STRATEGIC PROCESSES IN A TRANSITIONING INDUSTRY:
ENTREPRENEURIAL ORIENTATION, KNOWLEDGE-BASED RESOURCES
AND THE PERFORMANCE OF FIRMS

A Thesis in
Forest Resources
by
Nathaniel C. Elser

© 2012 Nathaniel C. Elser

Submitted in Partial Fulfillment
of the Requirements
for the Degree of

Master of Science

August 2012
The thesis of Nathaniel C. Elser was reviewed and approved* by the following:

Judd H. Michael  
Associate Professor of Wood Products Business Management  
Thesis Advisor

Mark A. Gagnon  
Assistant Professor of Sustainable Entrepreneurship  
Thesis Co-Advisor

Chuck D. Ray  
Associate Professor of Wood Products Operations

Michael G. Messina  
Director of School of Forest Resources

* Signatures are on file in the Graduate School.
ABSTRACT

As the scope of entrepreneurial orientation (EO) research continues to progress, there is a growing need for the examination of EO and its relationships within carefully defined contexts. Understanding how the performance implications of EO vary across highly specified contexts will help generate a more in-depth and cumulative body of knowledge. This study seeks to answer the call for greater context specificity by investigating the relationships between EO, knowledge-based resources and firm performance within a particular manufacturing industry. The first objective of this research was to investigate how specific types of knowledge-based resources relate to performance in the North American wood pallet and container manufacturing industry. The second objective was to investigate how knowledge-based resources affect the EO-performance relationship in the broader transport packaging industry. These relationships were examined utilizing survey data collected from 183 industry firms. Regarding the first objective, results from this study suggest that firms having high levels of knowledge resources relating to markets, technology and management perform better than those lacking such resources. For the second objective, support was found for a model in which knowledge-based resources mediate the EO-performance relationship. In post hoc analyses, a multidimensional view of the EO construct was applied, finding each dimension to act independently of one another. Furthermore, we find support for the mediation model when testing the disaggregated EO construct. Results from this study suggest EO research may benefit from placing greater emphasis on investigating contextual roles in the EO-performance relationship, as well as from treating EO as a multidimensional concept in particular contexts.
# Table of Contents

List of Tables ................................................................................................................. vi
List of Figures ............................................................................................................... vii
Acknowledgements ..................................................................................................... viii

Chapter 1: INTRODUCTION ................................................................................... 1
  Concepts of Strategic Management ................................................................. 2
  Contextual Background .................................................................................. 4
  Justification and Significance ........................................................................ 10
  Research Objectives ....................................................................................... 12
  Literature Cited .............................................................................................. 14

Chapter 2: LITERATURE REVIEW ........................................................................ 19
  Resource-Based View ..................................................................................... 20
  Entrepreneurship ............................................................................................ 28
  Hypotheses ....................................................................................................... 35
  Literature Cited .............................................................................................. 36

Chapter 3: METHODOLOGY ............................................................................... 42
  Literature Cited .............................................................................................. 48

Chapter 4: LINKING KNOWLEDGE TO PERFORMANCE ..................................... 50
  Abstract ........................................................................................................... 50
  Introduction ..................................................................................................... 51
  Background ..................................................................................................... 52
  Research Method ............................................................................................ 53
  Analysis and Results ....................................................................................... 54
  Discussion ........................................................................................................ 63
  Literature Cited .............................................................................................. 67

Chapter 5: STRATEGIES FOR A TRANSITIONING INDUSTRY .............................. 71
  Abstract ........................................................................................................... 71
  Introduction ..................................................................................................... 72
  Contextual Background .................................................................................. 75
  Theoretical Framework and Hypotheses ....................................................... 78
  Research Methodology ................................................................................... 84
  Analysis and Results ....................................................................................... 87
  Discussion ........................................................................................................ 90
  Literature Cited .............................................................................................. 95
## Appendix A: RESPONDENT PROFILE

Appendix A: RESPONDENT PROFILE .............................................................. 100

## Appendix B: SURVEY QUESTIONNAIRE

Appendix B: SURVEY QUESTIONNAIRE ............................................................ 104

- Cover Letter ........................................................................................................ 104
- Implied Consent Form ......................................................................................... 105
- Survey Items ....................................................................................................... 106

## Appendix C: DATA DICTIONARY

Appendix C: DATA DICTIONARY ........................................................................ 111

- Variable Information ........................................................................................... 111
- Firm Characteristics .......................................................................................... 112
- Knowledge-Based Resources .............................................................................. 115
- Firm Performance ............................................................................................ 116
- Entrepreneurial Orientation .............................................................................. 116
- Strategic Typology ............................................................................................ 118
- Sustainability Orientation ................................................................................ 119
- Environmental Scanning ................................................................................... 119
List of Tables

Chapter 3
Table 3.1 – Timeline of data collection process.............................. 45

Chapter 4
Table 4.1 - Summary of business activities involved in, by industry group........ 56
Table 4.2 - Summary of pallet types regularly sold, by industry group........... 57
Table 4.3 - Summary of waste management methods, by industry group..........58
Table 4.4 - Descriptive statistics, ANOVA results between performance groups.... 60

Chapter 5
Table 5.1 - Study Descriptions..................................................... 74
Table 5.2 - Means, standard deviations and correlations...............................87
Table 5.3 - Direct and mediational models for EO, knowledge and performance.... 88
Table 5.4 - Post hoc testing for EO dimensions, knowledge and performance....... 90

Appendix A
Table 6.1 - Primary source of revenue for all respondents, ranked..................102
Table 6.2 - Other business activities involved in for all respondents, ranked...... 102
Table 6.3 - Pallet types regularly sold for all respondents, ranked................... 103
Table 6.4 - Methods for managing wood waste for all respondents, ranked........ 103
List of Figures

Chapter 1
Figure 1.1 - Mediation Model................................................................. 13

Chapter 4
Figure 4.1 - Geographic regions of respondent headquarter locations.............. 55

Chapter 5
Figure 5.1 - Mediation Model................................................................. 75

Appendix A
Figure 6.1 - Distribution of all respondents, by geographic location.................. 100
Figure 6.2 - Distribution of all respondents, by total firm revenue in 2011........... 100
Figure 6.3 - Distribution of all respondents, by number of employees............... 101
Figure 6.4 - Distribution of all respondents, by firm age (in years)................... 101
Acknowledgements

I would like to express my sincerest gratitude to all those who have helped make this possible.

I am indebted to my advisor, Dr. Judd Michael, for providing me this opportunity. Without your guidance, advice, pragmatism and constant support, this thesis would not have come to fruition. Most of all, I would like to thank you for your continuous patience and ongoing efforts to encourage me to maintain a “big-boy” schedule.

Dr. Mark Gagnon, my co-advisor, has been an endless source of inspiration and motivation. My academic plan, research design and goals in graduate school would no doubt have been substantially less ambitious had it not been for your constant drive.

I also wish to thank Drs. Chuck Ray and Fern Willits for their guidance and council in preparing this thesis.

I am forever grateful to my family. To my mother, I am thankful for a lifetime of unconditional support. Your words of encouragement and weekly rations of bread and milk have certainly helped me through graduate school. I am indebted to my father, for teaching me the importance of continuous learning and citizenship. To my brother, I thank you for making my life easier by being the first “professional student” in the family. To my sister, I appreciate the comic relief you’ve provided when I’m most stressed.

Finally, I am deeply grateful to my fiancé, Ashley. Your emotional support, extreme patience and weekly provisions of non-Ramen meals truly kept me going when things were difficult. I could not have achieved this without you.

This project was supported in part by the National Wooden Pallet and Container Association. Funding was provided by the United States Department of Agriculture under Award No. 2009-34614-19801.
Chapter 1

INTRODUCTION

This chapter is intended to provide the reader with an overview of the key dimensions included in the research study. To begin, a basic description of strategic management as an academic discipline will be given. The second section will include brief explanations of the strategic management concepts that were studied. In the third section, background information of the industry on which the research focused is provided. Following this, justification of the research and its theoretical and practical significance will be discussed. Finally, the overall objective of the study and the specific questions it addressed will be presented.
CONCEPTS OF STRATEGIC MANAGEMENT

The academic study of strategic management, simply put, seeks to understand and explain the behaviors of organizations in relation to their external environments, and how those behaviors influence organizational outcomes. Organizations are in perpetual competition, contending for limited resources in the form of, among others, customers, inputs and revenues. As a result of this competition, individual firms are forced to participate in a continually evolving environment, being regularly presented with novel situations, problems and potential solutions. A basic proposition of the strategy field is that the choices made by the firm in response to its environmental conditions will have critical influence on the ultimate success or failure of the enterprise (Rumelt, Schendel, & Teece, 1994).

Firms competing in the same industry with one another will often face very similar environmental conditions. This, however, does not imply that each firm has available the same resources on which strategic decisions, in response to those conditions, can be made. Nor does the availability of similar resources imply that each firm is capable of responding in the same manner. This observation, that seemingly very similar firms can differ substantially in terms of performance, has led to an immense and growing body of research that seeks to better understand how firms interact with their environment, and to identify those factors most influential in the strategic process.

This study drew on concepts from multiple streams of research within the strategic management literature. In an effort to understand what firms are and the role they play in our modern world, many theories have been developed. These theories have been designed to address particular characteristics and behaviors of the firm (Machlup, 1967; Grant, 1996). While theories of the firm will often offer rival explanations of the same phenomena, they can also be complimentary of one another when addressing different phenomena (Grant, 1996). This study employed concepts from differing yet complimentary streams of research within the strategic management literature.
Knowledge-based resources

The first theory from which concepts were utilized is the resource-based view of the firm. In this view, individual firms can be distinguished by their own unique collection of resources and capabilities. Some firms may be able to gain competitive advantage through proper leveraging of their specific collection of resources and, ultimately, earn returns greater than their competitors (Grant, 1996). Both tangible and intangible assets coupled with a firm can contribute to its collection of resources. Examples of resources may include employees, access to capital, machinery and equipment, intellectual property, etc. This research focused on knowledge-based resources internal to the firm, specifically market and technological expertise. Wiklund and Shepherd (2003) argue that knowledge associated with markets and technology can increase a firm’s ability to discover and exploit new opportunities.

Strategic orientation

Another concept studied as part of this thesis is that of strategic orientations. The strategic orientation a firm chooses to adopt is often differentiated from the broader strategy in which it is applied. Strategy is, as defined by Chandler in 1962, “the determination of the basic long-term goals and objectives of an enterprise, and the adoption of courses of action and the allocation of resources necessary for carrying out the goals” (pg. 13-14). Whereas strategy is typically used to describe the long-term goals of a firm and the general methods it employs in an effort to meet those goals, strategic orientation, while still broad, describes the processes within an organization that are involved with strategic decisions. Less a description of the content of decisions, strategic orientation is more closely related to the processes involved with those decisions. Dimensions of these processes can encompass all organizational activities that involve planning, decision making and management, as well aspects of organizational culture, shared value systems and corporate vision (Pascale, 1985; Hart, 1992; Lumpkin and Dess, 1996). As a result, strategic orientation is a reflection of how a firm operates, rather than the firm’s actual operations (Lumpkin and Dess, 1996; Wiklund and Shepherd, 2003).
Entrepreneurship

Concepts from the entrepreneurship research field were also studied. Traditionally, entrepreneurship research was seen as being applicable only in attempts to understand phenomena occurring within newly established firms. Many of the ideas founded in this traditional view, however, are now finding value in their application to a plethora of business environments. The study of entrepreneurship is no longer restricted by just a handful of firm characteristics. Entrepreneurship has been studied in organizations that differ in terms of size, age, geographic reach, ownership, industry and structure, among many other characteristics. This broader scope is the result of greater understanding in the relevance of entrepreneurship to all business managers, regardless of the size, age or activities specific to their organization (Brown, Davidsson, & Wiklund, 2001).

Entrepreneurship carried on in the pursuit of business opportunities, as noted by Lumpkin and Dess (1996), spurs business expansion, technological progress and wealth creation, not just for start-up ventures, but for existing firms as well (p. 135).

Entrepreneurship and the activities associated with it, when occurring in established organizations, have been referred to in many ways, including intrapreneurship (Pinchot, 1985), corporate venturing (Burgelman, 1983), and, among others, entrepreneurial management (Stevenson & Jarillo, 1990). These labels are often used to describe different forms of organizational phenomena. Of interest to this study, are examples in which an “entrepreneurial” philosophy has permeated all aspects of an organization’s activities and strategic decision making processes (Covin and Miles, 1999). The entrepreneurship perspective that this research study is primarily concerned is at the firm level, frequently referred to as corporate entrepreneurship.

CONTEXTUAL BACKGROUND

This study researches phenomena associated with entrepreneurship, innovation, and knowledge-based resources specific to firms operating within the U.S. transport packaging industry. Observing the actions of firms operating in such a specific industry has the potential to provide valuable insights into how organizations observe, perceive and react to shared environmental conditions. These conditions and the industry’s characteristics will be discussed below.
Studying the U.S. transport packaging industry presents many advantages including contributions to the strategic management literature, discovery of potentially valuable knowledge to be applied by industry members, as well as practicality for the researcher. In regards to theoretical contributions, the benefits of studying transport packaging companies relate to certain economic and structural characteristics of the industry in which they operate.

**Industry evolution**

The concept of product life cycle can be a useful tool for predicting the probable course of an industry’s evolution. In this sense, each stage of the cycle describes a stage of an industry’s evolution, most commonly; introduction, growth, maturity, and decline (Porter, 1980). The implications of evolutionary changes can be beneficial or harmful to both individual firms and entire industries. From a firm-level perspective, understanding and predicting changes in the industry is important due to the costs that typically accompany delayed reactions to new environmental conditions and the advantages that can result from being the first in the industry to implement a new strategy (Porter, 1980). On a broader scale, the failure of an entire industry to perceive, and effectively react to, the fundamental changes it will inevitably experience can contribute to its decline and eventual obsolescence. The orientation, skills and resources of firms can influence the evolutionary path of the industry in which they compete. If companies perceive their industry’s life cycle as being outside their control, the evolutionary forces can become an undesirable self-fulfilling prophesy (Porter, 1980). Consequently, it is critical for all firms to not only recognize the state of their particular industry, but also adopt strategies that take those environmental conditions into consideration.

Generally described as having a slow, and sometimes decreasing, rate of growth over time, mature industries have also been characterized as having decreasing profitability (Patton, 1959); decreasing employment (Walsh, 1991); little product differentiation (Porter, 1980); excess production capacity (Levitt, 1965); and mass market saturation (Porter, 1980). While not all of these descriptors correspond to the transport packaging industry, many can be considered to be representative.
**Transport packaging industry**

Identifying an industry’s position within its evolutionary life cycle will most often include some form of economic analysis. In the case of the transport packaging industry, certain statistics imply that it is transitioning into a state of maturity. As all respondent firms in our sample are manufacturers of wood pallets and/or containers, economic data provided by the U.S. Department of Commerce can facilitate the assessment of this industry’s status. The North American Industry Classification System (NAICS) defines the “wood container and pallet manufacturing” industry (#321920) as comprising “establishments primarily engaged in manufacturing wood pallets, wood box shook, wood boxes, other wood containers, and wood parts for pallets and containers” (United States Census Bureau, 2007). Although this industry classification includes non-pallet products such as wooden barrels and baskets, statistics pertaining to this generalized industry can serve as a starting point for evaluating specifically the status of the U.S. transport packing industry.

In the decade between 1997-2007, the number of companies operating in this industry decreased by nearly 8% (USCB, 2009). In terms of size, the number of small establishments (less than 20 employees) decreased by 8%, while the number of the largest (more than 100 employees) increased nearly 30% (USCB, 2009). In addition to this, the share of total value shipped by the 50 largest establishments in the industry grew 33% (USCB, 2009). These numbers imply a process of consolidation occurring in the industry. Mobility barriers and concentration often occur concurrently, creating a difficult environment for new firms to enter and succeed (Porter, 1980).

In terms of gross output, which represents the market value of an industry’s production, the wood container and pallet manufacturing sector has grown about 1.7% annually from 2000-2010 (United States Bureau of Economic Analysis, 2011). Although this growth rate is positive and comparable to the combined average rate for all manufacturing industries in the U.S. over the same period of time, it is substantially lower than that of high-growth industries such as petroleum refining and petrochemical manufacturing, the growth rates of which over the same period of time were approximately 19% and 16%, respectively (United States Bureau of Economic Analysis, 2011).
Finally, factors external to the industry also present challenges for potential new entrants. One significant challenge is due to the fact that the products of the industry are closely coupled with international trade. For instance, as explained below, pallets are frequently designed based on the specifications of the particular product to be transported and intended to work within the infrastructure of the exporting country. The multiplicity of pallet product standards that now exist worldwide can lead to increases in transaction costs (Raballand & Aldaz-Carrol, 2007). When transporting goods internationally, pallets must often times be unloaded and reloaded at the border of the destination country, when that country utilizes a pallet standard dissimilar to that of the exporting country (Raballand & Aldaz-Carrol, 2007). Because the pallet standards a country adopts typically reflects the country’s type of handling equipment, depalletising and repalletising goods commonly necessitates manual labor and time, reducing logistics efficiencies while increasing costs (Raballand & Aldaz-Carrol, 2007). If the US transport packaging industry is required to place greater emphasis on export markets in order to maintain a competitive advantage, the costs of doing so could further deter industry growth.

**Product overview**

In terms of product diversity, pallets can be most broadly classified based on the material from which they are manufactured. The most common material is solid wood, which accounts for nearly 95% of all manufactured pallets (Clark, 2004). Following this, solid wood pallets can be distinguished between hardwood and softwood. Hardwood, by volume, accounted for over 63% of the material used in the US wood pallet industry in 2006, with softwood accounting for the remainder (Araman, Bush, & Hager, 2010). As hardwoods account for roughly two-thirds of the seven billion board feet (bf) of lumber consumed annually in the manufacturing of pallets, the industry has become the “single most important user of hardwood lumber (by volume) in North America” (Buehlmann, Araman, & Bush, 2010).

While wood is by far the most common pallet material, both in the US and the world, other materials are used and worth mentioning. Plastic, although making up only about 2% of new pallet production in the US, is gaining popularity due to advantages associated with durability, weather resistance and design potential (Clark, 2004). Wood composites, such as plywood, oriented strand board (OSB), particle board and laminated veneer
lumber (LVL), have also grown in popularity, largely due to their being exempt from pest related regulations, but maintain a market share similar to that of plastic (Clark, 2004). Finally, pallets manufactured from metal and paper based materials can also be seen in the transport industry, but generally find acceptance only in niche markets and so account for a small minority of total market share (Clarke, 2004).

Regardless of the material used, the vast majority of pallets can be classified as one of two design types (Clarke, 2004). Stringer pallets, which accounted for about 80% of all pallets produced in the United States in 2006, are traditionally made of hardwood and are the main type used in North America (FPInnovations, 2009). Block pallets, which are the preferred design in Europe, are most often manufactured out of softwood (FPInnovations, 2009). Although stringer pallets typically require less material to manufacture, and so are cheaper to produce, their design restricts forklift access to only two sides. Block pallets, on the other hand, are generally more expensive to produce but provide the advantage of full access on all four sides (Clarke, 2004). As a result of this four-way accessibility, block pallets are becoming favored by such retail giants as Costco and Wal-Mart (FPInnovations, 2009). In fact, as of 2011, Costco locations in North America no longer accept stringer type pallets, preferring block style pallets in an effort to increase efficiencies (Brindley, 2010).

Despite the fact that most pallets are wooden and fall into one of two categorical types, the variation in size and dimensions is immense. As was alluded to earlier, many pallet standards have been developed. In fact, the ten most produced sizes in North America, as of 2000, accounted for only about 60% of total annual pallet production, with the remaining 40% being comprised of hundreds of different sizes (Clarke, 2004). Pallet producers often design their products to meet the specified requirements of their buyers, resulting in a multitude of dimensions (Raballand & Aldaz-Carrol, 2007). Efforts have been made, however, to standardize the product. “In the 60’s and 70’s, the US grocery industry began conversion towards the 48x40” standard footprint, and today the size is not only standard in the grocery industry, but in many other industries as well” (Clarke, 2004, p. 3). The Grocery Manufacturers of America (GMA)-type pallet is now the most common size in the US, accounting for nearly 30% of annual pallet production (Clarke, 2004).
efforts, recognizing the six most commonly used pallet sizes across the major trading regions of the world. The ISO standard, however, remains less than ideal due to the fact that none of the six sizes is commonly used across all regions (Raballand & Aldaz-Carrol, 2007).

Other developments have also occurred in the US transport packaging industry relatively recently. Significant among these is the growth of pallet pooling systems. These systems have developed in response to both economic and environmental costs associated with recovering pallets following delivery of goods. The cost of retrieving a pallet, especially when shipped across continents, can easily be greater than that of the pallet, oftentimes leading to abandonment or disposal (FPInnovations, 2009). Pallet pooling systems allow pallet users to rent, rather than own, the pallets on which their goods are transported. By outsourcing pallet management activities such as collecting, sorting and repairing, pallet users can save valuable resources (Trebilcock, 2010). Companies such as CHEP, Peco Pallets and iGPS have developed extensive networks through which they distribute and track their pallet inventories using various technologies (Mosqueda, 2010). In addition to single companies managing pallet systems, organizations, such as the European Pallet Association (EPAL) and the Canadian Pallet Council (CPC), manage pooling systems through networks composed of many individual pallet manufacturing and recycling companies (Mosqueda, 2010).

