

# ENTREPRENEURIAL ORIENTATION OF EASTERN WHITE PINE PRIMARY PRODUCERS AND SECONDARY MANUFACTURERS: A REGIONAL PHENOMENON?

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**Abstract.**—Eastern white pine (EWP) and red pine make up nearly 8.5 percent of the total sawtimber volume in the New England, Mid-Atlantic, and Lake States regions. The majority of white pine growing stock is found in the Mid-Atlantic and Lake State regions; however, the center of eastern white pine production and markets is in New England. EWP is produced in both hardwood sawmills and EWP mills using the same equipment and sawing methods as common hardwood species. The quality of Mid-Atlantic and Lake States eastern white pine is arguably equal to or better than that found in New England. Given transportation and transaction costs, why does this competitive advantage exist? In part, this research was pursued to discern whether producers in New England had a greater level of *entrepreneurial orientation*; if so, then these findings (i.e., competitive advantage attributes) could be presented to the industry as a whole. To assess entrepreneurial orientation, a mail survey of EWP primary and secondary manufacturers was conducted in 2004 in the New England, Mid-Atlantic, and Lake State regions. Data were collected from more than 300 respondents and findings indicate that New England manufacturers were not more entrepreneurially oriented than Mid-Atlantic or Lake State producers. Frequency of implementing new technology and/or equipment and the active search for new markets are relevant indicators of entrepreneurship among eastern white pine producers, as opposed to the hypothesized main effects of manufacturing type and region.

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## INTRODUCTION

Eastern white pine (EWP) and red pine compose nearly 8.5 percent of the total sawtimber volume in the New England, Mid-Atlantic, and Lake States regions; only a minority of this estimate is red pine (USDA Forest Service 2004). EWP is dealt with very much like hardwood species: the same equipment and sawing methods as for common hardwoods are used to produce it in both EWP mills and hardwood sawmills (J. Easterling, pers. comm., May-Aug. 2003), and it is sold primarily on an aesthetic or appearance-grade basis, very similar to hardwood lumber. In New England, both primary manufacturers and secondary producers of EWP lumber and products have long been noted for their business acumen. It is generally demonstrated by their penchant for sustaining and advancing EWP markets, while other regions' manufacturers and producers labor to obtain and/or retain similar markets. The majority of EWP growing stock is found in the Mid-Atlantic and Lake States regions, yet the center of EWP production and markets is New England (Duvall 2004; Alderman and others 2007a, b). Why does this market success exist?

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There is some evidence for a regional preference; for example, research discerned that a preference for New England EWP was found among manufacturers in the New England and Mid-Atlantic regions (Duvall 2004). Other factors also contribute to EWP's success in the New England market. The first is history: New England has been the traditional market for EWP. The region has an extensive record of producing EWP lumber dating to colonial times (Alderman and others 2007a, b). A second factor is the presence of an industry trade association, the Northeastern Lumber Manufacturers' Association (NeLMA), which is the main promotional advocate for EWP. NeLMA's main constituency is in New England and the extreme northern Mid-Atlantic region. Third, NeLMA administers EWP grading, and its certification representatives currently do not serve most of the Mid-Atlantic and Lake States regions due to a lack of market penetration. Fourth, most EWP mills in New England saw EWP exclusively, without significant production of any other species (Duvall 2004). Furthermore, in New England, the retail market consumes nearly half of the total production. While retail markets are present in the Mid-Atlantic and Lake States regions, these markets are not nearly as large as in New England (Alderman and others 2007a, b). One could argue that New England EWP manufacturers have a type of "brand-loyalty" that has developed during the past three centuries. While it is beyond the scope of this paper to examine brand-loyalty, Oliver's (1999) paraphrased definition of brand loyalty may well apply to EWP markets in New England: "A deeply held commitment to repurchase or re-patronize a preferred product/service consistently in the future – resulting in repetitive identical-brand or same brand-set purchasing, in spite of situational influences or marketing efforts that potentially could result in a switching behavior." Anecdotally, and from previous research (Duvall 2004; Alderman and others 2007a, b), EWP originating from New England does possess certain aspects of brand-loyalty. Finally, another explanation for preferring New England EWP is based on perceived wood quality; however, the quality of EWP originating from the Mid-Atlantic or Lake States regions is arguably at least as good as that found in New England (Alderman and others 2007a, b).

