

# When innovativeness determines market orientation: the forest sector and the Great Recession

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## Abstract

*The forest sector and the global financial crisis (GFC) provide a unique setting for investigating the relationships among market orientation, innovativeness and firm performance. While most of the extant literature suggests that market orientation helps a firm build its innovativeness, we suggest that in the production oriented forest sector, especially when reacting to the crisis, being innovative allows a production oriented firm to develop a market orientation. Using data from 142 US-based forest sector manufacturing firms, we find that some types of innovativeness have a positive effect on the dimensions of market orientation. Process & business systems innovativeness positively impact firm performance suggesting that this relationship holds regardless of business cycles or the general state of the economy. We also find that market orientation does not positively impact firm performance, which is in contrast to the majority of the extant literature.*

**Keywords:** market orientation, innovativeness, firm performance, recession, manufacturing firms

## 1.1 INTRODUCTION

The global financial crisis (GFC), which peaked in 2008, provides a unique context within which to explore the relationship among different characteristics of firms and to examine how these characteristics facilitate firm performance in a time of economic decline. In this study, we choose innovativeness and market orientation (e.g. Han et al., 1998), the two characteristics that have previously been linked to improved performance in times of economic stability. Our central motivation is to examine whether a focus on innovation prior to a recession helps a firm achieve higher market orientation following a recession. Additionally, we examine if pre-recession innovativeness and post-recession market orientation positively impact post-recession financial performance.

Innovativeness is widely lauded as a means for increased firm performance and maintenance of competitive advantage (Tsai & Yang, 2013; Rosenbusch et al., 2011; Gibb & Haar, 2010; Hult et al., 2004; Han et al., 1998), contributing to performance through creating or adopting new products, processes and business systems. Closely connected to innovativeness is market orientation, which positively impacts firm performance through an improved understanding of customer needs, better reacting to competitor actions, and integrating knowledge of customers and competitors throughout the firm (Kirca et al., 2005; Pelham, 2000; Han et al., 1998).

In a decline situation, such as that represented by the GFC, firms tend to respond in one of two ways, either innovating in an attempt to develop new products or markets or retrenchment and cost cutting. These two approaches have been referred to as the mother of rigidity versus the mother of invention (McKinley et al., 2014). In the rigidity approach, firms focus on restricting information processing, centralizing authority, increasing formalization, and increasing operational efficiencies (Staw et al., 1981), or riding out the storm (O'Malley et al., 2011). In the invention approach, innovation is the reaction to decline, where managers engage in greater risk to try to "hit a home run" to recover (Latham & Braun,

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2009). The GFC has motivated considerable new work on marketing and innovation in recessionary periods (Rollins et al., 2014; Huhtala et al., 2014; McKinley et al., 2014), and yet how a firm's focus on a key characteristic during a pre-recession period affects other key characteristics during a post-recession period is not well-understood.

To partially address that gap, we investigate the role of market orientation and innovativeness in a decline situation. The most important contribution of our work is the idea that in this industry and economic context, pre-recession innovativeness is what allows companies to achieve a post-recession market orientation. This conceptualization is in contrast with much of the market orientation literature, yet consistent with the entrepreneurship literature thus illuminating an inconsistency in management scholarship. We also explore impacts of pre-recession innovativeness and post-recession market orientation on post-recession financial performance.

We conduct this study in the US forest sector, an industry especially impacted by the GFC. The primary market for many forest sector firms is housing. When US housing starts fell by nearly 80% between the peak years prior to, and the depths of the GFC, this industry sector was extremely hard hit with employment in the sector falling from 1.1 million in 2005 to only 645 thousand in 2011 (US Census, 2013).

The remainder of the manuscript is organized as follows. We begin with a brief theoretical background focusing on market orientation and innovativeness. This is followed by explanation leading to our hypotheses. Next, we provide details regarding the methods used in the study. We combine results and discussion in order to more fully explain our findings in relationship to past literature. We summarize by providing our thinking regarding implications of the findings for future research and for practitioners as well as acknowledging key limitations of the work.