Another major trend in the US transport packaging industry that has occurred over the past few decades is the significant increase in pallet reuse and recycling. The rise of companies specializing in the repair and remanufacturing of pallets is in large part the result of increasing landfill fees, recycling mandates, and a perceived market opportunity (Clarke, White, & Araman, 2005). The growth of this specialized industry can be seen in pallet recovery rates over the previous two decades. According to one study, 51 million pallets were recovered and reused in 1992, and by 2006, this number had dramatically increased to 357 million units (Buehlmann, Araman, & Bush, 2010). In another study, slightly more than half of wood pallet producing firms indicated involvement in pallet recovery, repair and/or remanufacturing in 2006 (Araman, Bush, & Hager, 2010). Furthermore, the recovery, repair and/or remanufacturing of pallets was the primary source of revenue for 25% of responding firms that same year (Araman, Bush, & Hager,
Finally, some pallet manufacturing firms will also produce value-added products from residual wastes, such as colored/uncolored mulch, wood-based fuel and animal bedding (Araman, Bush, & Hager, 2010).

**JUSTIFICATION AND SIGNIFICANCE**

As was previously mentioned, this study seeks to make meaningful contributions to the strategic management literature. Fundamental to the proposed study is the concept of entrepreneurial orientation and the effect its adoption has on firm performance. Since Miller’s (1983) proposed definition of the entrepreneurial firm, the research devoted to the concept of entrepreneurial orientation has grown immensely. Innumerable studies of this concept have been conducted over the previous three decades, leading to widespread acceptance and acknowledgement of both the concept’s meaning and persistent relevance (Rauch, Wiklund, Lumpkin, & Frese, 2009). Of primary concern to most EO based research is the relationship between a firm’s EO and its performance. A recently conducted meta-analysis of EO based research found that the number of studies measuring this relationship has increased more than five-fold in the past decade as compared to the previous one (Rauch et al., 2009).

Despite having been heavily researched over the past ten years, the opportunities for contribution to this stream of research are many. The significance of this study, in terms of theoretical contributions, stems from two aspects of its design. First, this research studied the relationships between knowledge-based resources, EO and performance. Second, the context specificity of this research may be advantageous in generating empirically valid knowledge on which future EO research can be based (Miller, 2011).

**Theoretical contributions**

Although conceptual arguments will imply that firms’ adoption of an EO will lead to increases in performance, the extent to which this bivariate relationship presents itself varies across studies (Rauch et al., 2009). As a result, many scholars of EO have called for the consideration of contingent variables when measuring the EO-firm performance relationship (Covin & Slevin, 1989; Lumpkin & Dess, 1996; 2001; 2005; Wiklund & Shepherd, 2003; 2005; Rauch et al., 2009). In order to increase understanding of how EO contributes to firm performance, Rauch and colleagues (2009) called for further
investigation into the roles played by environmental and organizational factors. Our research helps address this need by measuring the potential influence knowledge-based resources have on the EO – firm performance relationship. Although Wiklund and Shepherd (2003) proposed and tested this relationship, this study builds on their research by testing these variables in new models within an industry specific context. Furthermore, evaluating the influence of additional factors on a bivariate relationship facilitates a comprehensive understanding of the fundamental relationship between the base variables (Rosenberg, 1968; Lumpkin & Dess, 1996; Rauch et al, 2009).

As was discussed earlier, of primary concern to most EO based research is the relationship between a firm’s EO and its performance. Performance, as an outcome to be measured, is a multidimensional concept. The relationship between performance and EO can often be dependent on the methods employed for assessing performance (Lumpkin & Dess, 1996; Rauch et al, 2009). In an assessment of EO based research, Dess and Lumpkin (2005) encouraged researchers to “look beyond economic outcomes when examining the EO-performance relationship” (p. 153). By measuring the relationship between EO and both financial and nonfinancial performance outcomes, we attempt to gain understanding of how EO influences the actual strategic decisions a firm makes in regards to firm-level entrepreneurial behaviors. Also valuable is the potential to observe how firms strategically react to similar environmental conditions and the implications those reactions have on their performance.

A focus on firms operating in the transport packaging industry will also provide valuable information to the EO literature. Zahra and colleagues (1999) noted that, at the time, very few studies had explored the effects that industry life cycle stages have on the entrepreneurial activities of firms. More recently, Sciascia and colleagues (2009) also noted a lack of research devoted to this relationship, despite the intense maturity conditions and increasing rivalry that many industries in the US, Europe and Japan are now experiencing. By researching the EO – performance relationship of firms in the transport packaging industry, we hope to shed new light on phenomena unique to transitioning industries.
RESEARCH OBJECTIVES

The first objective of this exploratory research was to identify those types of knowledge resources that may be related to firm performance in the North American pallet industry. In this context, understanding the value of different types of knowledge can be beneficial in strategic decisions involving the acquisition and allocation of resources. Past research of firms in various industries, such as film studios (Miller & Shamsie, 1996), law firms (Hitt, Bierman, Shimizu, & Kochhar, 2001) and textile manufacturers (Sciascia, Alberti, & Salvato, 2009), has shown knowledge resources to be positively related to firm performance. Thus, one of our goals was to investigate the potential existence of this relationship in a wood industry setting. Understanding how a firm’s knowledge resources influence its competitiveness within this type of industry can help facilitate managerial decisions related to, for example, the recruitment, retention, and training of employees (Thornhill, 2006).

The second objective of this research was to determine whether or not an entrepreneurial orientation, in conjunction with market- and technology-based knowledge resources, is positively correlated with the performance of firms operating in the transport packaging industry. Our study builds on those of Keh and colleagues (2007), Wang (2008) and Simsek and Heavey (2011). Using measures similar to those of Wiklund and Shepherd (2003), we test multiple models in an effort to further explain the relationship between certain knowledge resources, EO and firm performance. Rather than investigating the existence of these relationships within a heterogeneous population, however, we instead focus on the well-defined context of a particular manufacturing industry.

Evidence from recent entrepreneurship research suggests firm knowledge not only enhances the performance benefits of entrepreneurial pursuits, but may actually be the mechanism through which those pursuits affect firm performance (Keh, Nguyen, & Ng, 2007; Wang, 2008; Li, Huang, & Tsai, 2009; Simsek & Heavey, 2011). Based on these relatively recent studies, we argue that, in the specified context of a transitioning industry, that a bundle of knowledge-based resources applicable to the discovery and exploitation of opportunities will mediate the relationship between EO and firm performance (Figure 1.1).
Aside from potential theoretical contributions, the findings of this study may be beneficial to companies operating in the transport packaging industry. Conclusions of this research can aid these firms in their strategic decision making processes by providing insight into methods of operation that can potentially promote or hinder the realization of competitive advantage. From an industry-wide perspective, these findings can be utilized in developing possible solutions for delaying or reversing the evolutionary processes that could lead to the industry’s maturity and decline.

**Research Questions**

1. Does entrepreneurial orientation influence firm performance?
2. Is entrepreneurial orientation related to knowledge-based resources applicable to the discovery and exploitation of opportunities?
3. Do knowledge-based resources applicable to the discovery and exploitation of opportunities mediate the relationship between an entrepreneurial orientation and firm performance?
LITERATURE CITED


Chapter 2

LITERATURE REVIEW

This chapter is intended to present the reader with a general representation of the current body of knowledge relating to the study. The chapter is organized into three distinct sections, each focused on a subject matter necessary for consideration in the realm of this research. The first will review literature related to the resource-based view (RBV) of the firm. Because the literature related to RBV is quite extensive, and the focus of the proposed study is a single concept drawn from this literature, the first section will provide the basic foundations of RBV before addressing specifically knowledge-based resources (KBR). Next, a review of the relevant literature associated with entrepreneurship theory will be supplied. This section will address both corporate entrepreneurship and entrepreneurial orientation as they relate to this research. In the final section, the hypotheses of the research study will be provided.
RESOURCE-BASED VIEW

As was discussed in the previous chapter, a central goal of the study of strategic management is understanding the behaviors of organizations in relation to their external environments and the impact a firm’s environment has on its performance. Although a relatively young field of study, strategic management has roots in, among others, industrial organization (IO) economics. The influence of IO economics, and the research conducted by scholars such as Porter (1980), led many scholars within the strategic management field to focus on characteristics external to the firm, such as its industry structure and competitive position (Hoskisson, Hitt, Wan, & Yiu, 1999). As a result, strategy formulations were often generalized as being the product of attributes specific to an industry, rather than to the firms within that industry.

Barney (1991) described how scholars that focused on environmental conditions tended to operate under two simplistic assumptions. The first assumption was that firms within an industry are homogenous in terms of the resources they control, and so, are also similar in the strategies they pursue (Scherer, 1980; Porter, 1981; Rumelt, 1984). The second inherent assumption was that the novelty of any one firm’s resources would be temporary, due to the highly mobile nature of resources within the markets (Barney, 1986; Hirshleifer, 1980).

Firm heterogeneity

Whereas the IO economics based perspectives focused on those aspects external to the firm, the resource-base view (RBV) examines the relationship between the internal characteristics of a firm and its performance. Consequently, RBV research operates under assumptions converse to those based in IO economics. In the RBV perspective, firms within an industry may be heterogeneous in terms of the strategic resources they control. In addition to this, RBV also assumes that not all resources are perfectly mobile across firms, allowing for the potential of long lasting heterogeneity (Barney, 1991). Barney (1991), based on Daft (1983), defined firm resources as including “all assets, capabilities, firm attributes, information, knowledge, etc. controlled by a firm that enable the firm to conceive of and implement strategies that improve its efficiency and effectiveness” (p. 101).
By assuming the potential for heterogeneity within an industry, individual firms can then be conceptualized by their own unique collection of resources and capabilities. As described earlier, this heterogeneity can permit some firms to gain competitive advantage through proper leveraging of their specific collection of attributes and, ultimately, earn returns greater than their competitors (Grant, 1996). Wernerfelt’s oft-cited affirmation that “resources and products are two sides of the same coin” (1984, p. 171) sought to provide explanation of the relationship between resources and performance. Newbert (2007) elaborated on this with his explaining that “while a firm’s performance is driven directly by its products, it is indirectly (and ultimately) driven by the resources that go into their production” (p. 122).

**The VRIO framework**

Of course, simply having access to resources that are neither comparable to those of your competitors nor simple to transfer does not necessarily imply the potential of sustained competitive advantage. To have this potential, a firm resource must have four attributes: (a) it must valuable, in the sense that it exploits opportunities and/or neutralizes threats in a firm’s environment, (b) it must be rare among a firm’s current and potential competition, (c) it must be imperfectly imitable, and (d) there cannot be strategically equivalent substitutes for this resource that are valuable but neither rare or imperfectly imitable (Barney, 1991, p. 105-106). Besides having these resource attributes, a firm must also have an organizational design that allows for the full exploitation of those resources, in order for a sustained competitive advantage to be attained (Barney, 1997; Barney & Wright, 1998; Newbert, 2007). This framework for determining the heterogeneity and immobility of a firm’s resources is often referred to as VRIO (valuable, rare, inimitable, organization). The description presented here of the business-level resource-based perspective was part of a seminal work in the RBV stream, with most subsequent RBV studies being either based on, or extensions of, Barney’s (1991) framework (Priem & Butler, 2001).

In an effort to simplify their study, Barney (1991) also classified firm resources into three categories: physical capital resources (Williamson, 1975), human capital resources (Becker, 1964), and organizational capital resources (Tomer, 1987). Some scholars have focused on resources related to human capital, such as experience, judgment, and insights
of individual managers and employees, as being the most strategically important of the firm’s resources (Grant, 1996). This narrower scope of attention has resulted in a research stream extended from that of RBV, focused specifically on knowledge-based resources (KBR). The distinction of, and emphasis on knowledge-based resources, will be an integral concept on which the proposed study will draw heavily.

**Knowledge-based resources**

Whereas property-based resources refer to tangible inputs, knowledge-based resources describe the ways in which firms combine and convert those tangible inputs to improve performance (Galunic & Rodan, 1998; Wiklund & Shepherd, 2003). Competitive advantages linked to knowledge-based resources have received significant interest from scholars of strategic management. This increased interest is the result of scholars and practitioners alike recognizing the influential role of knowledge-based resources in the creation of competitive advantage. It has even been argued that firm specific knowledge serves as the most important source of competitive advantage and superior performance (Drucker, 1995; Spender & Grant, 1996). In order to identify those attributes that make knowledge a potential source of competitive advantage, this section will make use of Barney’s (1991) VRIO framework through its application to knowledge-based resources.

**Value of knowledge**

Consideration of how knowledge can be valuable to a firm is not a difficult task. A firm’s knowledge can, for example, lead to unique methods for increasing process efficiencies. Or, knowledge could help a firm to recognize market disequilibrium, increasing the possibility of new opportunity identification (Bojica, Fuentes, & Gomez-Gras, 2011). In either case, the knowledge may lead to a firm obtaining first mover advantages, and thus value through the potential creation of entry barriers in the firm’s market. Once the value of a firm’s knowledge resources are verified within the market, the rarity and inimitability of those resources will significantly influence the extent to which they are strategically advantageous to the firm (Wang, He, & Mahony, 2009).
**Rarity of knowledge**

The fundamental nature of firm knowledge makes the attribute of rarity equally simple to comprehend. A firm’s knowledge can be either acquired from external sources or created internally. Knowledge acquisition often comes in the form of prior knowledge possessed by members of an organization. The unique characteristics of an individual’s information stock are the product of that individual’s idiosyncratic life experiences (Shane, 2000). Furthermore, a person’s acquisition of knowledge may be completely coincidental, due to the stochastic and disorderly process information is sometimes disseminated (Nelson & Winter, 1982; Shane, 2000). As result, the unique repository of knowledge an individual develops through work experience, education or other means, will ultimately have a distinct influence on that individual’s ability to extrapolate, interpret and make use of new information (Roberts, 1991; Shane, 2000).

Firms often gain knowledge through similarly organic processes. Sinkula, Baker and Noordewier (1997) observed the process of organizational learning as being highly variable, concluding that methods of learning may differ substantially between firms. Organizations might learn actively or passively, by their own volition or through force, as a luxury or by necessity, through systematic analysis or by trial and error, and through long-term versus short-term feedback from a dynamic or stable environment (Sinkula et al., 1997, p. 314). Just as with an individual, a firm will have unique abilities to perceive, comprehend and apply new information. From this perspective, a firm’s knowledge-based resources include not only what it has learned as a result of its own circumstances, but also the collective body of knowledge gained through the combined experiences of its members. Consequently, the potential rarity of any one firm’s knowledge can be easily appreciated by the extraordinarily multifarious nature of that knowledge.

**Inimitability of knowledge**

Longevity of competitive advantage depends upon the inimitability of the capabilities which underlie that advantage (Grant, 1996, p. 117). Inimitability, like rarity, is a resource attribute that is particularly applicable to knowledge. Unlike physical or property-based resources, knowledge-based resources prove especially difficult for imitation by competitors due to their inherent subtlety and, as described above,
complexity. These resources often involve talents that are elusive and whose connection to results is difficult to discern (Lippman & Rumelt, 1982; Miller & Shamsie, 1996).

This connection between a firm’s actual knowledge and the role it plays within the organization is usually quite vague, especially to those outside the organization. Because knowledge-based resources are often firm specific, competitors seeking to attain value through imitation of another firm’s knowledge need more than simply gain access to that knowledge. In order to fully valuate a firm-specific knowledge-based resource, a rival firm must also fully understand the context in which it is utilized, such as the organizational functions and complimentary resources that support its deployment (Wang, He, & Mahony, 2009).

These organizational idiosyncrasies describe imitation barriers related to the complexity of knowledge. Complexity usually refers to the number of unique elements that must interact in order for a system to perform at an optimal level (McEvily & Chakravarthy, 2002). The complexity of firm knowledge is often related to the extent to which that knowledge is dispersed throughout the organization (Galunic & Rodan, 1998). When a firm’s collective knowledge is scattered throughout multiple departments, units and individuals, that knowledge will ultimately reside in a system of interactions. Moving this type of systems-embedded knowledge may require the wholesale uprooting and transplanting of the system, which may be expensive if not unrealistic (Galunic & Rodan, 1998, p. 1198).

Two other characteristics of knowledge often associated with imitation barriers are tacitness and specificity (Galunic & Rodan, 1998; McEvily & Chakravarthy, 2002). The specificity of a knowledge resource refers to its applicability outside of the organizational context. The more specific a firm’s knowledge resource is, the less likely a rival firm will be able exploit that resource equally effectively. The search for, and accumulation of, novel solutions built upon a firm’s preexisting knowledge will frequently result in the production of firm-specific knowledge (Nelson & Winter, 1982; Teece, 1986; Cohen & Levinthal, 1989; Wang, He, & Mahony, 2009). And so, the specificity of a firm’s knowledge resource may arise when the productivity of that resource is dependent on its use in conjunction with complimentary resources idiosyncratic to the firm (McEvily & Chakravarthy, 2002).
Whereas complexity and specificity describe knowledge resources in relation to the organizational systems in which they reside, tacitness describes how knowledge is communicated and transferred across individuals, space, and time. A simple distinction between tacit and explicit knowledge commonly cited in the literature is Grant’s (1996) knowing how versus knowing about. Explicit knowledge, also referred to as declarative knowledge, is easily codifiable and so can be processed, stored and transferred with relatively little difficulty (Alwis & Hartmann, 2008). Examples of explicit knowledge are that found in manuals, patents, diagrams, scientific formulae, etc.

Tacit knowledge, conversely, is difficult to formulize. Also referred to as procedural knowledge, it is tied to the senses, experiences, skills, intuition, unarticulated mental models or implicit rules of thumb (Nonaka & von Krogh, 2009). Tacit knowledge is not codified and so is not communicated through language alone; it is acquired through sharing experiences, observation and imitation (Kikoski & Kikoski, 2004; Hall & Andriani, 2002; Alwis & Hartmann, 2008). As a result, its transfer between people is often time-consuming and costly (Kogut & Zander, 1992; Grant, 1996).

**Knowledge specialization and expertise**

As was briefly discussed above, value in a knowledge resource is oftentimes the outcome of the identification and evaluation of entrepreneurial opportunities. An entrepreneurial opportunity is the prospect of bringing into existence new goods, services, processing or organizing methods that permit outputs to be sold for greater than their cost of production (Casson, 1982; Shane, 2000). These opportunities exist due to the lack of perfect information within the market. Addressing the rarity of knowledge, the process through which information is disseminated through the market and obtained by individuals was described earlier as being a stochastic and disorderly one. This asymmetry of available information implies that, not only are individuals afforded dissimilar probability of being presented entrepreneurial opportunities, but each individual will further differ in their ability to recognize those entrepreneurial opportunities when presented (Shane, 2000). Thus, a firm’s knowledge-based resources can facilitate the search for, assessment of, and capitalization on entrepreneurial opportunities (Cohen & Levinthal, 1990; Wiklund & Shepherd, 2003).
Recalling Simon’s (1972) theory of bounded rationality, it is understood that the human brain has finite capacity for the acquisition, processing, interpretation and storage of knowledge. Consequently, the efficient production of knowledge (creation of new knowledge, acquisition of existing knowledge, and storage of knowledge) necessitates the specialization of individuals in particular areas of knowledge (Grant, 1996, p. 112). For instance, in explaining how these efficiencies can arise, Shepherd and DeTienne (2005) argued that an individual knowledgeable in a particular area will likely focus their attention on only those key dimensions of the information available to them, as well as process that information in a more intuitive manner than someone lacking the same knowledge resources. Rather than through conscious, step-by-step systematic processing, the decision making process for these individuals will be more automatic, and so more efficient (Logan, 1990; Shepherd & DeTienne, 2005).

The process efficiencies that come about through knowledge specialization have been of particular interest to researchers of cognitive learning and knowledge acquisition. It has been suggested that information processing efficiencies occur in those whose cognitive models are built on prior knowledge related to the information of interest. Individuals that specialize in a particular area of knowledge will, as they become more knowledgeable through experience, develop in-depth categories of information based on structures involving progressively more, stronger, and richer connections between concepts (Frederick & Libby, 1986; Frederick, 1991). An individual’s ability to identify entrepreneurial opportunities can be enhanced by these richer, more profound linkages (Shepherd & DeTienne, 2005). Specialized knowledge, then, can be viewed as the set of cognitive pathways that may be followed for solving a given problem or doing a given task – the problem solver’s network of possible wanderings (Amabile, 1997, p.42).