In an effort to explain New England's competitive advantage in the face of transportation and transaction costs, this research in part asked whether New England manufacturers were imbued with greater *entrepreneurial orientation* (EO) than those from other regions. If these producers were found to have this attribute to a greater degree, then these attribute findings (competitive advantage attributes) could be presented to the entire industry to assist all regions' producers in the utilization and marketing of the EWP resource. To begin, the foundations of what is meant by "entrepreneur" are explored.

The French verb *entreprendre*, meaning "to undertake," is the origin of the term "entrepreneur." Cantillon (1755) defined "entrepreneur" as a businessman's method of risk-bearing to manage production factors in order to deliver a product or service to the market. In the early 20th century, Schumpeter (1934) described an entrepreneur as a person who is willing and able to transform a new idea or invention into a successful innovation; he concluded that entrepreneurship is a critical driving force for change. More specifically, he posited three typologies of entrepreneurship. The first is *entrepreneurial behavior*, which is the focus of this paper, and includes: 1) Introducing a new product and/or service; 2) new production method(s); 3) new market(s); 4) conquering a new source of raw materials; or 5) reorganizing an industry in a new manner. Schumpeter's other typologies are *entrepreneurial motivation* and *entrepreneurial action*. Twenty-first century definitions emphasize a strong link between entrepreneurship and innovation and differentiate entrepreneurship from typical forms of business management. More concretely, Miller (1983) summarized the characteristics of an entrepreneurial firm as "one that engages in product market innovation, undertakes somewhat risky ventures, and is first to come up with proactive innovations . . ." Entrepreneurship also is

viewed as a critical link between new knowledge and economic growth – as it facilitates knowledge transfer. Entrepreneurs incorporating new technology or equipment may indicate that technology is a business opportunity for those entrepreneurially oriented (Jelinek 1996).

The most widely used operationalization of EO or strategic posture (Table 1) was formulated by Covin and Slevin (1989); they theorized that innovation, proactiveness, and risk-taking behave in concert to “comprise a basic, unidimensional strategic orientation” and therefore should be aggregated when investigating entrepreneurship. The construct of EO is a combination of these three dimensions: *innovativeness* (to revitalize current products or services), being more *proactive* than competitors, and *taking risks* by introducing new and indeterminate (in regards to whether the introduction will be successful) products or services (Miller 1983; Covin and Slevin 1989, 1990, 1991; Zahra 1993; Zahra and Covin 1995). Typically, we evaluate entrepreneurship by measuring the entrepreneurial orientation construct. A further elucidation of EO follows.

## ENTREPRENEURIAL ORIENTATION

The EO scale’s theoretical basis is the assumption that entrepreneurial firms differ from other firm types. Initial EO research posits that entrepreneurial firms tend to take more risks and proactively search for new opportunities (Mintzberg 1973, Khandwalla 1977). Similarly, one avenue by which entrepreneurs can differentiate their products or services is new product innovation, as entrepreneurs are noted for their motivation “to take considerable risks” (Miller and Friesen 1982). Covin and Slevin (1988) suggested that the level of entrepreneurship was an aggregate of three subconstructs. They then developed an EO scale measuring: *Innovation* – action to gain a competitive advantage for the firm, *Proactiveness* – competing aggressively with other firms, and *Risk-taking* – taking business-related risks. Firms are considered entrepreneurial if they have high scores for each dimension. Entrepreneurially oriented firms take risks and are proactive by introducing innovative products or services that change market boundaries and market behavior.

