may appear to be "paradoxical", successfully implementing both approaches requires the right culture mix that can support both an integration and differentiation approach to management (Raisch, Birkinshaw, Probst, & Tushman, 2009). Other approaches consider the sequential transitioning between autonomous and integrated unit during different stages of the innovation’s life cycle (Westerman, McFarlan, & Iansiti, 2006).

Studies such as the ones mentioned above have indeed found interesting complementarity effects between seemingly contradictory contrasts of the specific cultural dimensions. However,
a more comprehensive approach is to take organizational culture as a while, accounting for the impact of all the dimensions in tandem. This view of culture is used in Detert, Schroeder, and Mauriel’s (2000) work, which examines impact of the eight dimensions on TQM. The “ideal culture” for TQM emerges when all dimensions are in alignment with TQM-compatible values (p. 585). Similarly, it can be expected that organizational culture approaches an "ideal" structure that embodies ambidexterity as more dimensions reflect an ambicultural orientation. Therefore, we can hypothesize that ambiculture enables innovation capabilities.

H2: An organization's ambiculturality positively relates to its innovation capabilities.

Because an organization’s environment is continually changing, it is only by developing the cultural bandwidth to simultaneously pursue both explore and exploit innovation capabilities can a firm achieve sustainable innovation performance (Raisch & Birkinshaw, 2008; Raisch, Birkinshaw, Probst & Tushman, 2009). For example, Jansen et al. (2006) investigate antecedents and consequences of each innovation capability and find that pursing exploratory innovation in "dynamic environments" to be more effective, whereas exploitative innovation is more beneficial in "competitive environments".

While each capability may present different outcomes for firms, there is little debate about the fact that stronger innovation capabilities (which are reflective of both explore and exploit orientations) translate positively towards a firm's innovation performance.

H3: An organization's innovation capabilities positively relate to higher innovation performance.

Finally, to complete the causal link between innovation performance and firm performance, we refer to the extant literature on innovation output and organizational success. Market competition and changing customer demands makes it necessary for business organizations to consistently innovate new products, services, and processes to gain and maintain an economic advantage over competition. There is extant literature that points to innovation performance leading to a company's financial performance and growth (Jansen et al., 2006; Kostopoulos, Papalexandris, Papachroni, & Ioannou, 2011). Research has used multiple measurements of financial performance to establish its link with innovation performance. For example, Srinivasan et al. (2009) examine the effects of innovation on firm stock returns. Another study found finds support for the hypothesis that product innovations positively relate to firm profit rates (Bayus, Erickson, & Jacobson, 2003). Other studies finds positive relationships between innovation and return on sales, return on assets and cash flows (Kostopoulos et al., 2011; Sorescu, Chandy, & Prabhu, 2007). Our conceptual framework is summarized in Figure 1.

H4: An organization's innovation performance positively relates with its financial performance.

Figure 1: Conceptual Model
METHODS

Sample and Data

We used data from the fifth round (2012-2014) of a worldwide survey conducted by the Global Manufacturing Research Group (GMRG). GMRG is a multinational research collaboration dedicated to the study and improvement of global supply chains (www.gmrg.org). Researchers followed well-established procedures to develop and enhance the survey instrument over twenty years (Whybark, Wacker, & Sheu, 2009). Studies have reported excellent face validities, content validities, and translation equivalence of the measures (Power, Klassen, Kull, & Simpson, 2015; Schoenherr, Power, Narasimhan, & Samson, 2012).

The key informants are facility directors or managers who are knowledgeable about the strategies, practices and performances of their sites. The use of such key informants as a source of organizational data has been a viable method widely adopted in the field of operations management (e.g., Joshi, Kathuria, & Porth, 2003; Ketokivi & Schroeder, 2004; Paulraj, Lado, & Chen, 2008; Shin, Collier, & Wilson, 2000). The average tenure of the respondents with their companies is 12 years. The unit of analysis is the manufacturing site or plant. This study includes a total of 432 plants from seven countries. Three are English speaking countries: Australia (26), Ireland (30), and U.S.A. (76); while four are non-English speaking countries: Croatia (110), Hungary (35), Poland (78), and Vietnam (77).