## 1.2 THEORETICAL BACKGROUND

In the text that follows, we provide a summary of the concepts of market orientation and innovativeness. Both constructs are argued to be part of firm culture (Hurley & Hult, 1998). Deshpande and Webster (1989) describe organizational culture as the pattern of shared values and beliefs that help members of an organization understand why things happen and thus teach them the behavioral norms in the organization. There is strong evidence supporting market orientation as an organizational culture (Gebhardt et al., 2006; Kohli & Jaworski, 1990; Narver & Slater, 1990) and Hurley and Hult (1998) suggest that

the deepest manifestation of market orientation is at the cultural level. Others emphasize that innovativeness or innovation orientation is also manifested at the cultural level (Dobni, 2010; Augusto & Coelho, 2009; Hurley & Hult, 1998). Although the literature predominantly pursues a line of reasoning where market orientation facilitates innovativeness as elements of a firm culture, the directionality of this relationship is not as settled as described in much of the existing work. In fact, Woodside (2005) argues for a potential circular relationship where at least one component of market orientation, interfunctional coordination, and innovativeness build on each other over time. The potential for this dynamic may be especially relevant in a modern, highly competitive environment given findings indicate a decreasing return on investment in market orientation over time (Grewal & Tansuhaj, 2001). Since innovativeness and market orientation are both seen as elements of firm culture, their interrelationship may well be more complex than the commonly accepted maxim that market orientation positively impacts innovativeness.

### 1.2.1 Market Orientation

A market orientation is the focus of a firm that treats marketing as a cross-functional responsibility where meeting customer needs is an overriding priority for the entire organization (Narver & Slater, 1990). The literature is replete with descriptions of the Narver and Slater (1990) versus Kohli and Jaworski (1990) approaches to market orientation, so we will not further expound on the issue. Instead, because of its basis in firm culture, we subscribe to the Narver and Slater approach. According to Narver and Slater (1990), market orientation consists of three dimensions: customer orientation, competitor orientation, and interfunctional coordination. Focusing on customer needs allows a firm to provide superior value and leads to higher levels of customer satisfaction. Concurrently concentrating on competitors and routinely discussing competitor strengths and weaknesses allows for rapid responses to competitive threats. Interfunctional coordination refers to sharing of customer and competitor information across the firm and the integration of all members of the firm in meeting customer needs. The outcome of this multi-dimensional approach is the increased likelihood of the provision of superior value to customers, widely considered key for maximizing long-term profitability (Kumar et al., 1998).

### 1.2.2 Innovativeness

Innovation and innovativeness are too often used interchangeably in the literature (e.g. Gibb & Haar, 2010) and the

definition of innovativeness is often overlooked, leading to confusion regarding its meaning (Tajeddini et al., 2006). As an example, Han et al. (1998), in a seminal piece in the field, refer to “innovation” in the title of their article and then measure “innovativeness” via various levels of technology adoption and refer to innovativeness throughout the manuscript. While interchangeable use is undoubtedly due to the proximity of meaning between the terms, here we emphasize the difference where an innovation is a new or improved product/service, manufacturing process, or business system and innovativeness is a function of adoption (Rogers, 2003) or creation (Gebert et al., 2003) and is considered a trait or characteristic of a firm that is embedded in culture (Pallas et al., 2013; Liao et al., 2011; Tajeddini et al., 2006; Calantone et al., 2003). Innovativeness has been referred to as openness to new ideas, products, etc. (Hurley & Hult, 1998). The term innovation orientation is often used synonymously with innovativeness (e.g. Rosenbusch et al., 2011; Augusto & Coelho, 2009). Stock and Zacharias (2011) refer to an innovation orientation as creating an innovation mentality where members of the organization are pushed toward innovation. To summarize, an innovative firm is one that has the propensity to create or adopt new products, processes or business systems (Knowles et al., 2008) and is better able to create or otherwise produce innovations.

### 1.2.3 Hypotheses

The literature consistently demonstrates a positive impact of market orientation on innovativeness (Liao et al., 2011; Nasution et al., 2011; Grinstein, 2008; Kirca et al., 2005). It is argued that a firm possessing a strong market orientation maintains a close relationship with its customer base and is agile in meeting changing demands. Similarly, a market oriented firm consistently monitors the actions of competitors, thereby positioning itself to imitate those actions deemed critical for meeting customer demands. Finally, a market oriented firm also maintains interfunctional coordination which means that knowledge gained from customers and competitors is efficiently distributed within the firm, thus equipping it with the knowledge and information necessary to facilitate innovation (Tajeddini et al., 2006).