## SUB-DIMENSIONS OF ENTREPRENEURIAL ORIENTATION

### Innovation

Schumpeter (1934) defined “innovation” as the introduction of something new (idea, method, technology), and it is the elemental task of an entrepreneurial firm. Covin and Miles (1999) claimed that innovation was the most critical factor in defining entrepreneurship and Stevenson and Gumpert (1985) noted that it is the “heart of entrepreneurship.” Schumpeter (1934) further defined innovation as the creation and development of new products or processes, and Fagerberg (2004) described it as the first attempt to put an invention or process into practice.

### Risk-Taking

McClelland (1960) wrote that entrepreneurship “involves, by definition, taking risks of some kind...” and entrepreneurs by definition are not risk-averse. Entrepreneurs often view business circumstances as being less risky than do non-entrepreneurs (Palich and Bagby 1995). Similarly, Busenitz (1999) argued that entrepreneurs tend to view situations more favorably than do non-entrepreneurs. *Risk-taking* is not the same as recklessness, as entrepreneurs are proficient at risk-assessment. As risk-taking is a salient constituent of entrepreneurial behavior, many entrepreneurs succeed by risk-avoidance and allowing others to assume risk; for instance, “My idea of risk and reward is for me to get the reward and others to take the risks” (cite from Di-Masi 2005).

## **Proactiveness**

Stevenson and Jarillo (1990) conceptualized *Proactiveness* as the “willingness to pursue opportunity.” Likewise, Lumpkin and Dess (2001) viewed proactiveness as an “opportunity-seeking, forward-looking perspective[,]” where new products and/or services are introduced before the competition and where future demand is identified to create change.

## **OBJECTIVES**

The research questions were framed with the following objectives:

1. To assess whether entrepreneurial orientation was region-specific (i.e., stronger in New England than in the Mid-Atlantic or Lake States region) and to assess the EO of primary producers and secondary manufacturers.
2. To determine whether entrepreneurial orientation was affected by gross sales, total production or consumption of EWP, an active search for new markets, frequency of technology or equipment implementation, and number of employees.
3. To develop a parsimonious model of entrepreneurial orientation.

## **METHODOLOGY**

### **SAMPLE AND DATA COLLECTION**

Research data were collected from primary and secondary manufacturers in the New England, Mid-Atlantic, and Lake States regions by a mail survey questionnaire. The EO segment of the questionnaire was designed based on relevant literature and then reviewed by faculty from Virginia Tech, the University of Wisconsin, and U.S. Department of Agriculture, Forest Service personnel. The survey instrument was pretested with 30 industry representatives. EWP manufacturers in three regions of the eastern United States were the population of interest: the Lake States (Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin), the Mid-Atlantic states (Kentucky, Maryland, North Carolina, Pennsylvania, Tennessee, West Virginia, and Virginia), and the New England states (Connecticut, Massachusetts, Maine, New Hampshire, New York, Rhode Island, and Vermont). The sample frame for each region was developed on a state-by-state basis from state and industry directories, national databases, trade association membership lists, and the NeLMA membership directory. Firms then were randomly selected through the use of these resources.

Consistent with previous EO studies, surveys were addressed to high-level executives (for instance, the owner or general manager). Numerous researchers have argued that an owner/general manager is the primary decision-maker and consequently decides on strategic orientation (Lumpkin and Dess 1997, Miller 1983).

After development of the sample frame and pretesting, the initial mailing was sent to 2,741 primary producers and secondary manufacturers in April 2004. A census was attempted for NeLMA members. The first mailing was followed by a reminder postcard approximately 3 weeks later, a second questionnaire was mailed 2 weeks after the reminder postcard was sent, and a second reminder postcard was sent after an additional 3 weeks. In addition to the mail survey, personal interviews were conducted after analysis of the mail survey. These interviews were conducted to validate mail survey results and gather information that may not have been addressed in the questionnaire.