Measures

Ambiculturality

The exogenous variable in our model is **ambiculturality**. As elaborated in our theory section, ambiculturality represents the collective ability of organizational members to simultaneously apply paradoxical cultural contrasts in various contexts. In order to measure the overarching ambicultural context, we created an aggregated index using data from the facility culture module (Appendix A). The culture survey seeks to capture cultural contrasts along eight dimensions of the facility culture discussed in our literature sections. A multi-round Q-sort procedure was used to develop and validate the survey instrument. Scholars followed definition-construction guidelines provided by the literature to assure that definitions are theory-driven, and verbal expressions are concise and clear to allow for empirical testing (Moore & Benbasat, 1991; Wacker, 2004). Because of the extensive number of dimensions pertaining to facility culture, the number of reflective measurement items for each sub dimension was limited to two, to ensure parsimony of the instrument and adequate sample size (e.g., Denison & Mishra, 1995). This procedure resulted in a 32-item survey measuring 8 primary dimensions of facility culture. Each primary dimension consists of two contrast sub-dimensions (two items each). The final questionnaire was rigorously constructed to assure face validity and also condensed to ease translation into foreign languages. Little, Lindenberger, and Nesselroade (1999) demonstrated that when two indicators of a construct are theoretically equivalent selections from the domain of possible indicators, they can lead to accurate recovery of the true construct centroids needed to be measured. Practically, decision science researchers have found 2-item scales to be useful in large-scale, complex questionnaires (Kathuria, Anandarajan, & Igbaria, 1999).
We performed confirmatory factor analyses (CFAs) in AMOS 22 (Arbuckle, 2014) to validate the psychometric properties of the culture instrument. Facility culture is conceptualized as a multifaceted construct with a hierarchical factor structure, for which moderate to high cross-subscale correlations were likely. Cortina (1993) explained that, theoretically, multifacets of perception or preference of a construct can enrich our understanding of the phenomena, in which case the unidimensionality of the scale is of lesser importance. CFAs allow us to build the measurement model based on their theoretical structure rather than on the data structure (Anderson & Gerbing, 1988).

Although a new instrument, the 16-factor measurement model resulted in adequate reliability and validity. Its model fit indices are satisfactory: $\chi^2 (344) = 815.10$, CFI = .912, IFI = .915, GFI = .894, AGFI = .838, RMSEA = .056, PLOCSE = .018. Because coefficient alpha is a function of both scale length and the average level of inter-item correlations, it increases with the number of items, and vice versa (Cortina, 1993). All the 2-item measures in our model met criteria for internal consistency suggested in the literature (Hair, Black, Babin, & Anderson, 2010). Results of coefficient alpha and composite reliability showed that ten factors have values between .70 and .85, five factors have values between .61 and .68, and one factor at .52. The 16 factors showed adequate validity too. The Average Variance Extract (AVE) values for 13 factors are between .50 and .74, two are .48 and .44, and only one is relatively low at .36.

We also examined possible common methods variance (CMV) for the culture survey between the English speaking and non-English speaking groups using two procedures recommended in the recent literature (Chang, Van Witteloostuijn, & Eden, 2010). For the 16-factor model, Harmon’s one factor test showed one common factor accounting for 24.75% of the variance, a result that did not raise major concern for CMV. Next, we used the “unmeasured latent factor” method that is more sensitive to CMV than Harman’s test (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Using this method, we created a “common latent factor (CLF)” model in which measurement items were allowed to load on their theoretical constructs as well as on the CLF. We calculated factor loading differences between the CLF model and the original 16-factor model. Factor loading differences for 8 items were around 0.3, signaling common method effect as common method variance is expected to reduce the factor loadings of the items in the CLF model. Therefore, we created a CFA regression weighted composite score for each of the 16 cultural sub-dimensions using the CLF model. This procedure allows the common methods variance to be incorporated in the composition scores that are used for subsequent analyses (Podsakoff et al., 2003).

Once the 16 sub dimensions of facility culture were validated, we created an aggregated factor score to measure ambiculturality in four steps. First, we created a CFA regression weighted composite score for each of the 16 cultural sub-dimensions (i.e. cultural contrasts) as described in the last section. Second, we ranked each of the 16 sub-dimensions into high vs. low category based on their median split values. We assigned value 1 to a “high” case if its factor score is above the median split value; and 0 to a “low” case if its factor score is below the median split value. Third, we multiply the values (1 or 0) between the two contrast sub-dimensions for each of the eight cultural dimensions. Cases (firms) that ranked high on the contrast pair sub-dimensions would score 1 in this cultural dimension; otherwise (high and low or low and low) would score 0. Fourth, we added the scores from the eight dimensions (1 or 0) and came up with a score that ranges between 0 and 8. This final score measures the degree of ambidexterity of the firms.
For comparison, we created a distribution of firms assuming they scored high or low randomly on each contrast using binomial probability. If the scoring process is random, each firm should have a 50% of chance of ranking high above the median split, and 25% of chance of ranking high in both the contrast pairs (0.5^2=0.25). As evidenced by figure 2.1 and 2.2, the pattern of these two distributions is very different, which suggests that firms do differentiate themselves deliberately in their cultural contexts. We’ll discuss this observation in more details in our discussion section.