Linking knowledge specialization to firm performance, Wiklund and Shepherd (2003) argued that concurrent possession of market and technological knowledge within a firm will encourage the discovery and exploitation of entrepreneurial opportunities.
Market knowledge

For a firm seeking entrepreneurial opportunities, the acquisition of knowledge pertaining to markets is a vital source for these discoveries. Such knowledge can enhance the firm’s sensitivity for detecting market disequilibrium, increasing the likelihood of entrepreneurial opportunity identification (Bojica, Fuentes, & Gomez, 2011). According to Wiklund and Shepherd (2003), a firm having market knowledge will be particularly adept to the discovery and exploitation of opportunities because: “awareness of customer problems may have great generality and thus constitute real market opportunities; it is easier to determine the market value of new scientific discoveries, technological change, etc; and the locus of innovation often lies with users of new technologies who cannot easily articulate their needs for not-yet-developed solutions to problems, and therefore the organization must share some of the same tacit knowledge as its users” (p. 1308, 1309).

Technological knowledge

Like market knowledge, technological knowledge can also be a valuable source of entrepreneurial discovery. Technological knowledge can allow a firm to quickly exploit an identified opportunity, or rapidly respond to competitors’ advancements (Cohen & Levinthal, 1990; Wiklund & Shepherd, 2003). A firm having technological expertise may discover new production processes, leading to gains in efficiency. This same knowledge could also allow for the creation of new products through the utilization of new materials, and, as a result generate new sources of supply (Schumpter, 1934; Shane, 2000). Regularly, technological knowledge is a complimentary resource to market knowledge. As noted above, Wiklund and Shepherd (2003) describe the dependent relationship common between new technologies and the availability of markets required for their adoption. This dependence between markets and technology is often mutual. Discovery of entrepreneurial opportunities frequently necessitates more than simply detecting market disequilibrium. Without the technological knowledge required to design and produce the appropriate solution to a market’s need, the identification of that market need is of little economic value. The ability to recognize opportunity from new information about a technology can be enhanced, by having prior knowledge of how that technology can be used to create a new product or service that will satisfy the needs of
the market (Shane, 2000). For example, a firm having already identified a market opportunity can then use its technological knowledge to design a product that optimizes functionality, cost and reliability (Rosenberg, 1994; Wiklund & Shepherd, 2003).

ENTREPRENEURSHIP

Entrepreneurship as an academic field of study can be applied at many levels. A common perception of entrepreneurship is that its existence is limited to single individuals or new start-up businesses. The entrepreneurship literature, however, has found its application to be useful across a wide spectrum of organizations. Entrepreneurship has been studied in organizations that differ in terms of size, age, geographic reach, ownership, industry and structure, among many other characteristics. Entrepreneurship carried on in the pursuit of business opportunities, as noted by Lumpkin and Dess (1996), spurs business expansion, technological progress and wealth creation, not just for start-up ventures, but for existing firms as well (p. 135).

The entrepreneurship perspective that this study is primarily concerned is at the firm level, frequently referred to as corporate entrepreneurship (CE). At this level, the focus is typically on venture development internal to the firm (Dess & Lumpkin, 2005). In their theoretical exploration of the CE construct, Covin and Miles (1999) note that the label of corporate entrepreneurship has been attached to multiple and sometimes distinct organizational phenomena. Three phenomena most commonly viewed as examples of CE were situations where (1) an “established” organization enters a new business; (2) an individual or individuals champion new product ideas within a corporate context; and (3) an “entrepreneurial” philosophy permeates an entire organization’s outlook and perceptions (Covin & Miles, 1999, p. 48).

Corporate entrepreneurship is often thought to have two dimensions: innovation aimed at business venturing and strategic renewal (Guth & Ginsberg, 1990; Zahra, 1996). Innovation, as a component of CE, refers to a firm’s commitment to creating new products and services, methods of production and organizational systems (Covin & Slevin, 1991; Lumpkin & Dess, 1996; Zahra, 1996). This commitment to creation, however, must be had with the intention of obtaining strategic advantage or some form of economic profits, as the first dimension expresses above. Here, venturing describes a
firm’s development of new business, often through entering new markets or expansion into preexisting ones. Finally, strategic renewal, as described by Zahra (1996), refers to the revitalization of a company’s operations by changing the scope of its business, its competitive approach, or both. In addition to this, strategic renewal also means the building or acquisition of new capabilities, and their subsequent creative leveraging to add value for shareholders (p. 1715).

Although entrepreneurship within a firm may present itself in different ways, the ability to recognize and exploit opportunities is maximized when all aspects of a company’s operations are perceived as a potential source of competitive advantage. The effect of CE on strategic success is most apparent in firms where both the leaders and culture generate the impetus to innovate, take risks and pursue opportunities, without limitation to particular activities or operations within the business (Dess & Lumpkin, 2005).

**Entrepreneurial orientation**

Today’s business environment is often characterized as one of rapid change and shortened product and business model lifecycles. As a result, a firm cannot reasonably expect the profit streams of its current operations to continue unabated, and so, must constantly seek out new opportunities (Rauch, Wiklund, Lumpkin, & Frese, 2009). A strategic orientation toward entrepreneurship may enable a firm to effectively seek out and capitalize on opportunities, ultimately leading to greater performance.

EO refers to the strategic orientation of a firm, encompassing entrepreneurial aspects of decision-making processes and methods. As it is heavily concerned with how decisions are made and strategies formed, the concept of EO can be traced back through the strategy-making literature. For example, Child (1972) argued, with his “strategic-choice” perspective, that prior ideologies of decision makers influence their choice of goals and objectives for their organizations, and ultimately, the strategic actions they take. Also relevant is Mintzberg’s (1973) entrepreneurial mode of strategy-making, which was one of three generic modes of strategy-making that he identified in the literature. His entrepreneurial mode described strategies as being “guided by the entrepreneur’s own vision of direction for his organization,” and the entrepreneur as a chief executive that “seeks out and thrives in conditions of uncertainty” (1973, p. 45, 46).
These articles, along with many others, suggested that strategic decision-making processes are very dynamic, being influenced by factors both internal and external to the firm. This, in combination with the fact that firms can differ in a variety of ways, led Miller (1983) to develop a broad measure of entrepreneurship. This measure, which came to be known as entrepreneurial orientation, was intended to demonstrate how entrepreneurial processes differed between different organizational configurations (Miller, 2011).

Since Miller’s (1983) seminal article, the concept of EO has become integral to the entrepreneurship literature, being the focus of a substantial collection of theoretical and empirical work (Covin, Green, & Slevin, 2006; Rauch, et al., 2009). In their 2009 assessment of past research, Rauch and colleagues identified over 100 studies conducted on EO, which “has led to wide acceptance of the conceptual meaning and relevance of the concept” (p. 762). The rate at which the EO literature has developed thus far, along with its continued prominence, reflects its centrality in both the strategic management and entrepreneurship fields (Anderson, Covin, & Slevin, 2009), as well as its applicability to business practitioners.

Entrepreneurship, being the content of entrepreneurial actions, has been differentiated within the literature from EO, which represents the process of those entrepreneurial actions (Miller, 2011). According to Lumpkin and Dess (1996), EO reflects more closely how a firm operates, rather than what it actually does. Rauch and colleagues (2009) argue that EO can be “viewed as the entrepreneurial strategy-making processes that key decision makers use to enact their firm’s organizational purpose, sustain its vision, and create competitive advantage” (p. 763). Because all organizations require decision-making processes, EO has been used broadly to investigate firm orientations toward entrepreneurial activity, irrespective of age, size, ownership type, etc. (Covin & Wales, 2011).

In regards to the VRIO framework for the assessment of firm resources, as previously discussed, EO is representative of the firm’s organization toward entrepreneurship (Wiklund & Shepherd, 2003). As was stated in section 1.1, in order for a sustained competitive advantage to be attained from a firm’s resources, in this case knowledge-
based resources applicable to the discovery and exploitation of opportunities, a firm must have an organizational design that allows for the full exploitation of those resources.

**Dimensions of entrepreneurial orientation**

In developing his measure of what is now referred to as EO, Miller (1983) reviewed previous literature for commonly cited dimensions of entrepreneurship. He argued that “an entrepreneurial firm is one that engages in product-market innovation, undertakes somewhat risky ventures, and is *first* to come up with “proactive” innovations, beating competitors to the punch,” whereas “a nonentrepreneurial firm is one that innovates very little, is highly risk averse, and imitates the moves of competitors instead of leading the way” (1983, p. 771).

Recognizing how these firms differ in their strategic actions, Miller (1983) ultimately identified the dimensions of innovativeness, risk-taking and proactiveness, as being the variables on which his measurement of entrepreneurship would be based. According to Rauch and colleagues (2009, p. 763):

- **Innovativeness** is the predisposition to engage in creativity and experimentation through the introduction of new products/services as well as technological leadership via R&D in new processes.
- **Risk taking** involves taking bold actions by venturing into the unknown, borrowing heavily, and/or committing significant resources to ventures in uncertain environments.
- **Proactiveness** is an opportunity-seeking, forward-looking perspective characterized by the introduction of new products and services ahead of the competition and acting in anticipation of future demand.

Building on these original components of EO, Lumpkin and Dess (1996) subsequently proposed the following dimensions, which they argued make unique and salient contributions to the entrepreneurial process (p. 148):

- **Competitive aggressiveness** is a firm’s propensity to directly and intensely challenge its competitors to achieve entry or improve position.
- **Autonomy** is the independent action of an individual or a team in bringing forth an idea or a vision and carrying it through to completion.
Lumpkin and Dess (2001) differentiate proactiveness from competitive aggressiveness, suggesting the former is a response to opportunities whereas the latter is a response to threats. They argue that, where “proactiveness refers to how firms relate to market opportunities by seizing initiative and leading in the market place; competitive aggressiveness refers to how firms react to competitive trends and demands that already exist in the marketplace” (2001, p. 434). Autonomy, they claim, is also a key dimension of EO because, in order for entrepreneurship to occur, individuals or teams within an organization must be given freedom to exercise their creativity and promote new ideas (Lumpkin & Dess, 1996).

EO research has since varied in how these five dimensions are utilized, however, the majority of investigations continue to focus on the original components of innovativeness, risk-taking and proactiveness (Miller, 2011). Over and above the literature’s ongoing discussion regarding which dimensions are most representative of EO, the conceptualization of the construct and its measurement has been the focus of much debate.

**Conceptualization of the entrepreneurial orientation construct**

Since Miller’s (1983) seminal article, a primary point of contention in the EO literature has been the dimensionality of the construct, that is, whether the component variables act independently or as parts of a whole when measuring EO. Miller’s (1983) measurement of entrepreneurship was based on his acknowledgement that the concept, as shown in the literature, was a multidimensional one, comprised of innovation, proactiveness and risk taking.

Following this recognition, however, Miller (1983) went on to argue that “in general, theorists would not call a firm entrepreneurial if it changed its technology or product-line (“innovated” according to our terminology) simply by directly imitating competitors while refusing to take any risks. Some proactiveness would be essential as well. By the same token, risk-taking firms that are highly levered financially are not necessarily considered entrepreneurial. They must also engage in product-market or technological innovation” (p. 780).

Based on this argument, Miller (1983) proposed an aggregate entrepreneurship variable, a single compound dimension representing an overall EO factor composed of
three subdimensions. As a result, if a firm failed to exhibit any of these elements within its strategy making process, that process could be considered “less than entrepreneurial.” Because he suspected that entrepreneurial processes would not manifest consistently across varying contexts, Miller (2011) chose his three dimensions with the intention of forming a “collective catchall – one that was broad enough to capture different sorts of processes in different contexts” (p. 2). This unidimensional conceptualization has been supported by the moderate-high intercorrelations often exhibited between the subdimensions of innovation, proactiveness and risk taking (Covin, et al., 2006).

As explained in the previous section, Lumpkin and Dess (1996) put forward the two dimensions of competitive aggressiveness and autonomy for inclusion in the EO construct. In addition to this contribution, their multidimensional conceptualization of the EO construct has been highly influential in the EO literature. The EO construct as conceived by Lumpkin and Dess (1996) is similar to that of Miller (1983) in that both recognize the centrality of each dimension in understanding the entrepreneurial process. Beyond this recognition, however, Lumpkin and Dess (1996) deviate in their treatment of the individual EO components.

Lumpkin and Dess (1996) argue that the dimensions of EO that make the greatest contributions to a firm’s entrepreneurial processes can vary independently from one another according to the specific context of interest. While all elements may simultaneously be present in the entrepreneurial processes of a firm, their concurrent existence is not a prerequisite for the firm to be deemed entrepreneurial. Rather, according to Lumpkin and Dess (1996), the extent to which each of these dimensions is useful for predicting the nature and success of a new undertaking may be contingent on external or internal factors (p. 137).

Thus, because Miller’s (1983) conceptualization necessitates the simultaneous coexistence of all three dimensions in order for a firm to be entrepreneurially orientated, the construct, as he originally proposed, was a formative one, meaning it was not intended to be decomposed into its constituent elements (Covin, et al., 2006). Lumpkin and Dess (1996), on the other hand, assert that a firm can be entrepreneurially oriented despite a lack of covariance between the dimensions, because depending on the context, any single component, or set thereof, can determine the existence of an EO. In their
explanation of how these views fundamentally differ, Covin and Wales suggest that the conceptualization of EO put forth by Lumpkin and Dess (1996) can be perceived as “more domain-focused – that is, it specifies where to look for EO – whereas the Miller (1983) conceptualization of EO is more phenomenon-focused – that is, it specifies what EO looks like” (2011, p. 5).

Although the EO literature presents conflicting views on how the construct is best conceptualized, consistent among researchers is their emphasis on context. Because entrepreneurial processes exhibit themselves differently depending on the circumstances, it’s the contextual realities of any given situation that may be most influential on those processes. As a result, there is no best practice for EO application that is equally effective across all contexts. Miller (2011) acknowledges that the disaggregation of the individual components can be valuable, particularly for gaining understanding of entrepreneurial behaviors. Furthermore, Miller (2011) contends that, in some research contexts, analyses may benefit from presenting results for both the unidimensional EO construct and for each of its chosen elements.

**Implications of entrepreneurial orientation**

At the very basis of the EO concept is the relationship between entrepreneurial processes and firm performance. Researchers generally agree that a firm’s adoption of an EO will, over time, contribute to that firm’s successful performance. Due to the shortening of product and business model life cycles common in today’s business environment, a firm that proactively pursues new opportunities, despite the inherent risk associated with such strategic actions, may have greater potential for realizing economic gains. While tried-and-true strategies may lead to high mean performance, research has suggested that risky strategies may prove more profitable over time (McGrath, 2001).

Although these conceptual arguments imply that EO leads to higher performance, variation in the magnitude of the relationship has occurred across studies (Rauch, et al., 2009). Because researchers have shown that the strength of this relationship can vary, or in some cases not exist, EO research has largely moved beyond investigations of the simple main-effects-only relationship. EO research has increasingly become grounded in contingency theory, in which the relationship between two variables is dependent on that of a third. By introducing moderating variables into simple bivariate relationships, we
can lessen the potential for misleading inferences and facilitate a more accurate understanding of the relationship.

Seeing that so much emphasis is placed on context in relation to EO, such methods are logical and in line with Lumpkin and Dess’s (1996) oft cited call for research to investigate how characteristics, both internal and external to the firm, influence the EO-performance relationship. Characteristics moderating this relationship that have been studied include, among others, environmental hostility (Covin & Slevin, 1989), access to financial capital (Wiklund & Shepherd, 2005), and industry life cycle (Lumpkin & Dess, 2001).

Finally, EO investigations have also varied in how firm performance is measured. Performance is commonly viewed as a multidimensional concept, and so the relationship between EO and performance may depend upon the indicators used to assess performance (Lumpkin & Dess, 1996). Performance has been evaluated with both financial and non-financial measures. Non-financial measures commonly include satisfaction, goal attainment and global success ratings, while financial measures can include factors such as sales growth, market share or return on investments (Rauch, et al., 2009). Financial performance can be assessed as archival when using secondary data sources, or as perceived when using self-reported data.

**HYPOTHESES**

*Hypothesis 1:* EO is positively related to firm performance.

*Hypothesis 2:* EO is positively related to a bundle of knowledge-based resources applicable to the discovery and exploitation of opportunities.

*Hypothesis 3:* A bundle of knowledge-based resources applicable to the discovery and exploitation of opportunities mediates the relationship between EO and firm performance.
LITERATURE CITED


Chapter 3

METHODOLOGY

This chapter introduces the methodology used in the research study. The research instrument through which self-reported data was collected for this study was an electronic questionnaire. Owners and/or executive level managers of firms operating in the transport packaging industry were surveyed about their perceptions of internal characteristics specific to their respective organization, such as knowledge availability, strategic decision-making processes and performance, as well their perceptions of environmental conditions in the industry. The questionnaire was first tested for validity and contextual suitability by having a panel of management scholars and industry representatives review the research instrument and subsequently provide feedback. Based on this feedback, modifications deemed necessary were made prior to the instrument’s final administration. This chapter includes descriptions of the measures used in the study. Data presented in this chapter are representative of the complete respondent sample including all useable responses.
Research Questions

The methodologies presented in this chapter were used to answer the following questions:

1. Does entrepreneurial orientation influence firm performance?
2. Is entrepreneurial orientation related to knowledge-based resources applicable to the discovery and exploitation of opportunities?
3. Do knowledge-based resources applicable to the discovery and exploitation of opportunities mediate the relationship between an entrepreneurial orientation and firm performance?

Instrumentation

The research instrument used to collect data for this study was a survey questionnaire administered electronically via the internet. This method of data collection is beneficial for many reasons. By utilizing a questionnaire-type survey, the sample population could be geographically expanded, if appropriate to do so, with relative ease. In addition to this, electronic questionnaires are generally cheaper and less time consuming than alternative methods. Finally, because of the absence of direct contact, such as that in verbally administered surveys, interviewer and respondent measurement errors are minimal (Glasow, 2005; Salant & Dillman, 1994).

Despite these benefits, a questionnaire-style survey method can present the potential for numerous types of error. Written surveys can be subject to the inadvertent or intentional skipping of items, impacting the error margins for particular variables (Glasow, 2005; Salant & Dillman, 1994). Also important are the non-response errors that can result from the generally low response rates typical of most mailed questionnaires. Working with the National Wooden Pallet and Container Association (NWPCA), we were able to widely distribute the survey while at the same time focusing on the industry population of interest. Endorsement from the president of the NWPCA likely helped increase response rates so that concerns of non-response bias were mitigated.

Our final concern related to the potential for method bias, which is common in self-administered surveys. In order to investigate perceptions held by executives within organizations, the data collected was self-reported by the individual respondents. While
self-reported data may offer greater flexibility in terms of measuring various organizational characteristics, “such measures may be subject to bias because of social desirability, memory decay, and/or common method variance” (Rauch, Wiklund, Lumpkin, & Frese, 2009, p. 765). However, previous research has suggested that subjective measures, such as those assessing firm performance, can accurately reflect objective measures, and so enhance validity (Dess & Robinson, 1984). Furthermore, self-perceived measures are the dominant method of measuring firm performance in EO research (Rauch, et al., 2009).

Validation of research instrument

To increase validity and ensure contextual suitability, a panel comprising both management scholars and industry experts was asked to review the survey and provide feedback. An important step in developing the research instrument was consultation of experts in order to assess various aspects of the study. Working with a statistician in the social sciences, we tested the intended survey instrument to ascertain the quality of the data it collected, and to ensure that the instrument was conducive to data processing and analysis (Glasow, 2005; Levy & Lemeshow, 1999).

To evaluate the contextual suitability of the survey, we consulted industry representatives who reviewed the research instrument. Feedback provided by these individuals was critical in assessing and refining the content validity of the questionnaire. Following review, a series of small pilot tests were run in which the electronic version of the survey was completed online by multiple people to ensure the website functioned properly. Finally, the research instrument was submitted to the Institutional Review Board (IRB #36859) to ensure compliance with all federal laws and university regulations.

Data collection

An email was sent in January of 2012 by the president of The National Wooden Pallet and Container Association (NWPCA) to known upper-level managers of approximately 1200 firms, including both NWPCA members and non-members. The list was comprised of organizations whose operations relate to the pallet industry, including several non-manufacturing firms. The email provided a brief description of the study, encouraged participation and included a link to the online questionnaire to be completed by a member
of the top management team. A follow-up email was sent by the NWPCA 10 days later as a reminder. Based on techniques found successful for mail surveys, we then sent personalized emails to approximately 280 NWPCA members in the following two weeks as a final request for their participation (Dillman, 1991). The online questionnaire consisted of 24 questions and required approximately fifteen minutes to complete. After three weeks, the online questionnaire was deactivated having received a total of 183 responses. After removing incomplete responses, the usable sample consisted of 174 cases, resulting in a response rate of about 14.5%. A timeline of events related to the data collection process is provided in Table 3.1.