## Nonresponse Bias

The assessment of nonresponse bias was patterned on the Armstrong and Overton (1977) methodology. Respondent survey data (30 subjects) were contrasted with 30 nonrespondents contacted by phone (after completion of data collection). Nonrespondents were asked four questions and then asked to estimate their annual EWP consumption. These questions assessed two EWP product attributes and two business service attributes. The following attributes received the highest or lowest overall mean ratings and were selected for analysis: *supports local industry*, *rustic look*, *consistent prices*, and *flexible payment*. It was assumed that these attributes would be robust indicators of bias. Analysis of variance (ANOVA) was performed and there were no significant differences in four of the five contrasts: *rustic look*, *consistent prices*, *flexible payment*, and *production volume*. There was strong evidence for the statistical significance of *supports local industry* as respondents rated this factor higher than did nonrespondents (mean: 5.30 vs. 4.07;  $P = 0.01$ ). *Supports local industry* may be more relevant to smaller mills, and the respondent sample was skewed toward these firms.

## Measures – Dependent and Independent Variables

Entrepreneurial orientation was assessed by the following main or fixed effects: 1) Primary or secondary firm, 2) region, 3) gross sales, 4) total production or consumption of EWP, 5) actively searching for new markets, 6) frequency of new technology and/or equipment implementation, and 7) number of employees.

EO was measured using items posited by Covin and Slevin (1988, 1989). EO has been utilized in several research settings and has demonstrated more than acceptable reliability and validity (Becherer and Maurer 1997, Dickson and Weaver 1997, Barringer and Bluedorn 1999). Each questionnaire item asked the respondents to indicate their perception on a seven-point Likert-type scale, ranging from ‘strongly disagree’ to ‘strongly agree’ with scale points on each side and a ‘neither’ point in the center (Brinberg and Axelson 2002).

Cronbach’s alpha, correlation analysis, principal components analysis (PCA) with varimax rotation, multivariate analysis of variance (MANOVA), and F-tests at  $\alpha = 0.05$  were utilized. SPSS® 12.0 (SPSS, Inc., Chicago, IL, 2003) was used for all analysis. PCA was used to detect structure in the relationships between variables. PCA reflects both the common and unique variance of variables, as the algorithm computes a linear combination of variables so that the maximum variance is extracted from the variables.

Cronbach’s alpha (Cronbach 1951) is a statistical method used to measure the internal consistency reliability of item(s) and the extent to which items are interrelated to one another (Churchill 1979). Alpha-levels above 0.70 are considered acceptable for organizational research (Nunnally 1978). Cronbach’s alpha was 0.88 for the aggregated EO constructs. Cronbach’s alphas also were calculated for individual constructs: *Proactiveness* ( $\alpha = 0.68$ ), *Risk-taking* ( $\alpha = 0.79$ ), and *Innovation* ( $\alpha = 0.86$ ). As the results were reliable, all three EO constructs are reported.

PCA also was utilized to assess whether the dimensions of EO represented discrete constructs and to assess reliability. The factor loadings for the EO scale indicated that all three sub-dimensions loaded on the appropriate factors, which accounted for 55 percent of the total variance. *Risk-taking* loaded on factor one (overall factor loading – 0.90; low-loading item = 0.89); *Proactiveness* – factor two (overall factor loading – 0.89; low-loading item = 0.71), and *Innovation* loaded on factor three (overall factor loading – 0.87; low-loading item = 0.81) (Table 1).

**Table 1.—Entrepreneurial orientation factor loadings by principal components analysis<sup>a</sup>.**

EO Constructs	Components		
	1	2	3
Innovation	.336	.348	<b>.875</b>
Proactiveness	.300	<b>.894</b>	.333
Risk-taking	<b>.902</b>	.295	.316

<sup>a</sup>Varimax rotation.

Multicollinearity was assessed by using variance inflation factors in accordance with Belsley and others' (1980) recommendations, and the results indicated that the independent variables were not significant and therefore were not confounded with each other. Additionally, the data were mean-centered; that is, the mean was subtracted from all observations. Centering variables may eliminate multicollinearity problems in the data because correlation with other independent variables may be reduced. Interaction terms are subject to multicollinearity and centering is appropriate for variables whose interactions are being modeled (Jaccard and Turrisi 2003).