**Innovation Capability, Innovation Performance, and Firm Performance**

Our three endogenous variables are innovation capabilities, innovation performance, and firm performance. *Innovation capabilities* is a 5-item scale adapted from previous literature (Parasuraman, 2000). It captures the facility’s ability to lead in learning and deploying new processes and to develop and introduce new produces. *Innovation performance* is a 5-item scale measuring the number, speed, and frequency of new products introduction, and sales volume and market share of the new products. Respondents were asked to evaluate their innovation capabilities and performance by comparing to their major competitors. Innovation capabilities and innovation performance are both 7-point Likert-type scales. *Firm performance* asks respondents to report changes of their sales volume, profitability, and market share in the previous fiscal year (Nahm, Vonderembse, & Koufteros, 2003). These changes are stated in seven percentage scopes ranging from “reduced more than 25%” to “increased more than 25%.” The responses were coded from 1-7 to allow this measure to be treated as a seven-point scale.
Because innovation capabilities and innovation performance are both perceptual measures that are subjective to potential perceptual biases, we included additional economic data as a secondary measure for innovation performance. This economic measure is the proportion of plants sales generated from the new products introduced in the last two years. We expect that firms with a higher level of innovation capabilities are able to develop more new products and as such generate more sales from new products. The new product sales data will be used as an alternative measure to supplement innovation performance measure. While the multi-item measure has the advantage of tapping into the multiple aspects of innovation performance, the objectivity of the economic measure can provide us with additional information concerning the relationships proposed in our model. We performed a series of CFAs to validity the 3-factor model and its constructs.

For the 3-factor model, goodness-of-fit statistics met satisfactory criteria: $\chi^2(59) = 174.846$, CFI = .968, IFI = .969, TLI = .958, AGFI = .914, RMSEA = .067, PCLOSE = .007. For convergent validity, each indicator’s estimated coefficient loaded significantly on its underlying construct. Average Variance Extracted (AVE) values were between .58 and .70, well above the suggested cutoff score of .5 (O’Leary-Kelly & J. Vokurka, 1998). Results also confirmed discriminant validity at both the construct and item levels. For all constructs, the Maximum Shared Variance (MSV) values were less than the AVE values; and the AVE values were above the Average Shared Variances (ASV) values. Also, the square roots of AVEs were larger than the inter-construct correlations in all instances. Composite reliabilities (C. R.) were .92 for innovation performance, and .87 for innovation capability and firm performance, suggesting excellent internal consistency (Hair, Black, Babin, & Anderson, 2010).

Concerning common methods variance, questions in the survey were queried in separate pages and sections, thus mitigating a respondent’s tendency to provide arbitrarily consistent answers. Harmon’s single factor test showed that one factor extracted only 12.3% of the total variance in the model. Next, CLF model results indicated that the model fit the data poorly, as it was not identifiable. While we could not completely rule out the CMV concern given the nature of the survey data, these procedures rendered us reasonable confidence on the validity of our measures.

As we intended to use new product sales as a secondary measure for innovation performance, we checked for the potential threat of CMV between this item and the innovation capabilities measure. The inter-item correlation between new product sales and the 5 items of innovation capabilities was .148, indicating new product sales is an independent measure from innovation capabilities.

Following the literature concerning sampling in cross-national research (Mullen, 1995), we tested measurement equivalence between our English speaking and non-English speaking sample groups to establish the unidimensionality of the 3-factor model. For configural invariance, the model fit indices were excellent: $\chi^2(118) = 251.543$, CFI = .964, TLI = .952, IFI = .964, RMSEA = .051, PCLOSE = .391, and all factor loadings and variances were statistically significant, confirming configural invariance. We used the multi-group multi-model (MGMM) procedure in AMOS to detect metric invariance and scalar invariance across the two groups through estimating a series of increasingly constrained nested models. For innovation performance, the results supported full measurement equivalence as the item loadings, intercepts, and residual variances of the constrained models were not significantly different from those of the unconstrained models. For innovation capabilities, results support equivalence for factor loadings ($p = .06$) and intercept ($p = .162$), but not for residual covariance ($p = .000$). For
firm performance, results support equivalence for intercept (p = .233) and residual covariance (p = .202), but not for factor loadings (p = .014). Together, these assessments provide adequate support of measurement invariance for our three constructs (Milfont & Fischer, 2010).