This market orientation to innovativeness connection is well-supported in the literature with hundreds of studies supporting the conceptualization (e.g. Han et al., 1998). However, the entrepreneurship literature paints a different picture. Innovativeness is commonly treated as one of several dimensions of entrepreneurial orientation (e.g. Matsuno et al., 2002; Lumpkin & Dess, 1996) where proac-

tiveness, risk taking and innovativeness are the ingredients that contribute to a market orientation and thereby positively impact firm performance (Raju et al., 2011; Matsuno et al., 2002). There are few studies that attempt to treat innovativeness as a distinct construct from entrepreneurial orientation (Rhee et al., 2010). Raju et al. (2011) suggest that future research should attempt to isolate the impact of entrepreneurial orientation on market orientation. A synthesis of 158 entrepreneurial orientation articles shows that across a broad range of fields and journals that innovativeness is consistently considered to be part of an entrepreneurial orientation (Wales et al., 2011). It is exactly this conceptualization—that innovativeness contributes to the development of a marketing orientation—which we embrace here. The founders of one market orientation paradigm (Jaworski & Kohli, 1993) themselves describe market orientation as a form of innovative behavior while others refer to market orientation as an organizational innovation (Kumar et al., 2011). It is also suggested that there is overlap in the definitions of market orientation and innovativeness and the constructs are typically highly correlated (Keskin, 2006).

Given this description from the entrepreneurial orientation literature, we propose that the relationship between innovativeness and market orientation, given the right context, can be such that innovativeness helps build a market orientation. Following this thinking, a firm that is more innovative is better able to adopt the necessary internal ingredients that can lead to a market oriented culture. This may be especially true within an industry sector that is traditionally production oriented and suffers from a commodity mentality, which is readily recognized for the US forest sector (Toppinen et al., 2014; Hansen et al., 2014; Cohen & Kozak, 2002; Rich, 1986). It has been suggested that the relationship between market orientation and innovativeness may differ based on the firms studied (Hurley et al., 2005; Woodside, 2005).

Mainstream innovation literature also provides support for innovativeness leading to market orientation. Simpson et al. (2006) outline a number of positive and negative outcomes of an innovation orientation. Among the positive outcomes are competition-related and customer-related aspects, which have commonalities with market orientation. According to Simpson et al. (2006, p. 1137), innovative firms “...proactively anticipate consumer needs and respond accordingly, creating greater value for consumers...” a concept strikingly similar to that of the customer orientation component of market orientation. Similarly, Simpson

et al. claim that innovative firms continuously monitor competitors. This work effectively suggests that innovativeness is a precursor to market orientation.

Perhaps the most intriguing proposal regarding the market orientation/innovativeness relationship comes from Woodside (2005) who suggests a system dynamics view. He primarily focuses on interfunctional coordination, describing a “positive feedback loop” between interfunctional coordination and innovativeness rather than a one-way, independent-dependent relationship. In this system dynamics view, all variables have dependent and independent relationships with all other system variables. Accordingly, innovativeness impacts market orientation and vice versa. Kwak et al. (2013) find innovativeness to positively impact the responsiveness dimension of market orientation defined by Kohli and Jaworski (1990). Hurley et al. (2005) acknowledge and support this more complex picture of the market orientation-innovativeness relationship.

Given the evidence, and the lag effect suggested by Hurley et al. (2005), we pose the following hypotheses, each related to the idea that the more innovative a firm before a recession, the higher its market orientation after the recession.

**H1: Forest sector firms with higher pre-recession product innovativeness are able to achieve a higher post-recession H1a) customer orientation, H1b) competitor orientation, and/or H1c) interfunctional coordination**

**H2: Forest sector firms with higher pre-recession process innovativeness are able to achieve higher post-recession H2a) customer orientation, H2b) competitor orientation, and/or H2c) interfunctional coordination**

**H3: Forest sector firms with higher pre-recession business systems innovativeness are able to achieve higher post-recession H3a) customer orientation, H3b) competitor orientation, and/or H3c) interfunctional coordination**

A large body of literature exists, including considerable work in the forest sector, extolling the critical need for innovativeness and innovation (e.g. Leavengood & Bull, 2013; Andrew et al., 2007; Hansen et al., 2006a; Schaan & Anderson, 2002) and a positive connection between innovativeness and firm financial performance (Rubera & Kirca, 2012; Nybakk, 2012; Rosenbusch et al.,

2011; Dobni, 2010; Gibb & Haar, 2010; Hult et al., 2004; Välimäki et al., 2004; Schumpeter, 1934). Furthermore, the ability to adopt the latest technology is a key source of competitive advantage for Nordic sawmills (Husso & Nybakk, 2010). Over the long-term, innovative companies are more successful and increasing innovative ability is important for increasing organizational growth and profitability (Dobni, 2010; 2006). Still, the literature is said to be fragmented and not fully consistent where nonsignificant and even negative associations have been found between innovativeness and performance (Rubera & Kirca, 2012). For example, innovativeness is not considered to be an advantage in conditions of high competitive intensity and low market turbulence and does not, in this context, contribute positively toward firm performance (Tsai & Yang, 2013).