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>December, 2011</td>
<td>Design and pretested survey instrument</td>
</tr>
<tr>
<td>January 6th, 2012</td>
<td>First email sent by president of NWPCA</td>
</tr>
<tr>
<td>January 6th, 2012</td>
<td>Began data collection</td>
</tr>
<tr>
<td>January 17th, 2012</td>
<td>Follow-up email sent by president of NWPCA</td>
</tr>
<tr>
<td>January 18th – 26th, 2012</td>
<td>Personalized emails sent by researcher</td>
</tr>
<tr>
<td>January 27th, 2012</td>
<td>Completed data collection</td>
</tr>
</tbody>
</table>

To address concerns related to non-response bias, we utilized common statistical tests to compare the answers of early versus late respondents. We evaluated the mean responses of survey measures for those managers who completed the survey prior to the stated deadline and those who completed the survey after the deadline had passed. The perceptions of late respondents are assumed to be more similar to those of non-respondents than those of early respondents (Kanuk & Berenson, 1975), and so significant correlations between item measures and the survey completion date would point to the existence of nonresponse bias (Combs & Ketchen, 1999). Using t-tests, we compared the mean responses of these two groups for multiple variables, including
number of employees, firm age, total revenue in 2011, total performance score, total knowledge score and total EO score. The results of these tests indicated that early respondents did not differ significantly from late respondents for any of the chosen variables ($p < .001$), thereby mitigating concerns of potential nonresponse bias.

**Measures**

Measures included in the study are outlined below. Validation for each measure as shown in previous research is provided. Each scale, including all items, can be found in the appendix, as can a hard copy of the entire survey.

The items employed in this study were adapted from previously established scales shown to be reliable measures in the entrepreneurship literature (Covin & Slevin, 1989; Wiklund & Shepherd, 2003). As already discussed, the use of self-reported data can increase the likelihood of bias results. The EO literature suggests, though, that potential problems of bias related to self-reported data are not of serious concern, as the magnitude of the EO-performance relationship has not been shown to differ significantly between the various methods commonly used methods for measuring performance (Rauch et al., 2009).

**Performance**

Measuring firm performance and its antecedents can be a challenge for researchers given the wide variety of firm operations, economic conditions, managerial goals, etc. For example, performance is commonly viewed as a multidimensional concept (Lumpkin & Dess, 1996), and so the relationship between performance and other variables may depend upon the indicators used to assess performance, including both financial and non-financial measures.

Previous research has suggested that subjective measures, such as those assessing firm performance, can accurately reflect objective measures, and so enhance validity (Dess & Robinson, 1984). Furthermore, self-perceived measures are the dominant method of measuring firm performance in EO research (Rauch, et al., 2009). FollowingWiklund and Shepherd (2003), respondents were asked to compare the performance of their own firm over the past three years to that of their most relevant competitors, for five different dimensions of performance: sales, number of employees, profitability,
product/service quality and customer satisfaction ($\alpha = 0.84$). Items were measured using five-point Likert scales ranging from “much weaker” to “much stronger.”

**Independent Variables**

We measured firm knowledge by asking respondents to rate the position of their own company, as compared to other companies in the industry, in terms of having specific types of knowledge. A modified scale adapted from Wiklund and Shepherd (2003) was used to measure 11 items related to market and technological knowledge: expertise regarding company management, staff with a positive commitment to the company’s development, expertise regarding development of products or services, staff educated in giving superior customer service, technical expertise in pallet design, staff who like to contribute with ideas for new products/services, working knowledge of information systems technology, staff capable of effectively marketing your products/services, technical expertise in manufacturing systems, proficiency in procuring and sourcing materials and expertise in marketing ($\alpha = 0.90$). These items were measured using five-point Likert scales ranging from “much weaker” to “much stronger.” A sixth option, “don’t know,” was also included with the knowledge items. The numerical value for this was independent of the five-point Likert scale. The amount data collected from the “don’t know” option was very limited and so largely excluded from our analyses.

To measure EO, Covin and Slevin’s (1989) version of the instrument was used. This scale consisted of nine semantic differential items measured on seven-point scales ($\alpha = 0.87$). The scale is intended to measure the three EO components, being innovativeness, risk taking and proactiveness.

The survey also included multiple items pertaining to characteristics of firm operations that could be used as controls. These included: sources of revenue, pallet products, waste utilization, firm size and age, total revenue and location. Data related to firm characteristics for all respondents can be found in Appendix A.


Chapter 4

“Linking Knowledge and Performance in the North American Pallet Industry”

Prepared for submission to the Forest Products Journal

ABSTRACT

The knowledge resources associated with a firm have been shown to influence both its performance and competitiveness. Understanding how specific types of knowledge resources relate to performance in a given industry can be valuable to business practitioners operating within that industry. This project utilized a survey of wood pallet and container manufacturers in North America to measure both the knowledge resources available to firms, as well as the value provided by those resources in terms of firm performance. The survey also identified the wood-based products and services most commonly offered by firms within the industry. Finally, the survey gathered information regarding what future challenges and opportunities industry firms perceive as being their greatest. The results suggest that firms having high levels of knowledge resources relating to markets, technology and management perform better than those lacking such resources. We also illustrate how pallet producers have become more diversified than in recent years.
INTRODUCTION

Firms competing in the same industry with one another will often face very similar environmental conditions. This, however, does not imply that each firm has available the same resources on which strategic decisions, in response to those conditions, can be made. Nor does the availability of similar resources imply that each firm is capable of responding in the same manner. This observation, that seemingly very similar firms can differ substantially in terms of performance, has led to an immense and growing body of research that seeks to better understand how firms interact with their environment, and to identify those factors most influential to firm-level outcomes.

A popular management theory is that firm-specific knowledge can act as a highly valuable source of competitive advantage (Wang, He, & Mahoney, 2009). More specifically, knowledge held within a firm that is related to markets and technology is believed to increase a firm’s ability to discover and exploit new opportunities (Wiklund & Shepherd, 2003). However, much of the past work in this area has been done on growing industries in which the effects of knowledge on firm-level outcomes may differ from those in a mature industry setting such as wood pallet manufacturing.

A primary objective of this exploratory research was therefore to identify those types of knowledge resources that may be related to firm performance in the North American pallet industry. In this context, understanding the value of different types of knowledge can be beneficial in strategic decisions involving the acquisition and allocation of resources. Past research with firms in various industries, such as film studios (Miller & Shamsie, 1996), law firms (Hitt, Bierman, Shimizu, & Kochhar, 2001) and textile manufacturers (Sciascia, Alberti, & Salvato, 2009) has shown knowledge resources to be positively related to firm performance. Thus, one of our goals was to investigate the potential existence of this relationship in a wood industry setting. Understanding how a firm’s knowledge resources influence its competitiveness within this type of industry can help facilitate managerial decisions related to, for example, the recruitment, retention and training of employees (Thornhill, 2006).
BACKGROUND

Value of knowledge resources

As previously mentioned, market and technology based knowledge has been shown to facilitate the innovation process (Wiklund & Shepherd, 2003; Burgers, Van Den Bosch, & Volberda, 2008). According to Burgers and colleagues, “technological knowledge refers to knowledge associated with products, technologies and/or processes,” whereas “market knowledge refers to knowledge associated with targeting customer sets, entering markets, distribution channels, marketing approaches and business models” (2008, p. 56).

Like market knowledge, technological knowledge can also be a valuable source of entrepreneurial discovery. Technological knowledge can allow a firm to quickly exploit an identified opportunity, or rapidly respond to competitors’ advancements (Cohen & Levinthal, 1990; Wiklund & Shepherd, 2003). For example, a pallet manufacturing company having expertise in information technology (IT) may utilize that knowledge to provide logistical services for its customers. A firm having technological expertise may discover new production processes, leading to gains in efficiency. This same knowledge could also allow for the creation of new products through the utilization of new materials, and, as a result, generate new sources of supply (Schumpeter, 1934; Shane, 2000). Knowledge of alternative materials such as steel, plastic and engineered wood could allow a pallet manufacturer to increase the variety of products it offers, making it less vulnerable to the markets of any single raw material.

North American pallet industry trends and developments

Although the pallet manufacturing industry may seem relatively stable, it has experienced important changes that are worth mentioning. Major trends of the past few decades include: a growing preference for block pallets among large retailers, new regulations for wood packaging material involved in international trade (e.g., ISPM 15), the growth of pallet reuse and recycling (Araman, Bush, & Hager, 2010), and the rise in power of large pallet pooling organizations (Trebilcock, 2010).

These trends have resulted in significant changes within the industry as it attempts to adapt to changes in customer preferences for unit load solutions, to new regulations, and to competing non-wood products (e.g., plastic and steel pallets). Considering these ongoing developments, knowledge of markets and technology may become increasingly...
valuable resources on which industry firms will depend. Such specialized knowledge can increase early awareness of new trends or changes in the industry, potentially resulting in a source of competitive advantage (Wiklund & Shepherd, 2003). In addition to this, the knowledge resources available to a firm may dictate the strategy it pursues in response to these market and technological changes (Burgers et al., 2008).

**RESEARCH METHOD**

Data were collected via electronic survey methods. An initial email was sent by the president of *The National Wooden Pallet and Container Association* (NWPCA) in January 2012 to known upper-level managers of approximately 1200 firms, including both NWPCA members and non-members with pallet-related operations. The email provided a brief description of the study and included a link to an online questionnaire to be completed by a member of the top management team. A follow-up email was sent by the NWPCA 10 days later as a reminder. Based on techniques found successful for mail surveys, we also sent personalized emails to approximately 280 NWPCA members in the following two weeks as a final request for their participation (Dillman, 1991). After three weeks the online questionnaire was deactivated having received a total of 183 responses.

**Measures used**

Measuring firm performance and its antecedents can be a challenge for researchers given the wide variety of firm operations, economic conditions, managerial goals, etc. For example, performance is commonly viewed as a multidimensional concept (Lumpkin & Dess, 1996), and so the relationship between performance and other variables may depend upon the indicators used to assess performance, including both financial and non-financial measures. This research therefore used performance and knowledge measures commonly validated in entrepreneurship and management research.

For the purposes of this study, performance was assessed using both financial and non-financial measures as described by Wiklund and Shepherd (2003). Respondents were asked to compare their firm’s performance over the past three years to that of their most relevant competitors for five different dimensions of performance: sales, number of employees, profitability, product/service quality and customer satisfaction ($\alpha = .80$). Five-point Likert scales ranging from “much weaker” to “much stronger” were used.
As discussed, results from previous studies have supported the existence of a relationship between a firm’s performance and the knowledge resources it has available (Wiklund & Shepherd, 2003). For this study, we used a modified version of Wiklund and Shepherd’s (2003) scale to assess firm knowledge by asking respondents to compare their firm’s knowledge position on 11 individual items relative to other companies within their industry (α = .91). The items, measured on a five-point Likert scale similar to that used for performance, addressed knowledge related to marketing, technology and company management. In addition to the individual item measures, each firm was also given a combined aggregate score representing their overall bundle of knowledge resources.

ANALYSIS AND RESULTS

Respondent profile

The identified population of interest for this study consisted of firms headquartered in North America whose primary source of revenue came from the production of new wood pallets or the recycling, repair and/or remanufacturing of wood pallets. After removing incomplete responses, those from firms headquartered outside of North America, or whose primary source of revenue came from non-pallet manufacturing activities such as wholesaling, leasing, logistics and primary wood processing, the usable sample consisted of 133 responses.

Even though this data were not meant to reflect the entire industry, we utilized common statistical tests to look for potential limitations due to nonresponse bias. We evaluated the mean responses of survey measures for those managers who completed the survey prior to the stated deadline and those who completed the survey after the deadline had passed. The perceptions of late respondents are assumed to be more similar to those of non-respondents than those of early respondents (Kanuk & Berenson, 1975), and so significant correlations between item measures and the survey completion date would point to the existence of nonresponse bias (Combs & Ketchen, 1999). Using t-tests, we compared the mean responses of these two groups for multiple variables, including number of employees, firm age, total revenue in 2011, total performance score and total knowledge score. The results of these tests indicated that early respondents did not differ
significantly than late respondents for any of the chosen variables \((p < .001)\), thereby mitigating concerns of potential nonresponse bias (Simsek & Heavey, 2011).

Of the respondent firms, 120 were headquartered in the United States, nine in Canada and four in Mexico. Of the 133 respondent firms, 65 percent identified their primary source of revenue as being from the production of new wood pallets, the remaining 35 percent being from the recycling, repair and/or remanufacturing of wood pallets (Figure 4.1). The mean age of respondent firms was 34 years. All but five respondent firms had less than 250 employees, with nearly 60 percent having fewer than 50 employees. Finally, the total revenue for about 45 percent of respondent firms in 2011 was less than $5 million; 43 percent had revenues between $5 million and $25 million while nine percent had revenues greater than $25 million. Five firms did not respond to the revenue item.

![Figure 4.1 Geographic regions of respondent headquarter locations](image)

*Figure 4.1* Geographic regions of respondent headquarter locations

*Map Source:* U.S. Census Bureau
Questions pertaining to business activities, product offerings and methods of wood waste utilization were included in the survey. These results suggest that the average pallet producer is diversified, pursuing a variety of revenue-producing activities. For example, in addition to their primary source of revenue, 66 percent of firms responded as being involved in at least two other business activities such as brokering/wholesaling, primary wood processing, third party logistics and pallet recovery/disposal (Table 4.1). Pallet remanufacturers were significantly more likely to be involved in third party logistical services than were new pallet producers ($p < .01$).

### Table 4.1 Summary of business activities involved in, by primary source of revenue

<table>
<thead>
<tr>
<th>Business Activity</th>
<th>New $n = 87$</th>
<th>RRR $n = 46$</th>
<th>Total $n = 133$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Producing new wood pallets</td>
<td>-</td>
<td>37</td>
<td>124</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>80.4%</td>
<td>93.2%</td>
</tr>
<tr>
<td>Recycling, repairing and/or remanufacturing wood pallets</td>
<td>50</td>
<td>-</td>
<td>96</td>
</tr>
<tr>
<td></td>
<td>57.5%</td>
<td>-</td>
<td>72.2%</td>
</tr>
<tr>
<td>Pallet recovery/disposal</td>
<td>46</td>
<td>38</td>
<td>84</td>
</tr>
<tr>
<td></td>
<td>52.9%</td>
<td>82.6%</td>
<td>63.2%</td>
</tr>
<tr>
<td>Brokering/Wholesaling</td>
<td>34</td>
<td>21</td>
<td>55</td>
</tr>
<tr>
<td></td>
<td>39.1%</td>
<td>45.7%</td>
<td>41.4%</td>
</tr>
<tr>
<td>Primary wood processing (sawmill)</td>
<td>16</td>
<td>6</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>18.4%</td>
<td>13.0%</td>
<td>16.5%</td>
</tr>
<tr>
<td>Other</td>
<td>16</td>
<td>5</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>18.4%</td>
<td>10.9%</td>
<td>15.8%</td>
</tr>
<tr>
<td>Third party logistics</td>
<td>8</td>
<td>12</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>9.2%</td>
<td>26.1%</td>
<td>15.0%</td>
</tr>
<tr>
<td>Pallet leasing/rental systems</td>
<td>2</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>2.3%</td>
<td>10.9%</td>
<td>5.3%</td>
</tr>
</tbody>
</table>

*Recovery, repair and/or remanufacturing

Note: Row and column totals will not sum to 100% due to calculation methods

Note: Percentages based on column value for $n$

Regarding the types of pallets respondent firms regularly sell, nearly all marked stringer, 62 percent marked block, 29 percent marked plywood, 24 percent marked panel deck, 12 percent marked non-wood (plastic, steel, etc.) and six percent marked wood composite/corrugated (Table 4.2). Nearly 40 percent of respondent firms regularly sell at least three different pallet types.
Table 4.2  Summary of pallet types regularly sold, by primary source of revenue

<table>
<thead>
<tr>
<th>Pallet Type</th>
<th>New ( n = 87 )</th>
<th>RRR (^a) ( n = 46 )</th>
<th>Total ( n = 133 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stringer</td>
<td>85 (97.7%)</td>
<td>46 (100%)</td>
<td>131 (98.5%)</td>
</tr>
<tr>
<td>Block</td>
<td>57 (65.5%)</td>
<td>26 (56.5%)</td>
<td>83 (62.4%)</td>
</tr>
<tr>
<td>Plywood</td>
<td>32 (36.8%)</td>
<td>7 (15.2%)</td>
<td>39 (29.3%)</td>
</tr>
<tr>
<td>Panel deck</td>
<td>28 (32.2%)</td>
<td>4 (8.7%)</td>
<td>32 (24.1%)</td>
</tr>
<tr>
<td>Non-wood (plastic, steel, etc.)</td>
<td>7 (8.0%)</td>
<td>9 (19.6%)</td>
<td>16 (12.0%)</td>
</tr>
<tr>
<td>Wood composite, corrugated</td>
<td>7 (8.0%)</td>
<td>1 (2.2%)</td>
<td>8 (6.0%)</td>
</tr>
<tr>
<td>Other</td>
<td>3 (3.4%)</td>
<td>0 (0.0%)</td>
<td>3 (2.3%)</td>
</tr>
</tbody>
</table>

\(^a\) Recovery, repair and/or remanufacturing

Note: Row and column totals will not sum to 100% due to calculation methods

Note: Percentages based on column value for \( n \)

Respondents were also asked how their firms manage wood waste (Table 4.3). Sales of animal bedding and landscaping mulch were the most commonly cited methods, with 44 percent and 35 percent, respectively. The high percentage of respondents selling wood waste as animal bedding is a potentially interesting development. Araman and colleagues (2010) found that, in 2006, “the smaller but potentially profitable animal bedding marking accounted for the equivalent of 4.4 percent of the ground/chipped pallets” (p. 209). Although our study does not measure this waste utilization method in the same manner, the dramatically different figures may point to a significant increase in material being sold as animal bedding products. Comparing new pallet producers to pallet remanufacturers, t-test results indicated that new producers were significantly more likely to sell wood waste as animal bedding \((p < .000)\).
# Table 4.3  Summary of waste management methods, by primary source of revenue

<table>
<thead>
<tr>
<th>Waste Method</th>
<th>New n = 87</th>
<th>RRR* n = 46</th>
<th>Total n = 133</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sell as animal bedding</td>
<td>51</td>
<td>8</td>
<td>59</td>
</tr>
<tr>
<td></td>
<td>58.6%</td>
<td>17.4%</td>
<td>44.4%</td>
</tr>
<tr>
<td>Sell as landscaping mulch</td>
<td>26</td>
<td>21</td>
<td>47</td>
</tr>
<tr>
<td></td>
<td>29.9%</td>
<td>45.7%</td>
<td>35.3%</td>
</tr>
<tr>
<td>Sell for production of fuel</td>
<td>34</td>
<td>10</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>39.1%</td>
<td>21.7%</td>
<td>33.1%</td>
</tr>
<tr>
<td>Give away</td>
<td>23</td>
<td>17</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>26.4%</td>
<td>37.0%</td>
<td>30.1%</td>
</tr>
<tr>
<td>Burn as fuel for company facilities</td>
<td>26</td>
<td>7</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>29.9%</td>
<td>15.2%</td>
<td>24.8%</td>
</tr>
<tr>
<td>Pay disposal fees</td>
<td>15</td>
<td>13</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>17.2%</td>
<td>28.3%</td>
<td>21.1%</td>
</tr>
<tr>
<td>Other</td>
<td>11</td>
<td>4</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>12.6%</td>
<td>8.7%</td>
<td>11.3%</td>
</tr>
<tr>
<td>Convert into pellets for fuel</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>2.3%</td>
<td>4.3%</td>
<td>3.0%</td>
</tr>
</tbody>
</table>

*Recovery, repair and/or remanufacturing

Note: Row and column totals will not sum to 100% due to calculation methods

Note: Percentages based on column value for n

We found that 33 percent of respondents sold wood waste for production of fuel, while one quarter burned wood waste as fuel for their company facilities. Four respondent firms converted their waste into wood pellets. Results from t-tests comparing new producers to remanufacturers showed that new producers were significantly more likely to sell wood waste for production of fuel (p < .05). Over half of the respondent firms cited having to give away or pay disposal fees to manage their waste. This was somewhat surprising given the increasing value of wood waste in recent years.
Knowledge and performance

To increase our understanding of the relationship between knowledge resources and firm performance, respondents were identified as either high performers or low performers. Firms whose mean performance score was greater than the mean performance score of the sample were categorized as high performers, whereas those whose mean scores were lower than the sample mean were categorized as low performers.¹

Descriptive statistics for each knowledge item and the combined knowledge score are given in Table 4.4, comparing the high and low performance groups. Analysis of variance procedures were carried out on each individual knowledge item, as well as the combined aggregate score, for both high and low performers to differentiate the knowledge resources of each group.

As can be seen, the high performers differ significantly from the low performers in terms of the overall bundle of knowledge resources they have available to them \( (p < .000) \). Furthermore, this difference remains significant for each of the 11 individual knowledge measures, albeit not all at the same level.