## ANALYSIS AND RESULTS

### DEMOGRAPHICS

The adjusted response rate for all regions and both industry segments was 17.0 percent; by region it was as follows: New England – 21.4 percent, the Mid-Atlantic – 12.8 percent, and the Lake States – 17.6 percent). By industry segment, the adjusted response rate was: Primary – 21.7 percent (New England – 48.9 percent, the Mid-Atlantic – 15.8 percent, and the Lake States – 17.2 percent) and Secondary – 12.5 percent (New England – 17.0 percent, the Mid-Atlantic – 14.9 percent, and the Lake States – 7.2 percent). The adjusted response rate was calculated by dividing the number of returned and completed questionnaires by the total number of questionnaires mailed (after subtracting unusable questionnaires).

Analysis indicates that 92 percent of the respondents were high-level executives: Owner (39 percent), president (32 percent), company manager (12 percent), and vice-president (9 percent). Total sales, by category were the following: 49 percent having less than \$1 million in sales, followed by \$1-5 million (27 percent), \$5-15 million (14 percent), more than \$50 million (4 percent), \$15-25 million (3 percent), and \$25-50 million (3 percent). Firm size (employee basis) was dominated by those employing less than 25 people (73 percent), followed by 25-50 (14 percent), 51-100 (7 percent), 101-200 (4 percent), and 200 or more (2 percent).

### MODELING ENTREPRENEURIAL ORIENTATION

To test construct relationships in a simultaneous manner, analysis was conducted using a MANOVA general linear model. The main effects were entered individually to assess their potential impact on EO: Primary or Secondary Firm, Region, Gross Sales, Total Production, Number of Employees, Frequency of New Technology or Equipment Implementation, and Actively Searching for New Markets (Table 2). The following main effects were not significant and were not retained in the model: Primary or Secondary Firm ( $P = 0.65$ ) (Wilks'  $\alpha$  reported for all MANOVA results), Gross Sales ( $P = 0.22$ ), Total Production ( $P = 0.26$ ), and Number of Employees ( $P = 0.22$ ). Region ( $P = 0.05$ ), Frequency of New Technology or Equipment Implementation ( $P < 0.01$ ), and Actively Searching for New Markets ( $P < 0.01$ ) (Fig. 1) were significant and were retained for the EO model.



**Table 2.—Means and standard deviations of entrepreneurial orientation construct items.**

Construct Items		N	Min	Max	Mean	Std. Dev.
Management philosophy	(I1)	272	1	7	4.10	1.87
New products/services - A	(I2a)	273	1	7	4.52	1.88
New products/services - B	(I2b)	265	1	7	3.86	1.72
Deal with competitors	(P1a)	261	1	7	4.32	1.63
Management response	(P1b)	265	1	7	3.86	1.44
Deal with competition	(P1c)	270	1	7	3.44	1.80
High- vs. low-risk projects	(R1)	269	1	7	3.79	1.69
Company management	(R2)	267	1	7	3.63	1.66
Respond to competitors	(R3)	266	1	7	4.05	1.71
<b>Constructs</b>						
Innovation		259	1	7	4.13	1.51
Proactiveness		255	1	7	3.86	1.28
Risk-taking		266	1	7	3.83	1.48