The majority of findings in the literature suggest a positive relationship between innovativeness and firm performance, leading us to the following hypotheses:

**H4: The more innovative a firm before a recession (H4a pre-recession product, H4b pre-recession process, H4c pre-recession business systems), the higher its post-recession financial performance**

The preponderance of evidence in the literature indicates a positive relationship between market orientation and performance (Raju et al., 2011; Agarwal et al., 2003; Pelham, 2000; Narver & Slater, 1990). Meta-analytic studies indicate a consistent, positive link (Kirca et al., 2005) as well as recent synthesis and conceptual works (Raju et al., 2011; Liao et al., 2011). Liao et al. (2011) describe the evidence as overwhelmingly in favor of a positive relationship. Ellis's (2006) meta-analysis shows that approximately 10% of performance variation in U.S. firms is due to a market orientation. However, there are scattered results indicating a negative or no relationship between market orientation and performance (Kirca et al., 2005). Therefore, we pose the following hypotheses:

**H5: The more post-recession market oriented (H5a post-recession customer oriented, H5b post-recession competitor oriented, H5c post-recession interfunctionally coordinated) a firm, the higher its post-recession financial performance**

## 1.3 METHODS

In the following sub-sections we explain the methods employed in the study. First, we explain the sample frame



and sampling methodology. Next, we discuss the various steps involving measurement, questionnaire pretesting, pilot testing, and data collection. We then describe the analyses conducted to address study objectives.

### 1.3.1 Sampling and Sample Frame

Data in this study come from manufacturers with fifty or more employees in the US wood products manufacturing (SIC 24) sector. A database from the North American Industrial Classification Association includes 976 firms from throughout the US. The database also includes information about firm size, year the firm was founded, and contact information of CEO/owner, our target respondent. For corporations that have multiple manufacturing sites, firm-level information is used since SBU and firm level cultures can differ (Deshpande & Webster, 1989; Homburg & Pflesser, 2000).

### 1.3.2 Measures

**Post-recession Financial Performance:** Post-recession financial performance is assessed by adapting subjective measures that are recommended and used in a number of previous studies (e.g. Nybakk & Jenssen, 2012; Morgan & Strong, 2003; Beal, 2000; Dess & Robinson, 1984). The following four items representing different aspects of financial performance are used: Return on sales, sales growth rate, after tax return on assets, and gross profit margin. Respondents compare their firm to the rest of the industry and judge within which quintile their firm resides. Respondents rate their firm based on how it compares with competitors in the industry using a 5-point scale where 1=the lowest 20%, 2=the next highest 20%, 3=the middle 20%, 4=the next highest 20%, and 5=the highest 20%. Their ratings are based on calendar year 2012.

**Post-recession Market Orientation:** A 15-item, three-dimension scale adapted from the work of Narver and Slater (1990) and Lukas and Ferrell (2000) is used. Items for the three dimensions (customer orientation, competitor orientation, and interfunctional coordination) are randomized in the questionnaire. Each of the five points of the interval scale are labeled where 1=not at all, 2=to a small extent, 3=to a moderate extent, 4=to a great extent, and 5=to an extreme extent.

**Pre-recession Innovativeness:** Pre-recession innovativeness is measured using an adaptation of the scale developed by Knowles et al. (2008) and validated by Crespell et al. (2008). The scale accounts for creation and adoption of product, process, and business systems innovations. Each

dimension is represented by four items. A 5-point, Likert scale is used with respondents providing their evaluation of the innovativeness of their firm during the pre-recession years (see Appendix 1 for a list of items).

### 1.3.3 Data Collection

The questionnaire was pre-tested with four industry managers and one University Extension Specialist intimately familiar with the sector, resulting in only minor alterations. Data were collected in early 2013, via mail survey, following the general principles of the Tailored Design Method (Dillman, 2007). After accounting for undeliverables, a total of 941 questionnaires were sent and 142 valid responses were received for an adjusted response rate of 15.1%. This is slightly higher than the average number of responses in studies summarized by Raju et al. (2011), indicating an acceptable database size for market orientation-focused research.