**Control Variables**

Literature has identified various contextual and organizational factors that can influence firm innovation and performance. We included 11 such variables in our analysis to partition their potential influence on the factors of interest.

**Firm size.** Large firms tend to have more resources to simultaneously invest in innovation development and commercialization activities (Kyriakopoulos & Moorman, 2004). On the other hand, smaller firms may be more motivated to develop temporal ambidexterity for innovation needs due to the lack the scale for separate subunits (Gibson & Birkinshaw, 2004; Raisch & Birkinshaw, 2008). We measured firm size by the number of full-time employees.

**Firm strategy.** We expect firms that choose innovation as a strategic priority to show a higher level of innovation performance. This is due to the fact that organizational procedures, performance metrics, and incentive schemes are expected to be aligned to performance outcomes. Strategic priority of innovation is measured by the reported weight percentage given to innovation as a strategic goal, among the six strategic goals of the facility (the other five being cost, quality, delivery timeliness, flexibility, and environment/safety). Strategic priority of innovation is controlled for all three endogenous variables in our model. We log-transformed values to normalize the sample distribution for firm size and innovation weight.

**Industry.** Pressure towards innovation varies across industries (Fine, 1998, 2000). For example, the electronics industry demonstrates a higher rate of innovations than the automobile industry, which has a higher rate than the tobacco industry. Based on the NAICS code, we dummy coded our sample into seven industry groups: food (58), textile (33), timber (61), petrochemicals (58), metal-based products (87), computing and electronics (60), and miscellaneous (48). We created a separate subsample based on 405 firms that provided industry information to test the possible industry effect.

**International ownership.** International ownership was included to reflect the possible effect of the values, priorities, communication, and culture of overseas ownership. Due to the highly uneven distribution of this value, we dummy coded international ownership into three groups: high for firms with 71% and more international ownership (n = 65), medium for 30-70% (n = 17), and low for under 30% (n = 283). 365 firms provided international ownership information.

**Resource allocation.** Organizational resources invested in innovation activities are expected to facilitate the development of innovation capabilities regardless of their cultural orientations. Therefore, we included firm investment on process technologies, process integration, and workforce training as covariates for innovation capabilities. These three variables are measured by a single seven-point Likert item indicating the extent of investment (money, time and/or people) in these three areas in the last two years (1 = not at all; 7 = great extent).

**Firm diversification.** A firm's product and sector diversification may pertain to the level of ambidexterity. Diversified firms tend to have a larger scope of operations, which may naturally steer the development of ambidexterity (Lubatkin, Semsek, Ling, & Veiga, 2006; Raisch &
Birkinshaw, 2008). We measured scope of operations using the percentage of total sales from the most important product line (log transformation) and covaried it with innovation performance.

**Competitive environment.** Environmental uncertainty can undermine the effectiveness of a firm’s internal strategic effort. We controlled the effects of three environmental factors: demand uncertainty, technological uncertainty, and competitive intensity. They were each measured with a single seven-point Likert item.

While some studies take a step further and control for possible country-level effects in the study of organizational culture, other studies show that national context did not influence a firm’s innovations and performance beyond the effect of organizational culture (e.g., Naor et al., 2010; Tellis et al., 2009). This resonates with the articulation by Tushman and O’Reilly (1996, p. 19) that “the importance of organizational culture transcends country, industry and firm size.” Therefore, we did not covary the national context in our model.

We first ran SEM analyses for a model including all the control variables and main constructs. Results showed that five control variables were significantly related to the main constructs. Following recommendations in the literature (Becker, 2005), we included these five variables in the subsequent model for hypothesis testing.

**Analysis and Results**

Following the procedure outlined in the literature (Anderson & Gerbing, 1988; Bollen, 1989; Jöreskog, 1993; Lubatkin et al (2006), we tested six nested structural models and compared their relative fit with each other using various model fit indices and the amount of variance explained in the endogenous constructs. We then reported standardized estimates results for hypotheses testing. Appendix B summarizes the fit indices of the nested models.