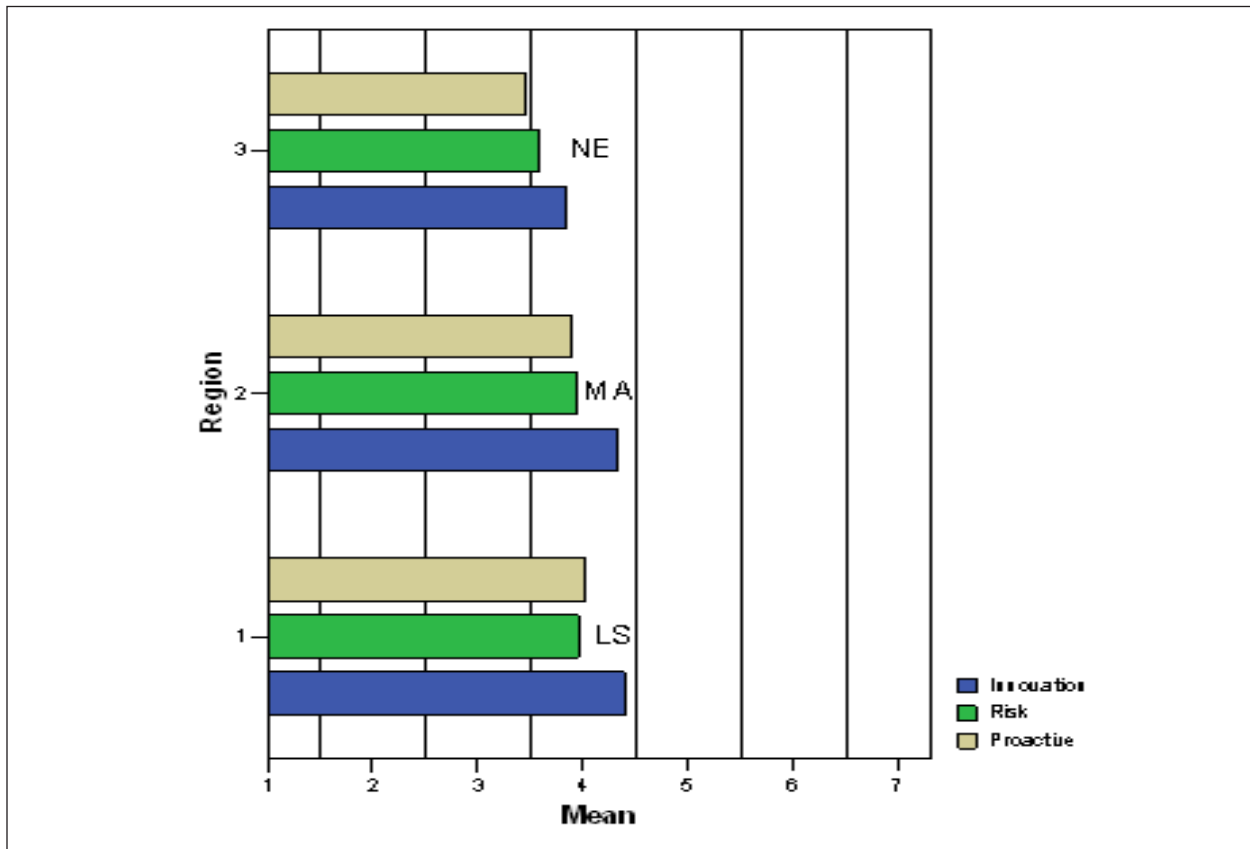


Figure 1.—Entrepreneurial orientation construct means. (NE = New England states, MA = Mid-Atlantic states, and LS = Lake States.)

The overall MANOVA model was significant, with  $F_{(3, 209)} = 4.19$  and  $P < 0.01$ ; however, only one main effect was significant in the overall model: *Actively Searching for New Markets* ( $P < 0.01$ ). A between-subjects test was conducted to assess whether differences in the model existed between primary producers and secondary manufacturers. Differences were detected, leading to a corrected model of: *Innovation* ( $F_{(3, 29)} = 2.02$  and  $P < 0.01$ ); *Risk-taking* ( $F_{(3, 29)} = 1.80$  and  $P = 0.01$ ); and *Proactiveness* ( $F_{(3, 29)} = 2.21$  and  $P < 0.01$ ). Next, while most fixed effects were found to be non-significant, a between-subjects analysis was conducted for each main effect to ascertain whether differences existed between primary producers and secondary manufacturers.

In the between-subjects assessment of Region, only *Risk-taking* was significant ( $P = 0.02$ ). In Tukey's HSD multiple comparisons, *Risk-taking* resulted in significant statistical differences between the Mid-Atlantic and New England regions ( $P = 0.03$ ); the Mid-Atlantic region had a greater mean (0.22 vs. -0.39, respectively). This result may indicate that Mid-Atlantic firms are more aggressive in their approach in order to maintain or access new markets.