The potential for non-response bias is tested two ways. First, we compare early (n=47) versus late (n=34) respondents (Armstrong & Overton, 1977) using data from the list provider with respect to firm size measured by sales and number of employees; no significant differences are found. We also compare all respondents (n=142) and all non-respondents (n=799) on the same two metrics with no indication of differences, suggesting non-response bias is not a significant concern for this study.

### 1.3.4 Data and Analysis

All statistical analyses were conducted in SPSS 21. In the first step, the data were thoroughly error checked. Next, exploratory factor analysis was conducted for identifying potential cross loadings. Based on this analysis, process and business systems innovativeness were combined into one dimension, process & business systems innovativeness. As a result, the hypotheses were accordingly changed. Table 1 outlines the alterations made in stated hypotheses. In addition, several market orientation items were deleted (Appendix 1).

Reliability analyses for all latent variables was tested using Cronbach's Alpha, Corrected Item-Total Correlation and Cronbach's Alpha if Item Deleted (Appendix 1). All latent variables were acceptable, with the Cronbach's Alphas higher than 0.7. For further details on analysis please see Hansen (2014). Based on these findings, new composite variables were calculated using the mean of all remaining items in each variable. Table 2 provides basic information about study constructs.

Even though the sample frame was designed to exclude firms with fewer than 50 employees, over 20% of responses came from such companies. This may have been a result of workforce reductions due to the GFC. Using data from the list provider, responding firms average \$38 million in annual sales and 380 employees.

## 1.4 RESULTS AND DISCUSSION

OLS regression was used to test the hypotheses. Results of regression analyses are shown in Table 3 (H1-H4) and Table 4 (H5). Firm size is used as a control variable but has no significant impact.

With respect to pre-recession innovativeness and its impact on post-recession market orientation, product innovativeness was significant only with respect to customer orientation (Table 4). Being product innovative means a propensity to adopt and create new products. To do so successfully requires close interaction with customers in

order to assure that the product meets customer needs. In responding companies, product innovativeness results in an enhanced customer orientation. The combined innovativeness dimension of process & business systems was positively and significantly related to competitor orientation and interfunctional coordination. Because this aspect of innovativeness is heavily influenced by manufacturing processes, it is likely that innovative firms are creating and/or adopting machinery that increases fiber recovery or throughput and this may be motivated by meeting the actions of competitors, given the commodity product nature of the sector. Various departments in responding companies may be well-coordinated with respect to production processes and goals as a result of their process & business systems innovativeness.

An unexpected finding with respect to the role of innovativeness on performance is that product innovativeness was non-significant and negative. Given the non-significant value, the negative relationship should be interpreted

**Table 1: Proposed and altered study hypotheses**

Proposed Hypotheses	Hypotheses Subsequent to Change in Dimensions
H1a: Forest sector firms with higher pre-recession product innovativeness are able to achieve a higher level of post-recession customer orientation	Unaltered
H1b: Forest sector firms with higher pre-recession product innovativeness are able to achieve a higher level of post-recession competitor orientation	Unaltered
H1c: Forest sector firms with higher pre-recession product innovativeness are able to achieve a higher level of post-recession interfunctional coordination	Unaltered
H2a: Forest sector firms with higher pre-recession process innovativeness are able to achieve a higher level of post-recession customer orientation	H2a: Forest sector firms with higher pre-recession process & business systems innovativeness are able to achieve a higher level of post-recession customer orientation (combined with H3a)
H2b: Forest sector firms with higher pre-recession process innovativeness are able to achieve a higher level of post-recession competitor orientation	H2b: Forest sector firms with higher pre-recession process & business systems innovativeness are able to achieve a higher level of post-recession competitor orientation (combined with H3b)
H2c: Forest sector firms with higher pre-recession process innovativeness are able to achieve a higher level of post-recession interfunctional coordination	H2c: Forest sector firms with higher pre-recession process & business systems innovativeness are able to achieve a higher level of post-recession interfunctional coordination (combined with H3c)
H3a: Forest sector firms with higher pre-recession business systems innovativeness are able to achieve a higher level of post-recession customer orientation	Unaltered
H3b: Forest sector firms with higher pre-recession business systems innovativeness are able to achieve a higher level of post-recession competitor orientation	H4b: The more process & business systems innovative a firm, the higher its post-recession financial performance (combined with H4c)
H3c: Forest sector firms with higher pre-recession business systems innovativeness are able to achieve a higher level of post-recession interfunctional coordination	Unaltered
H4a: The more pre-recession product innovative a firm, the higher its post-recession financial performance	Unaltered
H4b: The more pre-recession process innovative a firm, the higher its post-recession financial performance	Unaltered
H4c: The more pre-recession business systems innovative a firm, the higher its post-recession financial performance	Unaltered
H5a: The more post-recession customer oriented forest sector a firm, the higher its post-recession financial performance	Unaltered
H5b: The more post-recession competitor oriented a firm, the higher its post-recession financial performance	Unaltered
H5c: The more post-recession interfunctionally coordinated a firm, the higher its post-recession financial performance	Unaltered