In model 1, the null model, the relationships between all latent factors were constrained to zero. The null model provided the basis for comparison of the nested structural models. Model 2, the covariate model, specified the influences of control variables. Model 3 linked ambiculturality to firm performance after controlling for the effects of covariates. Ambiculturality was positively, significantly related to firm performance (β = .25, p < .001) and explained an additional 11% of variance in firm performance beyond the covariates, thus supporting hypothesis 1. Model 4 connected the path from ambiculturality to innovation capabilities, and showed a significantly positive relationship between these two constructs (β = .203, p < .001, ΔR² = 2%). As such, hypothesis 2 was supported. Model 5 added the path from innovation capabilities to innovation performance. Results showed that innovation capabilities was a robust predictor of innovation performance (β = .536, p < .001, R² = 31.6%), providing strong support for hypothesis 3. Model 6 added the path from innovation performance to firm performance and showed a significant correlation between innovation performance and firm performance (β = .225, p < .001, ΔR² = 1.8%). Hence, hypothesis 4 is supported.

Model 6 (depicted in Figure 3) has the best fit among all six models: \( \chi^2 (162) = 457.607, \text{CFI} = .927, \text{IFI} = .928, \text{TLI} = .915, \text{AGFI} = .879, \text{and } \text{RMSEA} = .065. \) This information confirmed the validity and rigor of our hypothesized model that specified the relationship between ambiculturality, innovation capabilities, innovation performance, and firm performance. Figure 3 depicts the hypothesized model and testing results.
Post Hoc Analysis

Subgroup Analysis

In our literature review, we posited that the 16 sub dimensions of facility culture projected two general cultural orientations: exploration vs exploitation, as classified in Table 1. Internal consistency test showed that Cronbach’s alpha is .85 for the 16 items measuring exploratory traits, and .842 for the 16 items measuring exploitative traits. This result empirically supported the classification of these two sets of cultural traits into two cultural orientations. To further explore the differences between ambicultural firms and firms with strong emphasis on a relatively singular cultural orientation, we performed a post hoc subgroup analysis similar to the ambidexterity cluster analysis conducted in Lubatkin et al. (2006). We divided our sample into four subgroups in three steps. First, we added the scores from each contrast (either 1 or 0) resulted from our step 2 in creating ambiculturality index described earlier. This step created a total score for both explore and exploit orientation. Second, we coded firms into high (1) vs low (0) on exploration and exploitation orientations, respectively, using median splits of the total scores of the orientations. Third, we assigned firms that ranked high in both orientations to Group 1; those ranked high in exploration but low in exploitation to Group 2; those ranked high in exploitation but low in exploration in Group 3; and those ranked low in both orientations in Group 4.
Table 2: Post Hoc Subgroup Analysis

<table>
<thead>
<tr>
<th>Firms</th>
<th>N</th>
<th>Orientation</th>
<th>Innovation capabilities</th>
<th>Innovation performance</th>
<th>Firm performance</th>
<th>Ambiculturality score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>90</td>
<td>High/High</td>
<td>4.14</td>
<td>3.50</td>
<td>4.95</td>
<td>4.37</td>
</tr>
<tr>
<td>Group 2</td>
<td>82</td>
<td>Explore</td>
<td>3.80</td>
<td>3.28</td>
<td>4.25</td>
<td>1.78</td>
</tr>
<tr>
<td>Group 3</td>
<td>94</td>
<td>Exploit</td>
<td>3.61</td>
<td>3.12</td>
<td>4.39</td>
<td>1.77</td>
</tr>
<tr>
<td>Group 4</td>
<td>166</td>
<td>Low/Low</td>
<td>3.59</td>
<td>3.09</td>
<td>4.05</td>
<td>0.83</td>
</tr>
<tr>
<td>F</td>
<td></td>
<td></td>
<td>7.24***</td>
<td>5.00**</td>
<td>10.98***</td>
<td></td>
</tr>
</tbody>
</table>

** p < .01
*** p < .001

Table 2 demonstrates the post hoc comparison of the four groups. The univariate F-statistics show that the four groups significantly differ in their levels of performances. Specifically, Group 1 demonstrates the highest levels of innovation capabilities, innovation performance, and firm performance. Not surprisingly, Group 1 also has the highest average ambiculturality score. The correlation between Group 1 and our ambiculturality index is 0.75. Group 4, in contrast, exhibits the lowest values in all three outcomes. Post hoc Tukey B procedure suggests that Group 1 performs significantly better than the other 3 groups in both innovation capability and firm performance. Concerning innovation performance, groups 1 and 2 outperform groups 3 and 4. There is no significant difference between group 1 and 2 for innovation performance. These results provide additional evidence supporting our hypotheses and findings regarding the importance of ambicultural norms and practices.