Regarding Frequency of New Technology/Knowledge Implementation, only *Risk-taking* was significant ( $P = 0.04$ ). Tukey's HSD analysis for Frequency of Implementation resulted in statistical significance for: *Innovation*: Between 1 and 3 years ( $P = 0.02$ ) and 3 and 5 years ( $P = 0.01$ ) and *Proactiveness*: Between 1 and 3 years ( $P < 0.01$ ) and 3 and 5 years ( $P < 0.01$ ). Those who implement new technology or knowledge frequently could be categorized as entrepreneurs based on Jelinek's (1996) proposition that technology is viewed as a business opportunity for entrepreneurs.

For Actively Seeking New Markets, *Proactiveness* and *Risk-taking* were significant ( $P = 0.01$  and  $P = 0.04$ , respectively). Results from Tukey's HSD analysis revealed differences in all three constructs: *Innovation*: Yes vs. No ( $P < 0.01$ ); *Proactiveness*: Yes vs. No ( $P < 0.01$ ); and *Risk-taking*: Yes vs. No ( $P < 0.01$ ). Obviously, in all sub-constructs, the means for Yes were much greater and intuitively it would seem that the Active Search for New Markets is a hallmark of entrepreneurs.

Last, utilizing principal components analysis, all constructs were significant (Table 1): *Innovation* (0.875); *Proactiveness* (0.894); and *Risk-taking* (0.902).

## DISCUSSION AND CONCLUSION

A myriad of exogenous and endogenous factors affect business success. In the context of EO posture, the research question was whether New England manufacturers and producers were more entrepreneurially oriented than other regions' firms—they were not found to be so. Second, no evidence was found to support the hypothesis that secondary producers possessed a greater level of EO than did primary manufacturers. Entrepreneurial orientation appears not to be the primary factor for New England firms' success.

In the assessment of interactions, several were not significant. Most notably among those variables were Region and Firm Size (sales or production). Two variables were strong indicators of EO—*Frequency of Implementing New Technology* and *Actively Searching for New Markets*, both yielding significant interactions. These findings indicate that firms searching for new markets and frequently implementing new technologies appear to be more entrepreneurially oriented. This result is not surprising, as anecdotal evidence throughout business history suggests that entrepreneurs are innovators and skilled risk-takers.



New England's competitive advantage appears to be historically based and hence a type of brand loyalty has developed over the centuries. With this historical perspective in mind, what can firms in the Mid-Atlantic and Lake States do to become more competitive? Managers will have to strengthen their entrepreneurial orientation. From model analysis, this approach would include incorporating *innovation*, whether product- or service-based; *taking risks* by introducing new products or services; and adopting a *proactive* posture, which would involve targeting the competition and/or seeking new markets. Mid-Atlantic and Lake States firms' marketing efforts have to address brand loyalty and regional preference. Favorable attitudes assist in creating brand loyalty, but consumers have to be exposed to a product before they are inclined to purchase it.

Many initiatives can be employed to attain a strategic entrepreneurial posture. Developing an EO posture does not result simply from circumstance, but rather from a combination of factors, the most important of which is firm managers' incorporating an entrepreneurial orientation.

## LIMITATIONS

As with any research, this study had potential limitations, which can be attributed to several factors, including time and monetary constraints. The most significant limitation was the collection of data from only one individual in each organization. Two problems may ensue. The first possible problem is common method variance, when data are collected from the same source. The second problem could arise when trying to interpret and generalize results; as Podsakoff and Organ (1986) noted, "any defect in that source contaminates both measures, presumably in the same fashion and in the same direction . . .". The data suggest that the respondents may have been skewed toward smaller secondary producers; however, nonresponse bias analysis resulted in only one significant result, suggesting that the results could apply to the larger population. An additional limitation is that this study was a one-shot experimental design rather than longitudinal research.

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