**Table 2: Descriptive statistics of and correlations among study constructs**

Constructs	Mean	SD	1	2	3	4	5	6	7 <sup>1)</sup>
1) Pre-recession Process & Business Systems innovativeness	3.09	.93	1	.503**	.138	.278**	.274**	.312**	.025
2) Pre-recession Product Innovativeness	2.99	.96		1	.199*	.195*	.215	.055	-.108
3) Customer Orientation	3.89	.53			1	.361**	.491**	.135	-.104
4) Competitor Orientation	3.42	1.02				1	.359**	.227*	.087
5) Interfunctional Coordination	3.65	.61					1	.090	-.028
6) Performance	3.42	1.0						1	.079
7.) Size ( measured as sales)									1

\*Correlation significant at the 0.05 level

\*\* Correlations significant at the 0.01 level

Pearson correlation, <sup>1)</sup> = Spearman's rho correlation**Table 3: Impacts of pre-recession innovativeness on post-recession market orientation and post-recession financial performance**

	Post-recession Customer Orientation	Post-recession Competitor Orientation	Post-recession Interfunctional Coordination	Post-recession Financial Performance
Sales (control variable)	-.07 (-.07)	.10 (.24)	.02 (.85)	.06 (.52)
Pre-recession Product Innovativeness (H1a-c, H4a)	.20 (.04)*	.10 (.28)	.12 (.23)	-.16 (.15)
Pre-recession Process & Business Systems Innovativeness (H2a-c, H4b)	.04 (.69)	.22 (.02)*	.22 (.02)**	.40 (.00)**
R <sup>2</sup>	.058	.092	.086	.120

\* significant at the 0.05 level

\*\* significant at the 0.01 level

P-values in parentheses

**Table 4: Impacts of post-recession market orientation on post-recession financial performance**

	Performance
Sales (Control variable)	.07 (.48)
Post-recession Customer Orientation (H5a)	.07 (.53)
Post-recession Competitor Orientation (H5b)	.20 (.06)
Post-recession Interfunctional Coordination (H5c)	-.02 (.87)
R <sup>2</sup>	.06

\* significant at the 0.05 level

\*\* significant at the 0.01 level

P-values in parentheses

with caution, but it may be explained by the recessionary period when it was unlikely that firms were able to extract significant revenue from their new product development efforts. If recessionary periods could be predicted, firms may be wise to reduce investments in this area prior to oncoming recessions. An alternative explanation can be based on the work of Tsai and Yang (2013) in which they show innovativeness being detrimental to performance for firms in a low market turbulence and high competitive intensity context, a setting that fits many forest sector firms. The most relevant insight for the forest sector from Tsai and Yang (2013) is that high, price-based competition

results in customers paying less attention to differences in product features. As a result, there is little reward available for introducing product innovations.

On the other hand, process & business systems innovativeness is significantly related to performance in our responding firms. For many forest sector firms, raw materials (often logs) constitute a very high proportion of total costs. For example, log costs for a sawmill can represent as much as 80% of total costs. This rather unique context may help explain the importance of process & business systems innovativeness to firm performance. As this dimension is a combination of the original process innovativeness and business systems innovativeness dimensions, manufacturing processes are an important part of this form of innovativeness. A high focus on manufacturing processes is well established for this industry sector (Toppinen et al., 2014) and it has been suggested that business systems innovations are an appropriate pathway to improved performance for many forest sector firms traditionally focused on manufacturing processes and cost reduction. Gibb and Haar (2010) find that in times of high competition, such as during the GFC, firms should engage in innovative activities and risk taking to enhance performance. Although this study did not consider risk taking behavior, the findings are

partially congruent with respect to process & business systems innovativeness, but not with product innovativeness.