Alternative Test for Innovation Performance

For reasons discussed in the text above, we used new product sales proportion as a numerical surrogate for innovation performance. Results showed that new product sales had a very marginal connection with innovation capability (β = .088, p = .088) and was not significantly related to firm performance. This is not surprising given that sales volume only taps into a very small aspect of innovation performance, and is highly driven by market condition besides firm internal capabilities. We then compared the relationship of these two measures with ambiculturality. We found ambiculturality has a significantly positive effect on both measures (for new product sales, β = .182, p < .001. For innovation performance, β = .244, p < .001), thus providing additional support for the strength of ambiculturality on innovation performance.

DISCUSSION

Ambiculturality, Innovation and Performance

In this study, we investigate the emergent concept of ambiculturality. The ambicultural orientation challenges some of the traditional assumptions about organizational culture, particularly the assumption of mutual exclusiveness of competing contrasts that lie within cultural dimensions. Some studies have suggested a potential for combining competing cultural contrasts (Hartnell et al., 2011; Khazanchi, Lewis, & Boyer, 2007; Puranam, Singh, & Zollo, 2006), but such studies look at one or two cultural dimensions in isolation. We develop an index to measure the overall degree of ambiculturality of organizations, based on Detert et al.'s (2000)
eight cultural dimensions. Using this measure, we find strong evidence of a link between ambiculturality and innovation capabilities, supporting the idea that ambiculturality is a cultural manifestation of ambidexterity. Our theoretical development and empirical findings carry important implications for organization culture research and practice.

At face value there may appear to be natural trade-offs and contradictions between two competing contrasts, tempting researchers to consider cultural contrasts as dichotomies on a unidimensional scale. However, an organization committed to balancing two competing values can successfully embrace the best of both contrasts (Chen and Miller, 2010). This dialectic interpretation has been previously applied to research on loosely coupled organizations and organizational ambidexterity.

Previous literature has leaned towards promoting one “right” culture that it optimal for a specific strategy or mission. For example, Detert et al. (2000) points to specific contrasts in seven of the eight cultural dimensions discussed as being conducive to Total Quality Management. Only one dimension (process-orientation versus results orientation), they state that both contrasts are necessary. Pointing to a “right” cultural fit for a certain task resonates with contingency theory. However, a “right” culture only remains optimal as long as the assumptions and environmental factors remain consistent. Industries, organizations, and organizational strategies undergo cycles of change, market shocks, and many other uncertainties, often at a rate much faster than the rate which organizational culture can be adjusted. In other words, a culture that fits the firm's strategy, structure, and produces success for the firm may eventually cause inertia when a firm needs to reconfigure due to changes in the environment and/or strategy (Audia, Locke, & Smith, 2000). The ambicultural approach provides the means to resolve the “culture paradox” where "organizational culture is key to both short-term success and, unless managed correctly, long-term failure." (M. L. Tushman & O Reilly, 1996, p. 19). Our investigation provides empirical evidence that the dialectic view of culture (i.e. ambiculture) provides a more realistic reflection of the organizational cultures that promote long-term success, which remain relatively stable compared to the rapid changes in the business environment.

In order to gauge the presence of dual contrasts across multiple dimensions of culture in one concise metric, we develop an index that measures the degree of an organization's ambiculturality. Some simplifying assumptions were needed to reach this measure. First, the “median cut-off” approach to scoring the contrasts eliminates some of the variance in the cultural contrast measures, and the outcome becomes relative to the respondents in the sample. However, this median-cutoff approach has been previously applied in the ambidexterity context (He & Wong, 2004). Furthermore, post hoc analyses are consistent in their results, giving additional credence to the median cut-off approach. Second, our index assumes that each cultural dimension contributes equally towards ambiculturality. In reality, there may be a smaller subset of cultural dimensions that drive ambiculturality more than others. Without supporting evidence about the relative efficacy of each of the cultural dimensions, we leave the dimensions to be equally weighted.