¹ Tests comparing the lowest 1/3 and highest 1/3 of performers showed statistically similar results and therefore are not included here.
Table 4.4  Descriptive statistics and ANOVA results between performance groups

<table>
<thead>
<tr>
<th>Knowledge Measure</th>
<th>Perf. Group</th>
<th>n</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expertise regarding company management</td>
<td>Low</td>
<td>68</td>
<td>3.72</td>
<td>.878</td>
<td>35.191</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>56</td>
<td>4.52</td>
<td>.539</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staff with a positive commitment to the company’s development</td>
<td>Low</td>
<td>67</td>
<td>3.76</td>
<td>.872</td>
<td>24.223</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>58</td>
<td>4.45</td>
<td>.654</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expertise regarding development of products or services</td>
<td>Low</td>
<td>69</td>
<td>3.59</td>
<td>.828</td>
<td>14.959</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>57</td>
<td>4.16</td>
<td>.797</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staff educated in giving superior customer service</td>
<td>Low</td>
<td>68</td>
<td>3.93</td>
<td>.852</td>
<td>11.842</td>
<td>.001</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>56</td>
<td>4.41</td>
<td>.682</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technical expertise in pallet design</td>
<td>Low</td>
<td>68</td>
<td>3.74</td>
<td>.924</td>
<td>8.050</td>
<td>.005</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>56</td>
<td>4.18</td>
<td>.789</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staff who like to contribute with ideas for new products/services</td>
<td>Low</td>
<td>67</td>
<td>3.51</td>
<td>.766</td>
<td>7.764</td>
<td>.006</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>57</td>
<td>3.91</td>
<td>.851</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Working knowledge of information systems technology</td>
<td>Low</td>
<td>65</td>
<td>3.18</td>
<td>.864</td>
<td>24.475</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>57</td>
<td>3.95</td>
<td>.833</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staff capable of effectively marketing your products/services</td>
<td>Low</td>
<td>68</td>
<td>3.25</td>
<td>.904</td>
<td>21.374</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>57</td>
<td>3.98</td>
<td>.855</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technical expertise in manufacturing systems</td>
<td>Low</td>
<td>67</td>
<td>3.51</td>
<td>.959</td>
<td>4.425</td>
<td>.037</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>58</td>
<td>3.84</td>
<td>.812</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proficiency in procuring and sourcing materials</td>
<td>Low</td>
<td>69</td>
<td>3.61</td>
<td>.861</td>
<td>6.357</td>
<td>.013</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>56</td>
<td>3.98</td>
<td>.774</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expertise in marketing</td>
<td>Low</td>
<td>67</td>
<td>3.16</td>
<td>.846</td>
<td>13.837</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>54</td>
<td>3.76</td>
<td>.910</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Knowledge Score&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Low</td>
<td>60</td>
<td>3.55</td>
<td>.59538</td>
<td>29.472</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>49</td>
<td>4.13</td>
<td>.51060</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup>Includes only those respondents who answered all 11 knowledge items.
Opportunities and challenges

The survey asked respondents to provide open-ended responses to answer “What is the greatest challenge your company faces in 2012?” They were also asked to provide their greatest opportunity for the upcoming year (2012). The responses to the challenge question reflect several of the major trends impacting the pallet industry, as well as one problem common for small businesses. While the following results are not provided as a reflection of the entire industry, they do provide context to increase our understanding of the issues as perceived by this sample.

Challenges: The most common problem respondents foresaw in 2012 related to their ability to obtain sufficient volumes of wood raw materials; for new pallet producers this was primarily lumber and for pallet recyclers it was sufficient volumes of used pallet cores. Given that wood raw materials (e.g., lumber or cants) are the largest cost component for most pallet producers (Mitchell et al., 2005), and that overall U.S. lumber production was down during the recession, it is not surprising that new pallet producers are concerned about access to lumber.

Access to sufficient core supply is necessary for the health of the recycling segment of the industry. Pallet recyclers have risen to play a key role in the industry, and serve to extend the useful life of wooden pallets and keep old pallets out of landfills (Bush et al., 1997). There are believed to be more than 3,000 U.S. companies involved in pallet repair and recycling, and they have developed an extensive and efficient system to obtain used pallet cores from retailers or other users. The cores are inspected, sorted, and repaired as needed before being put back into the market.

A lack of core availability has been blamed on consolidation in the industry (e.g., CHEP’s purchase of rival IFCO) and the rise of the large pallet pooling firms. Pallet poolers, such as CHEP and PECO, maintain “pools” of millions of pallets that are rented or leased to users. The poolers have access to very large numbers of pallet users, providing them access to both white wood and their own proprietary pallets. Another recent factor reducing the number of available cores has been the manner in which Wal-Mart and other retailers manage the excess white wood pallets at their distribution centers.
The challenges of competing against the large pallet poolers was a second key issue noted by respondents. CHEP, for example, is the world’s largest pallet company with approximately 80-90 million wood pallets and 50-60% of the market share for GMA pallets. Another major pooler impacting the industry is iGPS. iGPS started operations in 2006 and is believed to have built a pool of 10 million plastic GMA pallets by 2011. As the poolers increase market share even further there could be additional negative consequences for white wood producers and recyclers. One of these will likely be the increased difficulty of finding sufficient cores not controlled by the poolers or their supply chain partners.

Finally, respondents repeatedly mentioned the challenge of “bad” competitors who may not fully understand their cost structure. An old management saying is that “your most dangerous competitor is your dumbest competitor”, and this is true in the sense that competitors who don’t know their true cost of doing business will often charge lower-than-market prices. One respondent reflected this by describing their greatest challenge as being “competitors that are unaware of their bottom line”. The poorly run companies can disrupt a market even though they may only stay in business for a year or two; as long as there are new players coming in at the bottom of the market they will always be a headache for the rest of the industry.

**Opportunities:** Two themes were most often mentioned as opportunities for 2012: block pallets and selling wood by-products. Both types of opportunities are reflective of past work suggesting that wood producers, and especially smaller ones, can become more competitive by meeting the needs of customers and branching out into more nontraditional, customized products (e.g., Bumgardner et al., 2011).

Block pallets have recently become a major issue in the pallet industry as retailers like Costco have stated they will no longer accept stringer pallets. Such a policy would favor the large pallet poolers like CHEP which only have block pallets, and may put independent producers who can only make stringer pallets at a disadvantage. The lead trade association for the industry, the NWPCA, sees opportunities in block pallets and has placed a great deal of emphasis on investigating and promoting a new block pallet pool for its members. The challenge, however, has been that block pallets are produced

---

2 These figures represent CHEP’s totals prior to its purchase of IFCO
using different equipment than stringers and are also more expensive. Even with these challenges, many of our respondents clearly believe that a “white wood block pallet program” represents a big opportunity for them going forward.

The second big opportunity is related to “new markets for wood by-products,” including such products as mulch, pellets and bio-fuel. Biomass markets in general should be considered as a viable secondary revenue stream for pallet producers who may be “rich” in wood waste. The value of pallet-related wood waste from a variety of contexts has been noted over the past two decades (e.g., Falk, 1997, Stark 1999), and especially as a potential source of fuel (e.g., Aruna et al., 1997). The value of wood waste should continue to rise as long as there is a shortage of wood waste from primary wood processing operations and new regulations emerge which impact how wood waste can be disposed of (Buehlmann et al., 2009).

DISCUSSION

The primary objective of this research was to identify those types of knowledge resources that may be related to the performance of firms in the North American pallet industry. Secondary objectives were to examine the business activities currently engaged in by a sample of producers. We sought to determine if firms in the industry could benefit from the development or acquisition of specialized knowledge related to markets, technology and management. While the research design prevents us from concluding causality, we can suggest that, in our sample, firms which performed at higher levels than their competitors simultaneously had greater knowledge resources.

Results from this study offer further evidence to support previous research (Wiklund & Shepherd, 2003; Thornhill, 2006; Simsek & Heavey, 2011) highlighting the link between a firm’s knowledge resources and its performance. Although of a relatively simplistic research design, the results shown here provide support for the existence of such a relationship. Of course, we acknowledge that other factors are likely involved in this relationship. As was mentioned earlier, firm innovativeness has been shown in previous studies to positively influence performance (Thornhill, 2006). For the reasons mentioned above, it is likely that firm knowledge enhances opportunity identification abilities, thereby facilitating innovative processes and ultimately encouraging greater
performance. Studying this or other similarly complex relationships, however, was outside the realm of this research.

Due to the statistically significant difference between high and low performers on each individual knowledge item, we did not identify any single type of knowledge that can be deemed irrelevant or detrimental in its relationship to performance. Nonetheless, the results may justify further consideration of some particular items. For instance, measures of manufacturing systems and pallet design expertise, although still significant \((p < .05)\) and \((p < .01)\) respectively, were among those that differed least between high and low performers. This relatively low variance may indicate such firm knowledge is less than vital to firm performance, or that nearly all of these producers utilized NWPCA’s Pallet Design System (PDS) and hence it is not a differentiating factor.

Expertise regarding company management had the highest mean score among all knowledge items for the top half of performers \((\bar{x} = 4.52)\), while having only the fourth highest mean score among all knowledge items for the lower half of performers \((\bar{x} = 3.72)\). As a result, it was also among those knowledge items that differed most between the two groups \((p < .000)\). This may have important implications for many industry firms, suggesting managerial knowledge is one of the most valuable assets.

The mean scores of the item pertaining to expertise in marketing may reflect a similar situation within the industry. Although showing significant variance \((p < .000)\), the mean scores were the lowest among all knowledge items for both the high performance group \((\bar{x} = 3.76)\) and low performance group \((\bar{x} = 3.16)\). Again, firms may not feel the need to invest in this specialized knowledge, feeling comfortable pursuing a “business as usual” marketing strategy. Such a marketing strategy may seem sufficient if industry firms perceive their products as commodities, having few aspects on which they can differentiate their products from those of their competitors.

**Limitations**

Although utilization of an online questionnaire is advantageous in many aspects, the potential of methodological bias common in self-administered surveys could present limitations in the research findings. Our use of an online questionnaire, self-reported data and subjective measures all create potential for error. To minimize this potential, we
used measurement scales having been previously validated in the literature. We also followed generally accepted methods for data collection and analysis procedures.

While self-reported data may offer greater flexibility in terms of measuring various organizational characteristics, “such measures may be subject to bias because of social desirability, memory decay, and/or common method variance” (Rauch, et al., 2009, p. 765). However, previous research has suggested that subjective measures, such as those assessing firm performance, can accurately reflect objective measures, and so enhance validity (Dess & Robinson, 1984).

Our research design also prevents us from determining causality in the relationship between knowledge resources and performance. Although our findings are in agreement with previous studies, we acknowledge that untested factors are also likely related to firm performance. The limited size of the sample population also prevents us from generalizing to the entire industry; we would remind readers that the purpose of this project was not to characterize the state of the entire pallet industry. As the study was exploratory in nature, we hope our findings may encourage others to investigate the relationship between knowledge resources and performance in other sectors of the forest products industry.

Conclusions

The wood pallet manufacturing industry, like many forest products related industries in North America, has been affected by a host of environmental factors such as economic fluctuations, competition from new products and changing consumer preferences. Due to the uncertainty associated with these changing environmental conditions, firms will likely benefit from proactively pursuing new markets to serve or new methods to increase operational efficiencies. As already noted, such innovative efforts are not simply limited to the development of new products, but can also include adoption of new technologies, new marketing programs or new administrative systems.

Previous research has shown that knowledge resources associated with markets and technology positively relate to firm performance (Wiklund & Shepherd, 2003). Knowledge of this kind can support and enhance the innovative processes of a firm. Understanding the needs of both current and potential customers may facilitate the
identification of opportunities. By recognizing problems and developing appropriate solutions, firms can create competitive advantage and increase performance.

Results from this study suggest that firms having greater knowledge resources perform better than their competitors. Industry executives may opt to acquire specialized knowledge through recruitment activities, develop knowledge resources through training programs, or invest resources elsewhere depending on their strategic objectives (Thornhill, 2006). Alternatively, firms may choose to develop new methods for managing their current knowledge resources in an effort to utilize them more effectively. The results of this study, along with those of previous research, suggest that industry practitioners should take seriously the value associated with their firm’s knowledge resources.
LITERATURE CITED


ABSTRACT

As the scope of the entrepreneurial orientation (EO) research field continues to progress, there is a growing need for the examination of EO and its relationships within carefully defined contexts. Understanding how the performance implications of EO vary across highly specified contexts will help generate a more in-depth and cumulative body of knowledge. This study seeks to answer the call for greater context specificity by investigating the relationships between EO, knowledge resources and firm performance within a particular manufacturing industry. Results from previous studies examining characteristics of firm knowledge in the EO-performance relationship are inconsistent, suggesting that additional factors may need explored. Utilizing data collected from 136 manufacturing firms operating in the transport packaging industry, we investigate and find support for a model in which knowledge resources mediates the EO-performance relationship. In post hoc analyses, we apply a multidimensional view of the EO construct, finding each dimension to act independently of one another. Furthermore, we find support for the mediation model when testing the disaggregated EO construct. Results from this study suggest EO research may benefit from placing greater emphasis on investigating contextual roles in the EO-performance relationship, as well as from treating EO as a multidimensional concept in particular contexts.
INTRODUCTION

The concept of entrepreneurial orientation (EO), as we know it today, has received considerable attention since its inception nearly 30 years ago. EO refers to the strategic orientation of a firm, encompassing entrepreneurial aspects of decision-making processes and methods. The study of entrepreneurship, and of the EO concept in particular, has grown increasingly popular. Miller’s (1983) seminal article has spawned such an immense amount of both theoretical and empirical research that, within the entrepreneurship literature, EO is one of the few areas in which a cumulative body of knowledge is being developed (Rauch, Wiklund, Lumpkin, & Frese, 2009).

In his recent reflection of EO research, Miller (2011) commended the progress that has been made in advancing our understanding of EO and its role in the broader study of entrepreneurship. Since Lumpkin and Dess’s (1996) oft cited call for greater research investigating the role of contingency and configurational approaches, emphasis has increasingly been placed on examining the influence of various environmental conditions and firm characteristics on the EO-performance relationship (Lumpkin & Dess, 2001; Wiklund & Shepherd, 2003, 2005; Covin, Green, & Slevin, 2006; Wang, 2008). As a result, the relationship between EO and performance has been shown to be complex, dependent on a host of factors.

Despite the general acceptance of the multifaceted nature of EO, studies often fail to address issues regarding context specificity (Miller, 2011). Lacking findings from highly-defined contexts can hinder the development of a cumulative body of knowledge. In an effort to enhance theoretical understanding of the contextual role in EO research, our study utilizes a well-defined industry context to investigate relationships that have been shown to exist in heterogeneous populations. As noted by Miller, “there is a growing need to fragment complexity so we can get informative and relevant accounts of particular situations” (2011, p. 6).

As previously mentioned, EO research has largely moved beyond testing simple bivariate relationships. One area that has shown promise for future research is investigations into the role of knowledge-based resources (KBR) in the EO-performance relationship. Results from multiple studies suggest that knowledge, and the ability to create, acquire and/or utilize it, can significantly contribute to the performance of firms.
pursuing entrepreneurial initiatives (Shane, 2000; McEvily & Chakravarthy, 2002; Wiklund & Shepherd, 2003; Thornhill, 2006; Keh, Nguyen, & Ng, 2007; Wang, 2008; Li, Huang, & Tsai, 2009; Simsek & Heavey, 2011). While these studies generally agree that knowledge can positively influence the performance benefits of entrepreneurial activities, the suggested relationships between these firm attributes are inconsistent, as explained below.

Drawing on resource-based theories of strategy (RBV), Wiklund and Shepherd (2003) investigated how particular knowledge-based resources and EO affect firm performance. Results from Wiklund and Shepherd (2003) suggest that EO moderates, or enhances, the positive relationship that knowledge associated with markets and technology has with performance. Keh and colleagues (2007), however, found the utilization of marketing information to partially mediate, rather than moderate, the EO-performance relationship. Wang (2008) found the EO-performance relationship to be mediated by a firm’s learning orientation (LO), conceptualized as the values that influence a firm’s propensity to create and use knowledge (Sinkula, Baker, & Noordewier, 1997). Similarly, Li and colleagues (2009) studied the role of knowledge creation, also finding those processes to mediate the EO-performance relationship. Finally, Simsek and Heavey (2011) found knowledge-based capital to mediate the relationship between corporate entrepreneurship and performance. These studies are summarized in Table 5.1.
Table 5.1 Study descriptions

<table>
<thead>
<tr>
<th>Authors (Year)</th>
<th>Measures, Model</th>
<th>Country of Origin</th>
<th>Industry of Firms</th>
<th>Sample Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Keh, Nguyen, &amp; Ng (2007)</td>
<td>Information utilization partially mediates EO-performance relationship</td>
<td>Singapore</td>
<td>Multiple Industries</td>
<td>294</td>
</tr>
<tr>
<td>Li, Huang, &amp; Tsai (2009)</td>
<td>Knowledge creation partially mediates EO-performance relationship</td>
<td>Taiwan</td>
<td>Multiple Industries</td>
<td>165</td>
</tr>
<tr>
<td>Simsek &amp; Heavey (2011)</td>
<td>Human capital mediates CE-performance relationship</td>
<td>Republic of Ireland</td>
<td>Multiple Industries</td>
<td>125</td>
</tr>
</tbody>
</table>

Although these studies utilize different constructs, their collective results demonstrate the importance of considering firm attributes related to knowledge when investigating relationships involving entrepreneurial pursuits and performance. Our study builds on those of Keh and colleagues (2007), Wang (2008) and Simsek and Heavey (2011). Using measures similar to those of Wiklund and Shepherd (2003), we tested multiple models in an effort to further explain the relationship between certain knowledge resources, EO and firm performance. Rather than investigating the existence of these relationships within a heterogeneous population, however, we instead focus on the well-defined context of a particular manufacturing industry.

Evidence from recent entrepreneurship research, as discussed above, suggests firm knowledge not only enhances the performance benefits of entrepreneurial pursuits, but may actually be the mechanism through which those pursuits affect firm performance. Based on these relatively recent studies, we argue that, in the specified context of a transitioning industry, that a bundle of knowledge-based resources applicable to the discovery and exploitation of opportunities will mediate the relationship between EO and firm performance (Figure 5.1).
The objective of this study was to evaluate the EO-KBR-performance relationship, drawing on data collected from 136 small- to medium-sized manufacturing firms operating in the transport packaging industry. Building on the results of the above mentioned studies, we seek to contribute to the EO literature by investigating the role of knowledge-based resources in the EO-performance relationship within a well-defined context.

**CONTEXTUAL BACKGROUND**

The concept of product life cycle can be a useful tool for predicting the probable course of an industry’s evolution. In this sense, each stage of the cycle describes a stage of an industry’s evolution, most commonly; introduction, growth, maturity, and decline (Porter, 1980). The implications of evolutionary changes can be beneficial or harmful to both individual firms and entire industries. From a firm-level perspective, understanding and predicting changes in the industry is important due to the costs that typically accompany delayed reactions to new environmental conditions, and the advantages that can result from being the first in the industry to implement a new strategy (Porter, 1980). On a broader scale, the failure of an entire industry to perceive, and effectively react to, the fundamental changes it will inevitably experience can contribute to its decline and eventual obsolescence. The orientation, skills and resources of firms can influence the
evolutionary path of the industry in which they compete. If companies perceive their industry’s life cycle as being outside their control, the evolutionary forces can become an undesirable self-fulfilling prophesy (Porter, 1980). Consequently, it is critical for all firms to not only recognize the state of their particular industry, but also adopt strategies that take those environmental conditions into consideration.

Generally described as having a slow, and sometimes decreasing, rate of growth over time, mature industries have also been characterized as having decreasing profitability (Patton, 1959); decreasing employment (Walsh, 1991); little product differentiation (Porter, 1980); excess production capacity (Levitt, 1965); and mass market saturation (Porter, 1980). While not all of these descriptors correspond to the transport packaging industry, many can be considered to be representative.

**Choice of industry**

Choosing to study the transport packaging industry is beneficial for many reasons. In terms of theoretical value, the context specificity may be advantageous in generating empirically valid knowledge on which future EO research can be based (Miller, 2011). In addition to the inherent value of studying a single industry, the transport packaging industry may be of particular value due to its current life cycle status. Exploring event-based aspects of context, such as industry transformations, may be useful in understanding how certain environmental conditions influence EO (Miller, 2011).

In the case of the transport packaging industry, various statistics may imply that the industry is transitioning into a state of maturity. As all respondent firms in our sample are manufacturers of wood pallets and/or containers, economic data provided by the U.S. Department of Commerce can facilitate the assessment of this industry’s status. The North American Industry Classification System (NAICS) defines the “wood container and pallet manufacturing” industry (#321920) as comprising “establishments primarily engaged in manufacturing wood pallets, wood box shook, wood boxes, other wood containers, and wood parts for pallets and containers” (United States Census Bureau, 2007).

In the decade between 1997-2007, the number of companies operating in this industry decreased by nearly 8% (USCB, 2009). In terms of size, the number of small establishments (less than 20 employees) decreased by 8%, while the number of the
largest (more than 100 employees) increased nearly 30% (USCB, 2009). In addition to this, the share of total value shipped by the 50 largest establishments in the industry grew 33% (USCB, 2009). These numbers may imply a process of consolidation occurring in the industry.

In terms of gross output, which represents the market value of an industry’s production, the wood container and pallet manufacturing sector has grown about 1.7% annually from 2000-2010 (United States Bureau of Economic Analysis, 2011). Although this growth rate is positive and comparable to the combined average rate for all manufacturing industries in the U.S. over the same period of time, it is substantially lower than that of high-growth industries such as petroleum refining and petrochemical manufacturing, the growth rates of which over the same period of time were approximately 19% and 16%, respectively (USBEA, 2011).