Contrary to much of the extant research findings (Grinstein, 2008; Ellis, 2006; Kirca et al., 2005), post-recession market orientation in our responding firms did not positively impact post-recession firm performance (see Table 5). This finding is not unprecedented (Liao et al., 2011), but relatively rare across samples, industry sectors, etc. Earlier research on forest sector firms provides evidence of a positive impact of market orientation on firm performance (Hansen et al., 2006b; Narver & Slater, 1990). The difference from past findings may be a result of the GFC. As mentioned earlier, the market for many forest sector firms shrank dramatically during the GFC, and the parallel housing crisis that saw housing starts fall by nearly 80%. In another study of the sector during the same timeframe, approximately 60% of responding firms indicated a decrease in financial performance while over thirty percent reported no change and less than five percent indicated an increase. On average, the reported change in performance was significantly negative (Hansen et al., 2013).

The customer orientation component of market orientation has been shown to be particularly important for small firms because it helps them compete with larger firms (Brockman et al., 2012), but in our results the relationship

was insignificant. In the Brockman et al. study, customer orientation was no longer significant at lower levels of innovativeness. This could be true for our sample since the overall values for innovativeness were rather low and could help explain the non-significant finding. As outlined by Brockman et al. (2012, p. 439), "Firms with lower levels of innovativeness will not receive performance benefits from customer orientation either, possibly because they are unable to grasp new concepts and approaches."

An overview of hypothesis testing is provided in Table 5 below.

### 1.4.1 Study Implications

This study contributes to the market orientation and innovativeness literatures by examining the dynamics of forest sector firm reactions to the GFC and the follow-on effects to market orientation and firm performance. We introduced a temporal element to the relationships between market orientation and innovativeness, but a more robust, time-series design would allow further insights into the evolution of relationships among study variables across business cycles. Our results provide insights for scholars as we move towards an enhanced understanding of the dynamic relationship between innovativeness and market orientation and their impact on firm performance.

**Table 5: Overall results of hypothesis testing**

Hypotheses	Result
H1a: Forest sector firms with higher pre-recession product innovativeness are able to achieve a higher level of post-recession customer orientation	Supported
H1b: Forest sector firms with higher pre-recession product innovativeness are able to achieve a higher level of post-recession competitor orientation	Rejected
H1c: Forest sector firms with higher pre-recession product innovativeness are able to achieve a higher level of post-recession interfunctional coordination	Rejected
H2a: Forest sector firms with higher pre-recession process & business systems innovativeness are able to achieve a higher level of post-recession customer orientation	Rejected
H2b: Forest sector firms with higher pre-recession process & business systems innovativeness are able to achieve a higher level of post-recession competitor orientation	Supported
H2c: Forest sector firms with higher pre-recession process & business systems innovativeness are able to achieve a higher level of post-recession interfunctional coordination	Supported
H4a: The more pre-recession product innovative a firm, the higher its post-recession financial performance	Rejected
H4b: The more process & business systems innovative a firm, the higher its post-recession financial performance	Supported
H5a: The more post-recession customer oriented forest sector a firm, the higher its post-recession financial performance	Rejected
H5b: The more post-recession competitor oriented a firm, the higher its post-recession financial performance	Rejected
H5c: The more post-recession interfunctionally coordinated a firm, the higher its post-recession financial performance	Rejected



The existing innovation knowledge base does not provide good guidance for managers to develop their innovation pathways (Hansen & Bull, 2010) and the results of this work are challenging to translate into managerial actions. The level of market orientation in a firm is largely within the control of firm managers (Kohli & Jaworski, 1990) and a host of research, both within and outside the forest sector, suggests that increases in market orientation will translate to enhanced firm performance. In fact, Song and Parry (2009) suggest that in times such as the GFC with high market turbulence and competitive intensity, an increased focus on market orientation is especially beneficial. Given this background, results of the current research are especially perplexing from a managerial perspective. We expect that the GFC was such an anomaly, such an extreme event, that the general findings from past research did not hold true. An evolution in strategic thinking and the approach to marketing has occurred in recent years in forest sector firms (Han & Hansen, 2016; Toppinen et al., 2014; Hugosson & McCluskey, 2009) and we suggest that, despite current findings, an increased focus on customers and competitors accompanied with careful dissemination and use of information about each across the firm remains an advisable path.