The distribution of our ambiculturality index across the sampled organizations provided some interesting insights (Figure 2.1). This outcome is different than what would be expected if the 16 contrasts (across the eight dimension) were randomly and equally likely to be scored “high” or “low” (this hypothetical result is presented in Figure 2.2). The number of observed organizations with a high degree of ambiculturality is a significantly higher than what we would observe from a random high/low mix of cultural contrasts present. This can imply that ambiculturality does not develop haphazardly, but rather by deliberate design. We observe ambiculturality, but know little
in terms of how these organizations successfully embrace two competing contrasts without having one dominate the other or, worse, causing clashes and confusion within the organization. The process towards developing a balance between competing culture contrasts is a fruitful research area. Literature on how ambidexterity can be built into organizations may provide more clues to identify how culture contrasts can be balanced for higher levels of performance (Birkinshaw & Gibson, 2004).

Another important implication of this research is the direct relationship between ambiculturality and financial performance. Consistent with the ambidexterity framing, ambicultural organizations demonstrated a higher level innovation capabilities and innovation performance, which in turn lead to higher financial performance. What's more interesting is that ambiculturality and financial performance was only partially mediated by innovation performance. This finding reveals potential to extend the conversation of the causal mechanism between ambiculturality and financial performance beyond the innovation context. It makes sense that organizational culture can provide numerous paths towards performance (Schein, 2010). This thought resonates closely with the research implications laid out in Chen (2014), which consider the positive impact that ambiculturality may have on stakeholder management, innovation, human resource management, competitive-cooperation dynamics, and entrepreneurship.

Finally, our findings and future research opportunities have clear managerial implications. Culture continues to be an important topic of discussion, particularly in a global business environment where diversity is emphasized. Our research advocates that organizational diversity can be leveraged towards higher performance. Some of the most prominent multinational organizations, such as Samsung, have already moved in a direction which fuses competing cultures (Khanna, Song, & Lee, 2011). Leaders of organizations need to be aware of the advantages and disadvantages of the cultural contrasts across all dimensions and promote the best values without gravitating towards one extreme and discounting the other (Chen and Miller, 2010). Having said that, ambiculturality should certainly not be about trying to do everything either, but rather "separating the wheat from the chaff—extracting the best and culling the worst." (Chen, 2014, p. 3).

Control Variables

Eleven control variables were included in the model to account for variance possibly generated from common contingencies. Among them, we found five to have contributed to the variance in our endogenous variables: plant size, investment in process integration, investment in process technologies, technological uncertainty, and demand uncertainty. The relationships between these control variables and our focal variables are consistent with previous research findings.

Other control variables did not appear to contribute to explaining the variance in our focal variables. Strategic priority did not show direct influence on innovation and performance in our model, perhaps due to the relatively long timeframe to transform strategy into measured performance. The invariability between international vs domestic ownership on innovation and performance implies generalizability of our model across international samples. Industry has been extensively researched as a driving force for innovation. However, given that managers in our study were instructed to evaluate their innovation performance and capabilities by comparing to their major competitors in their own industry, we infer that industry effects have been already factored in by virtue of the survey method.

CONCLUSION
The main objective of this paper is to investigate ambiculturality in organizations, and assess its effects on organizational performance. We propose an index that measures the degree of ambiculturality in organizations, based on well-established organizational culture dimensions. By applying this measure onto our international sample of manufacturing facilities, we find that, indeed, ambiculturality is congruent to ambidexterity in its association with higher innovation performance. Additionally, we find evidence that ambiculturality holds implications to organizational performance beyond innovation, as alluded to by Chen (2014).

Having been inspired by Chen's conceptual work on ambiculturality (Chen, 2014; Chen & Miller, 2010), we hope this research adds to that discussion and further inspires others to pursue empirical studies about ambiculturality. Future research can illuminate the process of adopting an ambicultural orientation, develop more refined methods to measure ambiculturality, and examine other outcomes that may be influenced by ambiculturality.
APPENDIX A
Facility Culture Dimensions

**FC01** Please answer questions in relation to the majority of facility personnel (operators, managers, engineers, staff, etc.). Responses are measured on a 7-point scale, where 1="Not at all" and 7="Great Extent"

To what extent is this behavior or attitude widely observed in the facility -

1.1 Financial computations justify all activities and investments
1.2 Quantitative measures are used more than personal judgments
1.3 Decisions rely mostly on intuition and qualitative factors
1.4 Subjective judgments are mostly used to fully understand situations