The industry’s low growth rate, limited product differentiation and relatively low rate of innovation suggest that it may be transitioning into a state of maturity (Porter, 1980). In addition to this, recent trends may indicate the industry is also undergoing a process of transformation. The introduction of alternative products manufactured from non-wood materials and the application of advanced technology, such as global positioning systems (GPS) used for tracking goods in transit, have the potential to disrupt the markets the industry has traditionally served. Pallet pooling systems, which allow pallet users to rent rather than own the pallets on which their goods are transported, is a growing trend that necessitates manufacturers alter their business models to remain competitive. Finally, shifts in product design preferences among large retail consumers, such as Costco and Wal-Mart, may require firms to develop new manufacturing processes in order to maintain market share.

Studying this particular industry also has practical value. Although the wood pallet and container manufacturing sector is relatively small in the U.S., it serves an integral role in the vital wood products manufacturing industry. As hardwoods account for roughly two-thirds of all lumber consumed annually in the manufacturing of pallets, the industry sector has become the single most important consumer of hardwood lumber in North America (Buehlmann, Araman, & Bush, 2010). While the pallet manufacturing sector employed just over forty-five thousand people and had total shipments valued at
$6.2 billion dollars in 2010, the wood products manufacturing industry employed well over three-hundred thousand people with shipments valued at nearly seventy billion dollars the same year (USCB, 2011).

THEORETICAL FRAMEWORK AND HYPOTHESES

Entrepreneurial orientation and performance

Today’s business environment is often characterized as one of rapid change and shortened product and business model lifecycles. As a result, a firm cannot reasonably expect the profit streams of its current operations to continue unabated, and so, must constantly seek out new opportunities (Rauch, et al., 2009). A strategic orientation toward entrepreneurship may enable a firm to effectively seek out and capitalize on opportunities, ultimately leading to greater performance.

As previously mentioned, EO refers to the strategic orientation of a firm, encompassing entrepreneurial aspects of decision-making processes and methods. Entrepreneurship, being the content of entrepreneurial actions, has been differentiated within the literature from EO, which represents the process of those entrepreneurial actions (Miller, 2011). According to Lumpkin and Dess (1996), EO reflects more closely how a firm operates, rather than what it actually does. Rauch and colleagues (2009) state that EO can be “viewed as the entrepreneurial strategy-making processes that key decision makers use to enact their firm’s organizational purpose, sustain its vision, and create competitive advantage” (p. 763). Because all organizations require decision-making processes, EO has been used broadly to investigate firm orientations toward entrepreneurial activity, irrespective of age, size, ownership type, etc (Covin & Wales, 2011).

Following Miller’s (1983) original conceptualization, our study utilized those dimensions of which an EO is thought to encompass: innovativeness, proactiveness and risk-taking. According to Rauch and colleagues (2009, p. 763):

*Innovativeness* is the predisposition to engage in creativity and experimentation through the introduction of new products/services as well as technological leadership via R&D in new processes.
Risk taking involves taking bold actions by venturing into the unknown, borrowing heavily, and/or committing significant resources to ventures in uncertain environments.

Proactiveness is an opportunity-seeking, forward-looking perspective characterized by the introduction of new products and services ahead of the competition and acting in anticipation of future demand.

Innovation is not necessarily limited to the development of new, or modification of existing, products, services and manufacturing processes. Innovative solutions can also be applied to administrative systems (Bantel & Jackson, 1989), such that new organizational structures, policies or programs can be developed to improve decision making processes (López-Nicolás & Meroño-Cerdán, 2011). Because innovation can be pursued in all business functions, its potential value is not limited to specific industries or certain types of firms. Although innovation is more common in highly dynamic, high-technology industries, the innovativeness of a firm has been shown to be positively associated with revenue growth irrespective of the industry in which that firm operates (Thornhill, 2006). In a transitioning industry, innovative capacity may be particularly important as it affects a firm’s ability to effectively pursue new opportunities that result from changing market demands. Manufacturing sectors inherently face high levels of environmental dynamism, and so, high levels of uncertainty (Yusuf, 2002). According to Garg, Walters and Priem (2003), “firms that confront uncertainty where is exists, via innovation, typically outperform those that ignore its presence” (p. 728).

Like innovation, the value associated with a willingness to assume risk is not restricted to certain environments. Due to the ambiguity associated with industry transformations, firms competing in a changing industry cannot accurately predict the future success of potential strategic actions. In this environment, a willingness to commit resources to projects having uncertain returns is often necessary to gain, or even maintain, competitive advantage. An apprehension to risk is characteristic of organizations that Miles and Snow (1978) described as being reactors. Managers of these organizations, despite perceiving change in their environments, are reluctant to adjust their strategies until forced to do so, ultimately leading to poor performance (Miles & Snow, 1978). Of course the pursuit of risky ventures can also prove detrimental. Only
carefully managed risk, through adequate research and planning, will most often lead to competitive advantages (Dess & Lumpkin, 2005).

The extent to which a firm anticipates future market needs, seeks out new opportunities and takes initiative in pursuing those opportunities is a measure of its proactiveness (Lumpkin & Dess, 1996). A proactive firm may seek out opportunities unrelated to their current operations, be willing to eliminate operations having diminishing prospects due to their reaching a state of maturity and lead the marketplace in new product or service offerings (Venkatraman, 1989). Maintaining focus on new opportunities that may result from changing environmental conditions can increase a firm’s potential of realizing economic gains.

Although the implications of EO on performance have been shown to differ in various contexts, the majority of EO research has concluded that businesses are likely to benefit from pursuing an EO (Rauch et al., 2009). In terms of the transport packaging industry, the potentially huge impact of recent market trends could necessitate firms fundamentally changing the ways in which they operate. Rather than producing commodity type products sold through traditional distribution channels, firms may need to adopt new business models that emphasize a combination of customized products with customized services in order to meet the needs of a changing market. Firms that proactively pursue new opportunities, despite the inherent risk associated with such strategic actions, may have greater potential for realizing economic gains. Due to the uncertainty associated with an industry in transition, adopting such a strategy may be of particular value. Thus:

*Hypothesis 1: EO is positively related to firm performance.*

**Knowledge-based resources and EO**

In the resource-based view (RBV), firms within an industry may be heterogeneous in terms of the strategic resources they control. In addition to this, RBV also assumes that not all resources are perfectly mobile across firms, allowing for the potential of long lasting heterogeneity (Barney, 1991). Barney (1991), based on Daft (1983), defined firm resources as including “all assets, capabilities, firm attributes, information, knowledge,
etc. controlled by a firm that enable the firm to conceive of and implement strategies that improve its efficiency and effectiveness” (p. 101).

This heterogeneity can permit some firms to gain competitive advantage through proper leveraging of their specific collection of attributes and, ultimately, earn returns greater than their competitors (Grant, 1996). Wernerfelt’s oft-cited affirmation that “resources and products are two sides of the same coin” (1984, p. 171) sought to provide explanation of the relationship between resources and performance. Newbert (2007) elaborated on this with his explaining that “while a firm’s performance is driven directly by its products, it is indirectly (and ultimately) driven by the resources that go into their production” (p. 122).

Some scholars have focused on resources related to human capital, such as experience, judgment, and insights of individual managers and employees, as being the most strategically important of the firm’s resources (Grant, 1996). This narrower scope of attention has resulted in a research stream extended from that of RBV, focused specifically on knowledge-based resources (KBR).

A firm’s knowledge can be either acquired from external sources or created internally. Knowledge acquisition often comes in the form of prior knowledge possessed by members of an organization. The unique characteristics of an individual’s information stock are the product of that individual’s idiosyncratic life experiences (Shane, 2000). As a result, the unique repository of knowledge an individual develops through work experience, education or other means, will ultimately have a distinct influence on that individual’s ability to extrapolate, interpret and make use of new information (Roberts, 1991; Shane, 2000). Just as with an individual, a firm will have unique abilities to perceive, comprehend and apply new information. From this perspective, a firm’s knowledge-based resources include not only what it has learned as a result of its own circumstances, but also the collective body of knowledge gained through the combined experiences of its members.

Numerous studies have highlighted the relationship between entrepreneurial pursuits and firm attributes related to knowledge. As entrepreneurial firms tend to place greater emphasis on environmental scanning processes (Miles & Snow, 1978), EO has been shown to be positively related to information acquisition (Keh et al., 2007). Similarly,
EO has also been shown to positively impact a firm’s propensity to create and use knowledge (Wang, 2008). Utilizing the corporate entrepreneurship (CE) construct, Simsek and Heavey (2011) found a firm’s pursuit of CE to be positively associated with its level of subsequent knowledge-based capital.

The results of these studies suggest that a predisposition to innovate, a willingness to take risk and a propensity to actively seize opportunities will, in turn, stimulate knowledge development processes. Put more simply, the very nature of EO, through environmental scanning, experimentation and tolerance to risk, encourages the creation and acquisition of knowledge-based resources (Wang, 2008). Thus:

*Hypothesis 2: EO is positively related to market- and technology based knowledge resources*

**Entrepreneurial orientation, knowledge-based resources and firm performance**

Following Wiklund and Shepherd (2003), we focused on those knowledge resources that are particularly well suited to the discovery and exploitation of opportunities. For a firm seeking entrepreneurial opportunities, the acquisition of knowledge pertaining to markets can be a vital source for these discoveries. Such knowledge can enhance the firm’s sensitivity for detecting market disequilibrium, increasing the likelihood of entrepreneurial opportunity identification (Bojica, Fuentes, & Gomez, 2011). According to Wiklund and Shepherd (2003), a firm having market knowledge will be particularly adept at the discovery and exploitation of opportunities because: “awareness of customer problems may have great generality and thus constitute real market opportunities; it is easier to determine the market value of new scientific discoveries, technological change, etc; and the locus of innovation often lies with users of new technologies who cannot easily articulate their needs for not-yet-developed solutions to problems, and therefore the organization must share some of the same tacit knowledge as its users” (p. 1308).

Like market knowledge, technological knowledge can also be a valuable source of entrepreneurial discovery. Technological knowledge can allow a firm to quickly exploit an identified opportunity, or rapidly respond to competitors’ advancements (Cohen & Levinthal, 1990; Wiklund & Shepherd, 2003). A firm having technological expertise
may discover new production processes, leading to gains in efficiency. This same knowledge could also allow for the creation of new products through the utilization of new materials, and, as a result generate new sources of supply (Schumpeter, 1934; Shane, 2000).

Regularly, technological knowledge is a complimentary resource to market knowledge. As noted above, Wiklund and Shepherd (2003) describe the dependent relationship common between new technologies and the availability of markets required for their adoption. This dependence between markets and technology is often mutual. Discovery of entrepreneurial opportunities frequently necessitates more than simply detecting market disequilibrium. Without the technological knowledge required to design and produce the appropriate solution to a market’s need, the identification of that market need is of little economic value.

Drawing on resource-based theory, Wiklund and Shepherd (2003) argued that a firm’s EO embodies its organization toward entrepreneurship, and so, can enhance the value of its knowledge-based resources. This argument is in line with Eisenhardt and Martin’s (2000) observation that strategic decision making is an organizational process through which resources may be manipulated to create new value. In other words, a firm’s entrepreneurial processes strengthen its ability to leverage its resources. Thus, it seems logical that results from Wiklund and Shepherd’s (2003) study would suggest that a firm’s organization toward entrepreneurship, as captured by its EO, moderates the relationship between its knowledge-based resources and its performance.

Following Wiklund and Shepherd (2003), we ascribe to the view that EO captures a firm’s organization toward entrepreneurship and can enhance the value of firm resources. However, we argue that specific firm resources, in this case knowledge of markets and technology, may be necessary to support an EO, depending on the environmental context in which it is applied. In an industry having high levels of uncertainty, the future status of markets, customer demands, technology utilization and successful business models could take countless forms. Entrepreneurial firms operating in such uncertain environments may recognize that, in order to realize economic gains from their entrepreneurial processes, they will need to increasingly rely on those knowledge resources most conducive to successfully pursuing their strategy. “Whether the
knowledge is internally generated or externally acquired, what an organization knows determines what it can do” (Thornhill, 2006, p. 691). Therefore:

_Hypothesis 3: A bundle of knowledge-based resources applicable to the discovery and exploitation of opportunities mediates the relationship between EO and firm performance; knowledge-based resources is the mechanism through which EO positively contributes to firm performance._

**RESEARCH METHODOLOGY**

**Sample**

A survey was used to collect data from manufacturing firms operating in the transport packaging industry. To develop our survey, a panel comprising both management scholars and industry experts was asked to review the survey and provide feedback. After finalizing the instrument, an email was sent by the president of _The National Wooden Pallet and Container Association_ (NWPCA) in January 2012 to known upper-level managers of approximately 1200 firms, including both NWPCA members and non-members. The list was comprised of organizations whose operations relate to the pallet industry, including several non-manufacturing firms. The email provided a brief description of the study, encouraged participation and included a link to the online questionnaire to be completed by a member of the top management team. A follow-up email was sent by the NWPCA 10 days later as a reminder. Based on techniques found successful for mail surveys, we then sent personalized emails to approximately 280 NWPCA members in the following two weeks as a final request for their participation (Dillman, 1991). The online questionnaire consisted of 24 questions and required approximately fifteen minutes to complete. After three weeks, the online questionnaire was deactivated having received a total of 183 responses. After removing incomplete responses and those from non-manufacturing firms, the usable sample consisted of 136 responses.

Of the respondent firms, 118 were headquartered in the United States, eight in Canada, four in Mexico and six outside North America. Results from a recent meta-analysis of past EO research suggest the cultural effects of EO on performance do not
differ significantly across countries, and so were not controlled for here (Rauch et al., 2009). The mean age of respondent firms was 36 years. On average, firms in our sample had 64 full-time production employees. All but four respondent firms had less than 250 full-time production employees, with nearly 80 percent having fewer than 100. Finally, the total revenue for about 42 percent of respondent firms in 2011 was less than $5 million, approximately 45 percent had revenues between $5 and $25 million while the remaining 13 percent had revenues greater than $25 million.

To address concerns related to non-response bias, we utilized common statistical tests to compare the answers of early versus late respondents. We evaluated the mean responses of survey measures for those managers who completed the survey prior to the stated deadline and those who completed the survey after the deadline had passed. The perceptions of late respondents are assumed to be more similar to those of non-respondents than those of early respondents (Kanuk & Berenson, 1975), and so significant correlations between item measures and the survey completion date would point to the existence of nonresponse bias (Combs & Ketchen, 1999). Using t-tests, we compared the mean responses of these two groups for multiple variables, including number of full-time production employees, firm age, total performance score, total knowledge score and total EO score. The results of these tests indicated that early respondents did not differ significantly than late respondents for any of the chosen variables ($p < .001$), thereby mitigating concerns of potential nonresponse bias.

**Variables and measurement**

The items employed in this study were adapted from previously established scales shown to be reliable measures in the entrepreneurship literature (Covin & Slevin, 1989; Wiklund & Shepherd, 2003). While self-reported data may offer greater flexibility in terms of measuring various organizational characteristics, “such measures may be subject to bias because of social desirability, memory decay, and/or common method variance” (Rauch et al., 2009, p. 765). However, the EO literature suggests that potential problems of bias related to these issues are not of serious concern, as the magnitude of the EO-performance relationship has not been shown to differ significantly between the various commonly used methods for measuring performance (Rauch et al., 2009).
Measuring firm performance and its antecedents can be a challenge for researchers given the wide variety of firm operations, economic conditions, managerial goals, etc. For example, performance is commonly viewed as a multidimensional concept (Lumpkin & Dess, 1996), and so the relationship between performance and other variables may depend upon the indicators used to assess performance, including both financial and non-financial measures.

Previous research has suggested that subjective measures, such as those assessing firm performance, can accurately reflect objective measures, and so enhance validity (Dess & Robinson, 1984). Furthermore, self-perceived measures are the dominant method of measuring firm performance in EO research (Rauch, et al., 2009). Following Wiklund and Shepherd (2003), respondents were asked to compare the performance of their own firm over the past three years to that of their most relevant competitors, for four different dimensions of performance: sales, profitability, product/service quality and customer satisfaction ($\alpha = 0.78$). Items were measured using five-point Likert scales ranging from “much weaker” to “much stronger.”

We measured firm knowledge by asking respondents to rate the position of their own company, as compared to other companies in the industry, in terms of having specific types of knowledge. A modified scale adapted from Wiklund and Shepherd (2003) was used to measure 11 items related to market and technological knowledge: expertise regarding company management, staff with a positive commitment to the company’s development, expertise regarding development of products or services, staff educated in giving superior customer service, technical expertise in pallet design, staff who like to contribute with ideas for new products/services, working knowledge of information systems technology, staff capable of effectively marketing your products/services, technical expertise in manufacturing systems, proficiency in procuring and sourcing materials and expertise in marketing ($\alpha = 0.89$). These items were measured using five-point Likert scales ranging from “much weaker” to “much stronger.”

To measure EO, Covin and Slevin’s (1989) version of the instrument was used, consisting of nine items measured on seven-point scales ($\alpha = 0.87$). Because our sample was limited to the well-defined context of a specific industry, control variables focused on firm characteristics. All respondent firms in our sample were manufacturers, and so
we controlled for firm size by measuring the number of full-time production employees at each firm. We also controlled for firm age (the number of years since a firm’s founding). Both firm size and firm age were log transformed because their distributions departed from normality.

**ANALYSIS AND RESULTS**

Table 5.2 presents means, standard deviations and correlations for all measures. Potential problems associated with multicollinearity are not likely to affect our data, as all interfactor correlations are below the recommended level of .70 (Tabachnick & Fidell, 1996). Hierarchical regression analysis was used to test the hypothesized relationships. For each model, the control variables were entered into the regression equation first, followed by the independent variable and mediator (Simsek & Heavey, 2011). Following Baron and Kenny (1986), we estimated three regression equations to test the linkages of the mediational model. Each regression model estimated in this process tests one of our hypotheses. Results are presented in Table 5.3.

<table>
<thead>
<tr>
<th>Table 5.2 Means, standard deviations and correlations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variables</td>
</tr>
<tr>
<td>1. Firm Performance</td>
</tr>
<tr>
<td>2. EO</td>
</tr>
<tr>
<td>3. Knowledge</td>
</tr>
<tr>
<td>4. Firm Age (log)</td>
</tr>
<tr>
<td>5. Firm Size (log)</td>
</tr>
</tbody>
</table>

\( N = 136; ***p < 0.001; **p < 0.01; *p < 0.05; 'p < 0.10 \)
Table 5.3 Direct and mediational models for EO, knowledge and performance

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1: Firm Performance</th>
<th>Model 2: Knowledge</th>
<th>Model 3: Firm Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>β</td>
<td>ΔR²</td>
<td>β</td>
</tr>
<tr>
<td>Control Variables</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Firm Age (log)</td>
<td>0.00</td>
<td>0.04</td>
<td>0.05</td>
</tr>
<tr>
<td>Firm Size (log)</td>
<td>0.19*</td>
<td>0.08**</td>
<td>0.18*</td>
</tr>
<tr>
<td>Independent Variable</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EO</td>
<td>0.28**</td>
<td>0.23***</td>
<td>0.49***</td>
</tr>
<tr>
<td>Mediating Variable</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R²</td>
<td>0.11</td>
<td>0.26</td>
<td>0.26</td>
</tr>
<tr>
<td>Adjusted R²</td>
<td>0.09</td>
<td>0.25</td>
<td>0.25</td>
</tr>
<tr>
<td>F</td>
<td>5.60**</td>
<td>15.75***</td>
<td>12.75***</td>
</tr>
</tbody>
</table>

N = 136; ***p < 0.001; **p < 0.01; *p < 0.05; †p < 0.10

In Model 1, the dependent variable is regressed on the independent variable. The first step of the model consists only of control variables. Adding the independent variable in the second step makes a significant contribution over and above the base model (ΔR² = 0.08, p < 0.01). The positive and significant relationship between EO and firm performance support Hypothesis 1. The mediator is regressed on the independent variable in Model 2. As with the previous model, the first step includes only the control variables. The base model here explains an insignificant portion of the variance in firm knowledge. The addition of EO into the equation significantly increases the explained variance (ΔR² = 0.23, p < 0.001), supporting our second hypothesis that EO is positively associated with firm knowledge.

Addressing our final hypothesis, the following conditions must hold to establish mediation (Baron & Kenny, 1986): First, the independent variable must be significantly related to the dependent variable (Model 1); second, the independent variable must be significantly related to the mediator (Model 2); third, controlling for the effects of the independent variable, the mediator must significantly relate to the dependent variable (Model 3). Upon satisfying these conditions, the final step in establishing mediation requires the effect of the independent variable on the dependent variable be less when controlling for the mediator (Model 3) than when not (Model 1). When all conditions are
met, perfect mediation is established if the independent variable is nonsignificant in the final equation (Baron & Kenny, 1986).

As already discussed, Model 1 shows EO to be positively related to firm performance ($\beta = 0.28, p < .01$), satisfying the first condition. EO is significantly related to knowledge in Model 2 ($\beta = 0.49, p < .001$), meeting the second condition. The third condition, which requires knowledge to be significantly related to firm performance when controlling for EO, is also supported ($\beta = 0.48, p < .001$). Finally, the effect of EO on performance becomes nonsignificant when knowledge is controlled for. Thus, Hypothesis 3 is supported; knowledge-based resources mediate the relationship between EO and firm performance.