What is consistent and clear from our findings is that process & business systems innovativeness is important for the financial performance of forest sector firms. While manufacturing process innovation has been the norm within the sector for many years (Hansen et al., 2014; Crespell et al., 2006), our results emphasize the need to maintain this focus as well as further develop efforts with respect to business systems innovations. Given the contribution to performance during the GFC and results from previous research focused on the sector, process & business systems innovativeness can be expected to positively impact performance regardless of stage of business cycle or the general state of the economy. On the other hand, product innovativeness does not appear to positively contribute to financial performance in the sector, suggesting that firms should not concentrate in this area. We speculate whether this reflects a sector that is still emerging from a production orientation and has yet to develop the refined capabilities needed to capitalize on new product development efforts (Stendahl et al., 2007). Firms that lack intimate customer knowledge struggle to recognize customer needs and therefore struggle to create new products that meet those needs (Alberti & Pizzurno, 2013). Both of these areas may deserve improvement across forest sector firms.

### 1.4.2 Limitations and Future Research

The response rate in this study is low, but is reflective of other survey research among US forest sector companies. Connected to the low response is the small number of total responses which impacted our analysis alternatives. However, the total number of responses is not significantly different from similar recent work (e.g. Forsman & Temel, 2011). Our data fails to include firms that went out of business during the GFC and therefore gives no insight into the market orientation or innovativeness focus of those companies. Insights into the actions of failed firms during the timeframe of the GFC could provide, perhaps, the most insight regarding the impacts of market orientation and innovativeness on firm performance. For example, was it the most or least innovative companies that were most likely to fail during the recession? Given the fact that market orientation did not positively impact firm performance in this study, did failed companies over-invest in becoming market oriented? We have attempted to introduce a temporal element into this study, but this is limited by the fact that the same respondent provided data for both and their ability to accurately recall prior events is an open question. True time series data is needed to begin determining causality among market orientation, innovativeness, and firm performance.

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## Appendix 1: Constructs and construct reliability

	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Post-recession Customer Orientation, Cronbach's Alpha = .73		
We constantly monitor our level of commitment and orientation to serving customers' needs	.494	.677
Our business objectives are driven primarily by customer satisfaction	.481	.687
Our strategy for competitive advantage is based on our understanding of customer needs	.535	.655
Our business strategies are driven by our beliefs about how we can create greater value for customers	.556	.639
We measure customer satisfaction systematically and frequently	deleted	
We give close attention to after-sales service	deleted	
Post-recession Competitor Orientation, Cronbach's Alpha = .73		
We rapidly respond to competitive actions that threaten us	.482	.728
Our salespeople regularly share information within our organization concerning competitors' strategies	.586	.608
Top management regularly discusses competitors' strengths and strategies	.612	.574
We target customers where we have an opportunity for competitive advantage	deleted	
Post-recession Interfunctional Coordination, Cronbach's Alpha = .70		
All of our bus. functions (e.g. marketing/sales, mfging, etc.) are integrated in serving the needs of our target markets	.541	
Our managers understand how everyone in our business can contribute to creating customer value	.541	
All the departments in our company are responsive to each other's needs and requests	deleted	
We freely communicate information about our successful and unsuccessful customer experiences across our company	deleted	
Pre-recession Process & Bus Systems Innovativeness, Cronbach's Alpha = .94		
Our company tends to be an early adopter of new manufacturing processes	.762	.919
Our company sees creating new manufacturing processes as critical to our success	.806	.916
Our company actively seeks new manufacturing processes from outside this organization	.676	.926
When it comes to creating new processes, our company is far better than the competition	.716	.922
Our company tends to be an early adopter of new business systems	.817	.915
Our company actively develops in-house business systems solutions	.689	.924
Our company sees creating new business systems as critical to our success	.805	.916
When it comes to creating new business systems, our company is far better than the competition	.775	.918
Pre-recession Product Innovativeness, Cronbach's Alpha = .84		
Our company actively develops new products in-house	.646	.800
Our company actively seeks new products from outside this organization	.613	.814
Our company sees creating new products as critical to our success	.751	.751
When it comes to creating new products, our company is far better than the competition	.655	.796
Post-recession Performance, Cronbach's Alpha = .94		
Return on sales	.857	.923
Sales growth rate	.774	.949
After tax return on assets	.909	.906
Gross profit margin	.899	.910