2.1 Facility decisions address long-term views rather than immediate needs
2.2 There is a strong concern for the future effects of all activities
2.3 Operational decisions are always set to quickly match current needs
2.4 We devote most of our time solving immediate, short-term issues

3.1 Personnel are best motivated by meaningful work
3.2 Operators are always intrinsically willing to help improve operations
3.3 Personnel are mostly motivated by monetary rewards and punishments
3.4 Goals and objectives are typically used to motivate personnel

4.1 Process changes are typically introduced slowly and with caution
4.2 We keep a stable and level workforce with few changes
4.3 Procedures are continually adapted and changed
4.4 Too much stability is seen as bad and not progressive

5.1 The top priority of our personnel is task completion and productivity
5.2 We devote all resources and time to the needs of production
5.3 Friendships and informal relationships are encourage in the facility
5.4 Social activities are done during work hours to show their importance

6.1 All decisions are made collaboratively and collectively
6.2 Cross-functional collaboration is always done
6.3 Work is accomplished individually without interference from others
6.4 All individuals are able to get things done on their own

7.1 Plans are centrally made by managers without wide facility involvement
7.2 Most operational decisions are controlled by engineers and managers
7.3 Time and resources are mostly allocated based on de-centralized choices
7.4 Decisions are typically made autonomously by work areas

8.1 The best ideas come from inside our facility, from our personnel
8.2 We develop internal expertise rather than hire external consultants
8.3 Most innovations come from monitoring competitors and/or using suppliers
8.4 We are constantly looking outside our facility for useful ideas
### APPENDIX B

Summary of fit indices for contrasts based on the hypothesized model (N=432)

<table>
<thead>
<tr>
<th>Model</th>
<th>df</th>
<th>$\chi^2$</th>
<th>CFI</th>
<th>IFI</th>
<th>TLI</th>
<th>AGFI</th>
<th>RMSEA</th>
<th>Inn cap R$^2$</th>
<th>Inn perf R$^2$</th>
<th>Firm perf R$^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 innovation perf to firm perf</td>
<td>145</td>
<td>419.53</td>
<td>.931</td>
<td>.932</td>
<td>.919</td>
<td>.880</td>
<td>.066</td>
<td>.237</td>
<td>.318</td>
<td>.135</td>
</tr>
<tr>
<td>5 innovation capabilities to innovation perf</td>
<td>146</td>
<td>428.03</td>
<td>.929</td>
<td>.930</td>
<td>.917</td>
<td>.879</td>
<td>.067</td>
<td>.236</td>
<td>.316</td>
<td>.114</td>
</tr>
<tr>
<td>4 ambiculturality to innovation capabilities</td>
<td>147</td>
<td>558.54</td>
<td>.897</td>
<td>.898</td>
<td>.880</td>
<td>.850</td>
<td>.081</td>
<td>.227</td>
<td>.000</td>
<td>.114</td>
</tr>
<tr>
<td>3 ambiculturality to firm performance</td>
<td>148</td>
<td>576.99</td>
<td>.893</td>
<td>.893</td>
<td>.876</td>
<td>.845</td>
<td>.082</td>
<td>.211</td>
<td>.000</td>
<td>.114</td>
</tr>
<tr>
<td>2 covariates only</td>
<td>149</td>
<td>601.98</td>
<td>.887</td>
<td>.887</td>
<td>.870</td>
<td>.836</td>
<td>.084</td>
<td>.211</td>
<td>.000</td>
<td>.04</td>
</tr>
<tr>
<td>1 null latent model</td>
<td>155</td>
<td>707.15</td>
<td>.862</td>
<td>.862</td>
<td>.848</td>
<td>.808</td>
<td>.091</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model Comparison</th>
<th>$\Delta\chi^2$</th>
<th>$\Delta df$</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 vs 6</td>
<td>8.5**</td>
<td>1</td>
</tr>
<tr>
<td>4 vs 5</td>
<td>130.51***</td>
<td>1</td>
</tr>
<tr>
<td>3 vs 4</td>
<td>18.45***</td>
<td>1</td>
</tr>
<tr>
<td>2 vs 3</td>
<td>24.99***</td>
<td>1</td>
</tr>
<tr>
<td>1 vs 2</td>
<td>105.17***</td>
<td>6</td>
</tr>
</tbody>
</table>

* p < .05
** p < .01
*** p < .001
REFERENCES