**Post hoc analyses**

Having collected data from a well-defined industry, we are presented with a unique opportunity to examine how the individual EO dimensions affect performance in a particular context. “Even within a carefully defined context, the differences between the components are important for understanding entrepreneurial behavior” (Miller, 2011, p. 8). Disaggregating the EO construct may also provide additional insight into how the different dimensions relate to knowledge-based resources.

Again, we used hierarchical regression analysis to examine the relationships. Results are shown in Table 5.4. As with our previous models, control variables were entered into the regression equations first, followed by the independent variables and mediator. Model 1 shows the main effects of each EO dimension on performance. Of the three dimensions, only proactiveness is positively and significantly related to performance ($\beta = 0.30, p < .01$). In Model 2, both innovativeness and proactiveness are positively and significantly related to knowledge, ($\beta = 0.25, p < .05$) and ($\beta = 0.37, p < .001$), respectively.
Table 5.4  Direct and mediational models for EO dimensions, knowledge and performance

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1: Firm Performance</th>
<th>Model 2: Knowledge</th>
<th>Model 3: Firm Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>β</td>
<td>ΔR²</td>
<td>β</td>
</tr>
<tr>
<td>Control Variables</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Firm Age (log)</td>
<td>0.00</td>
<td></td>
<td>0.05</td>
</tr>
<tr>
<td>Firm Size (log)</td>
<td>0.19*</td>
<td></td>
<td>0.18*</td>
</tr>
<tr>
<td>Independent Variable</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Innovativeness</td>
<td>0.03</td>
<td></td>
<td>0.25*</td>
</tr>
<tr>
<td>Risk Taking</td>
<td>0.02</td>
<td></td>
<td>-0.02</td>
</tr>
<tr>
<td>Proactiveness</td>
<td>0.30**</td>
<td></td>
<td>0.37***</td>
</tr>
<tr>
<td>Mediating Variable</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

R²                   | 0.14  |     | 0.30  |     | 0.29  |     |
Adjusted R²           | 0.11  |     | 0.27  |     | 0.26  |     |
F                    | 4.27**|     | 11.16***|   | 8.89***|   |

N = 136; ***p < 0.001; **p < 0.01; *p < 0.05; †p < 0.10

Finally, Model 3 represents the mediation model. As shown, knowledge is again positively and significantly related to performance (β = 0.47, p < .001). Furthermore, proactiveness is no longer significantly related to performance when controlling for knowledge. Once again, all conditions necessary for establishing mediation, as outlined by Barron and Kenny (1986), are satisfied. Results from these post hoc analyses suggest two important findings: first, in this industry context, only the proactiveness dimension of the EO construct significantly contributes to explaining variance in firm performance; and second, knowledge-based resources effectively mediates the relationship between proactiveness and firm performance.

DISCUSSION

The primary objective of this research was to investigate the relationships between EO, knowledge resources and firm performance in the specified context of a transitioning industry. As such, our first contribution to the EO literature is our application of the EO construct to a highly specified context. Although this well-defined context may limit the generality of our findings, the refined results contribute to an in-depth understanding of
the nature of EO. Results from our study suggest that EO has positive performance implications for manufacturing firms operating in a transitioning industry. Findings from previous studies support this notion, having shown EO to be positively associated with performance in manufacturing sectors having high levels of environmental uncertainty (Yusuf, 2002). The positive association we found between EO and knowledge is not surprising. Noting that “firm performance flows from the well-managed deployment of innovation,” Thornhill found knowledge assets and innovation to interact in their association with performance (2006, p. 693). Having prior knowledge of markets and technology can also influence an individual’s ability to discover entrepreneurial opportunities (Shane, 2000).

Our second contribution relates to our examination of how a firm’s market- and technology-based knowledge resources affect the relationship between its EO and performance. Our findings that suggest knowledge resources mediate the relationship between EO and performance are in line with those of other studies (Keh, Nguyen, & Ng, 2007; Wang, 2008; Li, Huang, & Tsai, 2009; Simsek & Heavey, 2011). This model, however, is somewhat contradictory to that of Wiklund and Shepherd (2003), who found EO to moderate the relationship between knowledge and performance. Drawing on resource-based theory, they argued that EO represents a firm’s organization toward entrepreneurship, and so, can enhance the positive relationship between a firm’s resources and its performance (2003). We also ascribe to this view, but believe the relationship between EO, market- and technology-based knowledge resources and firm performance is likely sensitive to the environmental conditions of different industry contexts.

According to Wiklund and Shepherd (2003), a firm’s knowledge can facilitate the process of opportunity identification and its EO can subsequently facilitate the pursuit of identified opportunities. In the context of a transitioning industry with a high level of environmental uncertainty, a tolerance of risk and a tendency to act in anticipation of future needs may not necessarily be enough to create competitive advantage. Absent the appropriate knowledge resources, such behavior may lead to strategic actions having little chance for success. As a result, entrepreneurial firms in this type of environment may exercise greater caution in pursuing risky ventures. These firms might rely heavily on
their knowledge resources, not for identifying opportunities, but instead for determining which opportunities are most appropriate for them to pursue. In this context, it is knowledge that may enable a firm to create value from its EO, rather than EO enabling a firm to create value from its knowledge.

Finally, the results of our post hoc analyses present a potentially valuable contribution to the EO literature. Because the EO-performance relationship has been shown to vary by context (high/low technology industries, new/established firms, growing/mature industries, etc.), examining the individual components of EO can generate valuable insight into the role of context. The results from our tests in which we disaggregated the EO dimensions suggest that, in this particular context, proactiveness alone contributes to firm performance while the risk taking and innovativeness components have little influence. Furthermore, when testing the mediation model, we found this relationship between proactiveness and performance to be mediated by knowledge even while controlling for the remaining EO components.

Our finding that only proactiveness makes a significant contribution to explaining the variance in performance can, again, likely be attributed to context. For instance, Wiklund and Shepherd (2005) found the performance of firms in a stable environment increases with EO, even when those firms lack the financial capital often required to pursue innovative projects that are inherently risky. The entrepreneurial strategies of these firms, as reflected by their EO, may greatly emphasize anticipation of market needs and pursuit of opportunities, yet prefer innovations that are incremental and less risky. In a stable environment, innovation may have negative consequences if the perspectives of customers are relatively inflexible and markets are unwilling to depart from the status quo (Thornhill, 2006). Proactiveness, however, has been shown to be positively related to performance in both dynamic and hostile environments (Lumpkin & Dess, 2001).

The classic EO scale of Covin and Slevin (1989) emphasizes innovation in products and services, giving greater weight to innovations that are more radical in nature. While the introduction of a radically innovative product can generate competitive advantage for a firm, so can a series of moderate changes to a firm’s operations. Whereas innovativeness is effectively limited to the introduction of new products and services, items that measure proactiveness in the EO scale account for the introduction of new
administrative techniques and operating technologies. In the context of a transitioning industry having high levels of environmental uncertainty, entrepreneurial firms may grow increasingly averse to risk and therefore hesitant of radical innovation. Instead, they may proactively seek and pursue opportunities throughout their organization that allow for incremental innovations, ultimately increasing performance through a succession of strategic actions. Such a strategy may seem entrepreneurial in one context and less than entrepreneurial in another.

**Implications**

The results of this study could have implications for resource-based strategy scholars. Our findings support those of previous studies linking firm characteristics associated with knowledge assets to the EO-performance relationship. The results supporting our model, in which knowledge mediates the EO-performance relationship, suggest that in certain contexts, the success of a firm’s strategic orientation may depend on the resources it has available. This is somewhat contradictory to traditional thinking in the resource-based literature. Results from this study would be expected to parallel those of Wiklund and Shepherd (2003), where EO enhanced the positive relationship between knowledge resources and performance. We argue that in the specified context of a transitioning industry, an entrepreneurial strategy may only lead to increased performance if the appropriate knowledge resources are available to support it.

For EO scholars, results from our study strengthen the call for closer examinations of how firm characteristics and environmental factors influence the EO-performance relationship (e.g., Lumpkin & Dess, 1996). In addition to this, our findings highlight the necessity of considering context when investigating the nature of EO. As noted by Miller (2011), “there are many aspects of context that simultaneously may influence EO and its relationships to sources and outcomes” (p. 8). We hope our study contributes to this understanding. Finally, our results support the notion that treating EO as a multidimensional concept may in some cases be warranted and beneficial (Lumpkin and Dess, 2001; Miller, 2011). Our finding that the dimensions of EO can act independently in their relations to performance may also be of value to business practitioners operating in highly uncertain environments. Results from this study suggest that firms can benefit
from continuously searching for new ways to improve operational functions and that initiatives need not be risky nor dramatic to create value.

**Limitations**

Although utilization of an online questionnaire is advantageous in many aspects, the potential of methodological bias common in self-administered surveys could present limitations in the research findings. Our use of an online questionnaire, self-reported data and subjective measures all create potential for error. To minimize this potential, we used measurement scales having been previously validated in the literature. We also followed generally accepted methods for data collection and analysis procedures.

As our study relied on cross-sectional data, we cannot empirically determine causality in the relationships between EO, knowledge resources and performance. Although our findings are in agreement with previous studies, we acknowledge that untested factors are also likely related to firm performance. Due to the context specificity of this study, our findings are limited in their generality. Future research investigating these relationships in other well-defined contexts will facilitate the development of a cumulative body of knowledge in the EO field.

**Conclusions**

Results from this study emphasize the need to account for contextual influence when examining the role of EO in organizational outcomes. The entrepreneurial processes of firms in one industry may differ substantially from those of firms in another industry. Entrepreneurship likely manifests itself differently depending on environmental conditions. As was already stated, a strategy that seems entrepreneurial in one context may seem less than entrepreneurial in another. By investigating the entrepreneurial processes of firms operating in very similar environments, a more fundamental understanding of EO and its consequences can be gained.

In addition to this, results from study also suggest that greater consideration should be given to treating EO as a multidimensional concept. We encourage EO researchers to further investigate potential relationships between each component of EO and various aspects of context. Examining how each dimension relates to performance in highly-defined contexts will help move the field of EO back to the configurational approach originally intended by Miller (1983).
LITERATURE CITED


Appendix A

RESPONDENT PROFILE

Figure 6.1 Geographic regions of headquarters locations for all respondents

Map Source: U.S. Census Bureau

Figure 6.2 Distribution of all respondents by total firm revenue in 2011
Figure 6.3  Distribution of all respondents by number of full-time manufacturing employees

Figure 6.4  Distribution of all respondents by firm age (in years)
Table 6.1  Primary source of revenue for all respondents, ranked

<table>
<thead>
<tr>
<th>Business Activity</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Producing new wood pallets</td>
<td>96</td>
<td>55.2</td>
</tr>
<tr>
<td>Recycling, repairing and/or remanufacturing wood pallets</td>
<td>47</td>
<td>27.0</td>
</tr>
<tr>
<td>Brokering/Wholesaling</td>
<td>13</td>
<td>7.5</td>
</tr>
<tr>
<td>Other</td>
<td>9</td>
<td>5.2</td>
</tr>
<tr>
<td>Primary wood processing (sawmill)</td>
<td>6</td>
<td>3.4</td>
</tr>
<tr>
<td>Third party logistics</td>
<td>2</td>
<td>1.1</td>
</tr>
<tr>
<td>Pallet leasing/rental systems</td>
<td>1</td>
<td>0.6</td>
</tr>
<tr>
<td>Pallet recovery/disposal</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>174</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 6.2  Other business activities involved in for all respondents, ranked

<table>
<thead>
<tr>
<th>Business Activity</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Producing new wood pallets</td>
<td>152</td>
<td>87.4</td>
</tr>
<tr>
<td>Recycling, repairing and/or remanufacturing wood pallets</td>
<td>117</td>
<td>67.2</td>
</tr>
<tr>
<td>Pallet recovery/disposal</td>
<td>103</td>
<td>59.2</td>
</tr>
<tr>
<td>Brokering/Wholesaling</td>
<td>81</td>
<td>46.6</td>
</tr>
<tr>
<td>Primary wood processing (sawmill)</td>
<td>32</td>
<td>18.4</td>
</tr>
<tr>
<td>Other</td>
<td>30</td>
<td>17.2</td>
</tr>
<tr>
<td>Third party logistics</td>
<td>27</td>
<td>15.5</td>
</tr>
<tr>
<td>Pallet leasing/rental systems</td>
<td>10</td>
<td>5.7</td>
</tr>
</tbody>
</table>

Note: This item allowed for multiple responses and so column totals will not sum to 100%
### Table 6.3  Pallet types regularly sold for all respondents, ranked

<table>
<thead>
<tr>
<th>Pallet Type</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stringer</td>
<td>166</td>
<td>95.4</td>
</tr>
<tr>
<td>Block</td>
<td>111</td>
<td>63.8</td>
</tr>
<tr>
<td>Plywood</td>
<td>55</td>
<td>31.6</td>
</tr>
<tr>
<td>Panel deck</td>
<td>38</td>
<td>21.8</td>
</tr>
<tr>
<td>Non-wood (plastic, steel, etc.)</td>
<td>26</td>
<td>14.9</td>
</tr>
<tr>
<td>Wood composite, corrugated</td>
<td>13</td>
<td>7.5</td>
</tr>
<tr>
<td>Other</td>
<td>6</td>
<td>3.4</td>
</tr>
</tbody>
</table>

Note: This item allowed for multiple responses and so column totals will not sum to 100%

### Table 6.4  Methods for managing wood waste for all respondents, ranked

<table>
<thead>
<tr>
<th>Waste Method</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sell as animal bedding</td>
<td>72</td>
<td>41.4</td>
</tr>
<tr>
<td>Sell for production of fuel</td>
<td>61</td>
<td>35.1</td>
</tr>
<tr>
<td>Sell as landscaping mulch</td>
<td>60</td>
<td>34.5</td>
</tr>
<tr>
<td>Give away</td>
<td>45</td>
<td>25.9</td>
</tr>
<tr>
<td>Burn as fuel for company facilities</td>
<td>42</td>
<td>24.1</td>
</tr>
<tr>
<td>Pay disposal fees</td>
<td>33</td>
<td>19.0</td>
</tr>
<tr>
<td>Other</td>
<td>23</td>
<td>13.2</td>
</tr>
<tr>
<td>Convert into pellets for fuel</td>
<td>8</td>
<td>4.6</td>
</tr>
</tbody>
</table>

Note: This item allowed for multiple responses and so column totals will not sum to 100%
Appendix B

SURVEY QUESTIONNAIRE

Business Strategies in the US Transport Packaging Industry

Researchers at the Pennsylvania State University would like to gain a better understanding of the business strategies commonly utilized by firms operating in the US transport packaging industry. Many firms in the industry have suffered in recent years as a result of the economic slowdown. Other firms, however, have performed well and experienced growth over this same period of time.

This study aims to collect information from firms within the industry so that we may better understand what strategies are being employed, and how these strategies relate to performance. The study intends to ask company managers from the industry to complete a short survey. The information collected in the survey will be used to identify certain firm attributes associated with high and low performance. The results of this study will be used to make recommendations on how firms in the industry may increase their performance.

The questions in the survey relate to:

- Business activities
- Products/services
- Company size and performance
- Perceptions of sustainability
- Entrepreneurial orientation
- Human capital
- Business capabilities

Through this study, we hope to:

- Understand what business strategies are being used
- Increase our understanding of how the industry is currently structured
- Identify those resources and attributes that are most influential on firm performance
- Provide evidence to support recommendations for potential actions that industry members may take to increase performance
Implied Informed Consent Form for Social Science Research
The Pennsylvania State University – IRB # 36859

Title of Project: Strategic Processes in a Transitioning Industry: Knowledge Resources, EO and the Performance of firms

Principal Investigator: Nathan Elser
214 Forest Resources Building
University Park, PA 16802
(814) 865-9485; nes5000@psu.edu

Research Advisor: Dr. Judd Michael
211 Forest Resources Building
University Park, PA 16802
(814) 863-2976; jhm104@psu.edu

1. Purpose of the Study: The purpose of this research is to investigate management strategies in the US wood pallet manufacturing industry.

2. Procedures to be followed: This survey should be completed by a member of your company’s top management team, preferably the primary decision maker for strategy. Respondents will be asked to answer questions about characteristics of your company, its competitive strategies and its performance.

3. Benefits: The benefits to the pallet industry include a better understanding of how pallet manufacturers are responding to industry trends and how different strategies affect firm performance.

4. Duration/Time: It will take about 12 to 15 minutes to complete the survey.

5. Statement of Confidentiality: Your participation in this research is confidential. The survey does not ask for any information that would identify who the responses belong to. In the event of any publication or presentation resulting from the research, no personally identifiable information will be shared because your name is in no way linked to your responses. If you complete the survey online your confidentiality will be kept to the degree permitted by the technology used. No guarantees can be made regarding the interception of data sent via the Internet by any third parties. Please print a copy of this form for your records.

6. Right to Ask Questions: You can ask questions about this research. Contact Nathan Elser at (814) 865-9485 with questions. You can also call this number if you have complaints or concerns about this research.

7. Voluntary Participation: Your decision to be in this research is voluntary. You can stop at any time. You do not have to answer any questions you do not want to answer. Refusal to take part in or withdrawing from this study will involve no penalty or loss of benefits you would receive otherwise.

You must be 18 years of age or older to take part in this research study.

Completion and submission of the survey implies that you have read the information in this form and consent to take part in the research.
Penn State Pallet Survey

Your responses are confidential and will only be seen by Penn State Researchers.

The purpose of this research is to investigate management strategies in the US wood pallet manufacturing industry. This survey should be completed by a member of your company’s top management team, preferably the primary decision maker for strategy. By completing this survey, you are providing your informed consent (for more information, click here) to participate in this research. For more information on this study, please contact Nathan Elser at (814) 865-9485 or at nce5000@psu.edu, or Dr. Judd Michael at (814) 863-2976 or jhm1164@psu.edu

1. What activities is your company involved with? (Mark all that apply)
   - Producing new wood pallets
   - Brokering/Wholesaling
   - Pallet Recovery/Disposal
   - Third Party Logistics
   - Pallet Leasing/Rental Systems
   - Recycling, repairing and/or remanufacturing wood pallets
   - Primary wood processing (sawmill)
   - Other (please specify) ________________

2. Which of these activities is your company’s primary source of revenue? (Mark only one)
   - Producing new wood pallets
   - Brokering/Wholesaling
   - Pallet Recovery/Disposal
   - Third Party Logistics
   - Pallet Leasing/Rental Systems
   - Recycling, repairing and/or remanufacturing wood pallets
   - Primary wood processing (sawmill)
   - Other (please specify) ________________

3. What types of pallets does your company regularly sell? (Mark all that apply)
   - Stringer
   - Block
   - Panel Deck
   - Plywood
   - Wood Composite/Corrugated
   - Non-Wood (plastic, steel, etc.)
   - Other (please specify) ________________

4. How do you manage wood waste? (Mark all that apply; skip if not applicable)
   - Burn as fuel for company facilities
   - Sell for production of fuel
   - Convert into pellets for fuel
   - Sell as landscaping mulch
   - Sell as animal bedding product
   - Pay disposal fees
   - Give away
   - Other (please specify) ________________

5. Approximately how many full-time production employees are working for your company today? ______

6. What year was your company founded? ______
7. What was your company’s approximate total revenue in 2011? (Select one)

- Less than $100K
- $100K to < $250K
- $250K to < $500K
- $500K to < $1M
- $1M to < $5M
- $5M to < $10M
- $10M to < $25M
- $25M to < $50M
- $50M to $100M
- Greater than $100M

8. What zip code is your company headquarters located in? ______

9. Compared to other companies in the industry, please rate your company’s position in terms of having...

<table>
<thead>
<tr>
<th>Expertise regarding company management</th>
<th>Much Weaker</th>
<th>Weaker</th>
<th>No Different</th>
<th>Stronger</th>
<th>Much Stronger</th>
<th>DON'T KNOW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staff with a positive commitment to the company's development</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Expertise regarding development of products or services</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Staff educated in giving superior customer service</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Technical expertise in pallet design</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Staff who like to contribute with ideas for new products/services</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Working knowledge of information systems technology</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Staff capable of effectively marketing your products/services</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Technical expertise in manufacturing systems</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Proficiency in procuring and sourcing materials</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Expertise in marketing</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

10. Compared to your most relevant competitors, please rate your firm’s performance over the past 3 years in terms of...

<table>
<thead>
<tr>
<th></th>
<th>Much Weaker</th>
<th>Weaker</th>
<th>No Different</th>
<th>Stronger</th>
<th>Much Stronger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Number of employees</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Profitability</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Product/Service quality</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Customer satisfaction</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>
In questions 11-14, you are presented with pairs of opposing statements. Between each pair of statements is a seven-point scale. Please mark the circle that best describes your company’s position on the scale between the opposing statements.

11. Which statement best characterizes your product or service line changes in the past 3 years?

<table>
<thead>
<tr>
<th>No new lines of products or services</th>
<th>Very many new lines of products or services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changes in product or service lines have been minor in nature</td>
<td>Changes in product or service lines have been quite dramatic</td>
</tr>
</tbody>
</table>

12. When confronted with decision-making situations involving uncertainty, I...

| Typically adopt a cautious, “wait-and-see” posture in order to minimize the probability of making costly decisions | Typically adopt a bold, aggressive posture in order to maximize the probability of exploiting potential opportunities |

13. In general, I...

| Favor a strong emphasis on the marketing of tried and true products or services | Favor a strong emphasis on R&D, technological leadership, and innovations |
| Have a strong preference for low-risk projects (with normal and certain rates of return) | Have a strong preference for high-risk projects (with chances of very high returns) |
| Believe that, given the nature of the business environment, it is best to explore it gradually via careful, incremental behavior | Believe that, given the nature of the business environment, bold, wide-ranging acts are necessary to achieve the firm’s objectives |

14. In dealing with its most relevant competitors, my firm...

| Typically responds to actions which competitors initiate | Typically initiates actions which competitors then respond to |
| Is very seldom the first business to introduce new products/services, administrative techniques, operating technologies, etc. | Is very often the first business to introduce new products/services, administrative techniques, operating technologies, etc. |
| Typically seeks to avoid competitive clashes, preferring a “live-and-let-live” posture | Typically adopts a very competitive, “under-the-competitors” posture |
The following statements refer to the business strategy your firm has pursued over the past 2-3 years. Please mark the circle representing how each statement reflects your situation.

15. We’ve attempted to locate and maintain a secure niche in a relatively stable product or service area. We try to protect this domain by offering higher quality and superior service. We may not be at the forefront of industry developments, but we attempt instead to do the best job possible in our market.

   Does not represent our strategy   ○   ○   ○   ○   ○   ○   ○   Exactly represents our strategy

16. We preferred to be “first-in” with new products or market areas even if they were initially not highly profitable. We’ve tried to respond rapidly to early signals concerning new areas of opportunity.

   Does not represent our strategy   ○   ○   ○   ○   ○   ○   ○   Exactly represents our strategy

17. We’ve attempted to maintain a stable, limited line of products and/or services, while at the same time trying to move quickly to follow a selected set of more promising developments in the industry. We are seldom first-in with new products/services, but by carefully monitoring the marketplace we are often “second-in” with a more cost-effective product or service.

   Does not represent our strategy   ○   ○   ○   ○   ○   ○   ○   Exactly represents our strategy

18. We generally compete by having a low price, low cost strategy. We make products (or offer services) to meet the short-term needs of the marketplace and don’t worry too much about innovating.

   Does not represent our strategy   ○   ○   ○   ○   ○   ○   ○   Exactly represents our strategy

19. We’ve not been able to have a consistent product-market strategy and haven’t been able to be as aggressive as our competitors. We didn’t take many risks and generally were forced to respond to pressures in the business environment.

   Does not represent our strategy   ○   ○   ○   ○   ○   ○   ○   Exactly represents our strategy
This section includes statements related to your opinions about sustainability and business. There are no right or wrong answers, just tell us how much you agree or disagree with each statement.

20. Please check the response that best describes your agreement with the following statements…

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Companies should take a leading role in the field of environmental protection.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Companies should provide support to beneficial social causes.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Company environmental performance should be considered more by financial institutions.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Corporate social responsibility should be part of the foundation of every company.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I think that companies need to increase their social responsibility.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I think that companies should provide a living wage for their employees.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Companies should contribute to the betterment of their local community.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

21. What is the greatest challenge your company faces in 2012?

22. What is the greatest opportunity for your company in 2012?

23. Please provide us your email address in the box below; we will send you a summary of the result of this industry study and you will be entered into a drawing for an iPod Touch: ____________________________

24. If you have any additional comments, suggestions or questions for the Penn State researchers or the NWCPA, you may provide them here:

Thank you!

We appreciate the time you have taken to answer these questions.
### Appendix C

#### DATA DICTIONARY

#### VARIABLE INFORMATION

<table>
<thead>
<tr>
<th>Construct Name</th>
<th># Items Original Scale</th>
<th># Items Actual Scale</th>
<th>Source</th>
<th>Coefficient $\alpha$ Original Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firm Characteristics</td>
<td>--</td>
<td>8</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Knowledge Based Resources</td>
<td>11</td>
<td>11</td>
<td>Adapted from Wiklund and Shepherd, 2003</td>
<td>.84</td>
</tr>
<tr>
<td>Firm Performance</td>
<td>10</td>
<td>5</td>
<td>Adapted from Wiklund and Shepherd, 2003</td>
<td>.82</td>
</tr>
<tr>
<td>Entrepreneurial Orientation</td>
<td>9</td>
<td>9</td>
<td>Covin and Slevin, 1989</td>
<td>.87</td>
</tr>
<tr>
<td>Strategic Typologies</td>
<td>3</td>
<td>5</td>
<td>Adapted from Miles and Snow, 1978; James and Hatten, 1995</td>
<td>--</td>
</tr>
<tr>
<td>Sustainability Orientation</td>
<td>--</td>
<td>7</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Environmental Scanning</td>
<td>--</td>
<td>2</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Construct Name</th>
<th>Number of Applicable Cases</th>
<th>Coefficient $\alpha$ Actual Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge Based Resources</td>
<td>162</td>
<td>.899</td>
</tr>
<tr>
<td>Firm Performance</td>
<td>165</td>
<td>.833</td>
</tr>
<tr>
<td>Entrepreneurial Orientation</td>
<td>157</td>
<td>.866</td>
</tr>
<tr>
<td>Sustainability Orientation</td>
<td>167</td>
<td>.835</td>
</tr>
</tbody>
</table>
**FIRM CHARACTERISTICS**

*What activities is your company involved with? (Mark all that apply)*

0 = “No”  
1 = “Yes”

<table>
<thead>
<tr>
<th>Item Name</th>
<th>Item Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACTIN 1</td>
<td>Producing new wood pallets</td>
</tr>
<tr>
<td>ACTIN 2</td>
<td>Brokering/Wholesaling</td>
</tr>
<tr>
<td>ACTIN 3</td>
<td>Pallet Recovery/Disposal</td>
</tr>
<tr>
<td>ACTIN 4</td>
<td>Third Party Logistics</td>
</tr>
<tr>
<td>ACTIN 5</td>
<td>Pallet Leasing/Rental Systems</td>
</tr>
<tr>
<td>ACTIN 6</td>
<td>Recycling, repairing and/or remanufacturing wood pallets</td>
</tr>
<tr>
<td>ACTIN 7</td>
<td>Primary wood processing (sawmill)</td>
</tr>
<tr>
<td>ACTIN 8</td>
<td>Other (please specify)</td>
</tr>
<tr>
<td>ACTIN O</td>
<td>(Specified response for “Other”)</td>
</tr>
</tbody>
</table>

*Which of these activities is your company’s primary source of revenue? (Mark only one)*

(0 = Missing Data)

<table>
<thead>
<tr>
<th>Item Name</th>
<th>Item Description</th>
</tr>
</thead>
</table>
| ACT REV   | 1 = Producing new wood pallets  
2 = Brokering/Wholesaling  
3 = Pallet Recovery/Disposal  
4 = Third Party Logistics  
5 = Pallet Leasing/Rental Systems  
6 = Recycling, repairing and/or remanufacturing wood pallets  
7 = Primary wood processing (sawmill)  
8 = Other (please specify) |
| ACTREV O  | Specified Response for “ACTREV = 8” |
What types of pallets does your company regularly sell? (Mark all that apply)  

<table>
<thead>
<tr>
<th>Item Name</th>
<th>Item Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PALLE 1</td>
<td>Stringer</td>
</tr>
<tr>
<td>PALLE 2</td>
<td>Block</td>
</tr>
<tr>
<td>PALLE 3</td>
<td>Panel Deck</td>
</tr>
<tr>
<td>PALLE 4</td>
<td>Plywood</td>
</tr>
<tr>
<td>PALLE 5</td>
<td>Wood Composite/Corrugated</td>
</tr>
<tr>
<td>PALLE 6</td>
<td>Non-Wood (plastic, steel, etc.)</td>
</tr>
<tr>
<td>PALLE 7</td>
<td>Other (please specify)</td>
</tr>
<tr>
<td>PALLE O</td>
<td>Specified Response for “PALLE 7”</td>
</tr>
</tbody>
</table>

0 = “No”  1 = “Yes”

How do you manage wood waste? (Mark all that apply; skip if not applicable)  

<table>
<thead>
<tr>
<th>Item Name</th>
<th>Item Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>WASTE 1</td>
<td>Burn as fuel for company facilities</td>
</tr>
<tr>
<td>WASTE 2</td>
<td>Sell for production of fuel</td>
</tr>
<tr>
<td>WASTE 3</td>
<td>Convert into pellets for fuel</td>
</tr>
<tr>
<td>WASTE 4</td>
<td>Sell as landscaping mulch</td>
</tr>
<tr>
<td>WASTE 5</td>
<td>Sell as animal bedding product</td>
</tr>
<tr>
<td>WASTE 6</td>
<td>Pay disposal fees</td>
</tr>
<tr>
<td>WASTE 7</td>
<td>Give away</td>
</tr>
<tr>
<td>WASTE 8</td>
<td>Other (please specify)</td>
</tr>
<tr>
<td>WASTE O</td>
<td>Specified Response for “WASTE 8”</td>
</tr>
</tbody>
</table>

0 = “No”  1 = “Yes”

Approximately how many full-time production employees are working for your company today?  

(. = Missing Data)  

<table>
<thead>
<tr>
<th>Item Name</th>
<th>Item Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMPLOY</td>
<td>Number (#)</td>
</tr>
</tbody>
</table>
**What year was your company founded?**

( . = Missing Data)

<table>
<thead>
<tr>
<th>Item Name</th>
<th>Item Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIRM EST</td>
<td>Year (#)</td>
</tr>
<tr>
<td>FIRM YRS</td>
<td>(2012 – FIRM EST)</td>
</tr>
</tbody>
</table>

**What was your company’s approximate total revenue in 2011? (Select one)**

(0 = Missing Data)

<table>
<thead>
<tr>
<th>Item Name</th>
<th>Item Description</th>
</tr>
</thead>
</table>
| REVENUE   | 1 = Less than $100K
            | 2 = $100K to < $250K
            | 3 = $250K to < $500K
            | 4 = $500K to < $1M
            | 5 = $1M to < $5M
            | 6 = $5M to < $10M
            | 7 = $10M to < $25M
            | 8 = $25M to < $50M
            | 9 = $50M to $100M
            | 10 = Greater than $100M |

**What zip code is your company headquarters located in?**

<table>
<thead>
<tr>
<th>Item Name</th>
<th>Item Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZIP</td>
<td>Zip Code (#)</td>
</tr>
<tr>
<td>CITY</td>
<td>Location of Zip Code (if applicable)</td>
</tr>
<tr>
<td>STATE</td>
<td>State of Zip Code (if in United States), otherwise Country</td>
</tr>
</tbody>
</table>
**KNOWLEDGE-BASED RESOURCES**

**Likert Scale:**

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Much Weaker</td>
<td>Weaker</td>
<td>No Different</td>
<td>Stronger</td>
<td>Much Stronger</td>
<td>DON’T KNOW</td>
</tr>
</tbody>
</table>

*Compared to other companies in the industry, please rate your company’s position in terms of having*

<table>
<thead>
<tr>
<th>Item Name</th>
<th>Item Description</th>
<th>(Missing Data: 0 = No Answer, 6 = DON’T KNOW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>KNOW1_5</td>
<td>Expertise regarding company management</td>
<td></td>
</tr>
<tr>
<td>KNOW2_5</td>
<td>Staff with a positive commitment to the company’s development</td>
<td></td>
</tr>
<tr>
<td>KNOW3_5</td>
<td>Expertise regarding development of products or services</td>
<td></td>
</tr>
<tr>
<td>KNOW4_5</td>
<td>Staff educated in giving superior customer service</td>
<td></td>
</tr>
<tr>
<td>KNOW5_5</td>
<td>Technical expertise in pallet design</td>
<td></td>
</tr>
<tr>
<td>KNOW6_5</td>
<td>Staff who like to contribute with ideas for new products/services</td>
<td></td>
</tr>
<tr>
<td>KNOW7_5</td>
<td>Working knowledge of information systems technology</td>
<td></td>
</tr>
<tr>
<td>KNOW8_5</td>
<td>Staff capable of effectively marketing your products/services</td>
<td></td>
</tr>
<tr>
<td>KNOW9_5</td>
<td>Technical expertise in manufacturing systems</td>
<td></td>
</tr>
<tr>
<td>KNOW10_5</td>
<td>Proficiency in procuring and sourcing materials</td>
<td></td>
</tr>
<tr>
<td>KNOW11_5</td>
<td>Expertise in marketing</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Item Name</th>
<th>Item Description</th>
<th>(Missing Data: 0 = No Answer)</th>
</tr>
</thead>
<tbody>
<tr>
<td>KNOW1_6</td>
<td>Expertise regarding company management</td>
<td></td>
</tr>
<tr>
<td>KNOW2_6</td>
<td>Staff with a positive commitment to the company’s development</td>
<td></td>
</tr>
<tr>
<td>KNOW3_6</td>
<td>Expertise regarding development of products or services</td>
<td></td>
</tr>
<tr>
<td>KNOW4_6</td>
<td>Staff educated in giving superior customer service</td>
<td></td>
</tr>
<tr>
<td>KNOW5_6</td>
<td>Technical expertise in pallet design</td>
<td></td>
</tr>
<tr>
<td>KNOW6_6</td>
<td>Staff who like to contribute with ideas for new products/services</td>
<td></td>
</tr>
<tr>
<td>KNOW7_6</td>
<td>Working knowledge of information systems technology</td>
<td></td>
</tr>
<tr>
<td>KNOW8_6</td>
<td>Staff capable of effectively marketing your products/services</td>
<td></td>
</tr>
<tr>
<td>KNOW9_6</td>
<td>Technical expertise in manufacturing systems</td>
<td></td>
</tr>
<tr>
<td>KNOW10_6</td>
<td>Proficiency in procuring and sourcing materials</td>
<td></td>
</tr>
<tr>
<td>KNOW11_6</td>
<td>Expertise in marketing</td>
<td></td>
</tr>
</tbody>
</table>
FIRM PERFORMANCE

Compared to your most relevant competitors, please rate your firm’s performance over the past 3 years in terms of...

<table>
<thead>
<tr>
<th>Item Name</th>
<th>Item Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PERF 1</td>
<td>Sales</td>
</tr>
<tr>
<td>PERF 2</td>
<td>Number of employees</td>
</tr>
<tr>
<td>PERF 3</td>
<td>Profitability</td>
</tr>
<tr>
<td>PERF 4</td>
<td>Product/Service quality</td>
</tr>
<tr>
<td>PERF 5</td>
<td>Customer satisfaction</td>
</tr>
</tbody>
</table>

ENTREPRENEURIAL ORIENTATION

Which statement best characterizes your product or service line changes in the past 3 years?

<table>
<thead>
<tr>
<th>Item Name</th>
<th>Left Item Description (1)</th>
<th>Right Item Description (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EO1 (INNOV 1)</td>
<td>No new lines of products or services</td>
<td>Very many new lines of products or services</td>
</tr>
<tr>
<td>EO2 (INNOV 2)</td>
<td>Change in product or service lines have been mostly minor in nature</td>
<td>Change in product or service lines have usually been quite dramatic</td>
</tr>
</tbody>
</table>

In general, I...

<table>
<thead>
<tr>
<th>Item Name</th>
<th>Left Item Description (1)</th>
<th>Right Item Description (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EO3 (INNOV 3)</td>
<td>Favor a strong emphasis on the marketing of tried and true products or services</td>
<td>Favor a strong emphasis on R&amp;D, technological leadership, and innovations</td>
</tr>
</tbody>
</table>
When confronted with decision-making situations involving uncertainty, I...

<table>
<thead>
<tr>
<th>Item Name</th>
<th>Left Item Description (1)</th>
<th>Right Item Description (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EO4 (RISK 1)</td>
<td>Typically adopt a cautious, “wait-and-see” posture in order to minimize the probability of making costly decisions</td>
<td>Typically adopt a bold, aggressive posture in order to maximize the probability of exploiting potential opportunities</td>
</tr>
</tbody>
</table>

In general, I...

<table>
<thead>
<tr>
<th>Item Name</th>
<th>Left Item Description (1)</th>
<th>Right Item Description (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EO5 (RISK 2)</td>
<td>Have a strong preference for low-risk projects (with normal and certain rates of return)</td>
<td>Have a strong preference for high-risk projects (with chances of very high returns)</td>
</tr>
<tr>
<td>EO6 (RISK 3)</td>
<td>Believe that, given the nature of the business environment, it is best to explore it gradually via careful, incremental behavior</td>
<td>Believe that, given the nature of the business environment, bold, wide-ranging acts are necessary to achieve the firm’s objectives</td>
</tr>
</tbody>
</table>

In dealing with its most relevant competitors, my firm...

<table>
<thead>
<tr>
<th>Item Name</th>
<th>Left Item Description (1)</th>
<th>Right Item Description (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EO7 (PROACT 1)</td>
<td>Typically responds to actions which competitors initiate</td>
<td>Typically initiates actions which competitors then respond to</td>
</tr>
<tr>
<td>EO8 (PROACT 2)</td>
<td>Is very seldom the first business to introduce new products/services, administrative techniques, operating technologies, etc.</td>
<td>Is very often the first business to introduce new products/services, administrative techniques, operating technologies, etc.</td>
</tr>
<tr>
<td>EO9 (PROACT 3)</td>
<td>Typically seeks to avoid competitive clashes, preferring a “live-and-let-live” posture</td>
<td>Typically adopts a very competitive, “undo-the-competitors” posture</td>
</tr>
</tbody>
</table>
**STRATEGIC TYPOLOGY**

Semantic Differential Scale:

<table>
<thead>
<tr>
<th>1</th>
<th>“Does not represent our strategy”</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>“Exactly represents our strategy”</td>
</tr>
</tbody>
</table>

(0 = Missing Data)

*How well does each of the following statements reflect the business strategy your firm has pursued over the past 2-3 years?*

<table>
<thead>
<tr>
<th>Item Name</th>
<th>Item Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>STRAT 1</td>
<td>We’ve attempted to locate and maintain a secure niche in a relatively stable product or service area. We try to protect this domain by offering higher quality and superior service. We may not be at the forefront of industry developments, but we attempt instead to do the best job possible in our market.</td>
</tr>
<tr>
<td>STRAT 2</td>
<td>We preferred to be “first-in” with new products or market areas even if they were initially not highly profitable. We’ve tried to respond rapidly to early signals concerning new areas of opportunity.</td>
</tr>
<tr>
<td>STRAT 3</td>
<td>We’ve attempted to maintain a stable, limited line of products and/or services, while at the same time trying to move quickly to follow a selected set of more promising developments in the industry. We are seldom first-in with new products/services, but by carefully monitoring the marketplace we are often “second-in” with a more cost-effective product or service.</td>
</tr>
<tr>
<td>STRAT 4</td>
<td>We generally compete by having a low price, low cost strategy. We make products (or offer services) to meet the short-term needs of the market place and don’t worry too much about innovating.</td>
</tr>
<tr>
<td>STRAT 5</td>
<td>We’ve not been able to have a consistent product-market strategy and haven’t been able to be as aggressive as our competitors. We didn’t take many risks and generally were forced to respond to pressures in the business environment.</td>
</tr>
</tbody>
</table>
SUSTAINABILITY ORIENTATION

Likert Scale:

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Neutral</td>
<td>Agree</td>
<td>Strongly Agree</td>
</tr>
</tbody>
</table>

(0 = Missing Data)

Please check the response that best describes your agreement with the following statement...

<table>
<thead>
<tr>
<th>Item Name</th>
<th>Item Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SO 1</td>
<td>Companies should take a leading role in the field of environmental protection.</td>
</tr>
<tr>
<td>SO 2</td>
<td>Companies should provide support to beneficial social causes.</td>
</tr>
<tr>
<td>SO 3</td>
<td>Company environmental performance should be considered more by financial institutions.</td>
</tr>
<tr>
<td>SO 4</td>
<td>Corporate social responsibility should be part of the foundation of every company.</td>
</tr>
<tr>
<td>SO 5</td>
<td>I think that companies need to increase their social responsibility.</td>
</tr>
<tr>
<td>SO 6</td>
<td>I think that companies should provide a living wage for their employees.</td>
</tr>
<tr>
<td>SO 7</td>
<td>Companies should contribute to the betterment of their local communities.</td>
</tr>
</tbody>
</table>

ENVIRONMENTAL SCANNING

What is the greatest challenge your company faces in 2012?

<table>
<thead>
<tr>
<th>Item Name</th>
<th>Item Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCAN CHA</td>
<td>(Open-Ended)</td>
</tr>
</tbody>
</table>

What is the greatest opportunity for your company in 2012?

<table>
<thead>
<tr>
<th>Item Name</th>
<th>Item Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCAN OPP</td>
<td>(Open-Ended)</td>
</tr>
</tbody>
</table>