

Do management control systems stifle innovation in small firms? A mediation approach

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www.jsbs.org

Keywords:

Small business, Management control, Innovation, Accounting

ABSTRACT

How entrepreneurial orientation (EO) as a strategy manifests into entrepreneurial behaviors like innovation, is an important research topic but not well understood. There is a gap in the examination of EO and entrepreneurial behavioral outcomes. Since mediators exist (see Rauch, Wiklund, Lumpkin, & Frese, 2009; Wales, 2016; Wales, Patel, Parida, & Kreiser, 2013) additional research is needed to uncover these potential relationships. Research suggests that management controls systems (MCS) may serve as a mediator between strategy and innovation outcomes. There is, however, conflicting evidence regarding the impact and use of management control systems (MCS) in the small firm context. As such, we examine the relationship between an individual-level measure of EO (IEO) and innovation level and explore the mediating role of financial and nonfinancial MCS on that relationship. Results suggest that nonfinancial MCS partially mediate the relationship between IEO and innovation, while financial MCS do not.

Introduction

Research generally shows a strong association between entrepreneurial orientation (EO) and firm performance, and this relationship has been found to hold across multiple operationalizations of the construct, as well as a number of cultural settings (see, Rauch, Wiklund, Lumpkin, & Frese, 2009). The true value in EO is the creation of strategy through which innovativeness, risk-taking, and proactiveness (Lumpkin & Dess, 1996; Wiklund, 1998), are consistently communicated and manifest to innovative behaviors (Kang, Matusik, Kim & Phillips, 2016; Pett & Wolff, 2016) or outputs (e.g., Shan, Song, & Ju, 2016; Wang & Juan, 2016). In fact, higher levels of EO are consistently associated with the firm's ability to find leverageable new opportunities via the creation of innovative solutions; thus,

providing a competitive advantage and superior performance effects (Ahluwalia, Mahto, & Walsh, 2017; Aloulou & Fayolle, 2005; Forés & Camisón, 2016; Ireland, Hitt, & Sirmon, 2003; McDowell, Peake, Coder, & Harris, 2018). As such, both EO (Covin & Slevin, 1991; Wiklund & Shepherd, 2003, 2005) and individual entrepreneurial orientation (IEO) (Bolton & Lane, 2012), when proxying strategic priority have been shown to influence reported innovation levels, or innovation output within small firms (Avlonitis & Salavou, 2007; Bolton, Peake, & Coder, 2017).

Based on the initial work of Covin and Slevin (1986, 1989) Lumpkin and Dess (1996) and Miller (1983), EO is generally viewed at the organizational level 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(s)” (Rauch et al., 2009, p. 763). Since the strategic direction of small firms of-

ten depends on the values and priorities of the owner (Dickson & Weaver, 2008), IEO has been a valuable construct in bringing EO from a firm level phenomenon to the individual level (Bolton & Lane, 2012; Goktan & Gupta, 2015). While research examining EO and innovation as an output of the firm stemming from innovativeness as a strategic priority, has been conducted (e.g. Anderson & Eshima, 2013; Atuahene-Gima & Ko, 2001; Tang, Chen, & Jin, 2015) there is still opportunity to examine these constructs both in terms of IEO and within the small firm context. This is particularly salient since innovation within small firms generally links to superior performance (McDowell et al., 2018), yet the linking mechanisms between entrepreneurial strategy and translating that strategy into innovation activity merits further exploration.

There are likely important mediating mechanisms to this relationship since innovation is a process facilitated by priorities, behaviors, and organizational processes within the firm (Lumpkin & Dess, 1996). Management control systems, when considered as “formal, information-based routines and procedures managers use to maintain or alter patterns in organizational activities” (Simons, 1995, p. 5), have been argued to serve as an important *facilitator* between the strategy of the firm and innovation outcomes (Davila, Foster, & Oyon, 2009). These systems were traditionally more oriented towards accounting systems but have morphed to include a broader variety of activities (Otley, 2016). The role of MCS in promoting or stifling innovation within small and/or start-up firms is a source of debate and is argued to be context-dependent.

Early research on MCS suggest that accounting and control are purely a hindrance to innovation (Ambile, 1998) since MCS may lead to overly detailed, bureaucratic processes, which suppress innovation (Davila et al., 2009). Such research suggests that informal controls based in social norms tend to be more effective in small businesses (e.g., Abernethy & Brownell, 1997; Abernethy & Lillis, 1995; Ouchi, 1979). More recently, empirical evidence suggests there is evidence counter to these decades-old assumptions (Bisbe & Otley, 2004; Henri, 2006; Li, Li, Liu, & Wang, 2005; Sandino, 2007) since MCS provide processes that codify and disseminate information, streamline innovation processes, and lend accountability for relevant employees and across departments (e.g., Barringer &

Bluedorn, 1999; Davila et al., 2009; Greiner, 1972); thus improving innovation levels.

Additionally, Davila et al. (2009) suggest that innovation level is contingent upon owner/manager characteristics and priorities, firm characteristics, and the level of management control implemented within the firm. Further, when considered from a contingency theory perspective, Davila et al. (2009) suggest that perhaps innovation levels may differ across entrepreneurial and/or small firms based on these preceding factors, indicating the need for more analysis focused on this area. Studies related to MCS have traditionally focused on established, larger firms embedded in stable contexts (Davila et al., 2009); however, with the importance of small businesses to the global economy, the field is remiss to overlook MCS adopted by or embedded within smaller firms by the owner/manager. Small firms must be flexible, agile, and innovative but also organized to codify information and streamline processes. Further, the founders' psychological frame likely impacts adoption of management controls as opposed to the more informal forms of control.

The small amount of prior research integrating MCS into this discussion provides inconclusive evidence for whether such controls benefit or harm the innovation level within small, entrepreneurial firms, and for how owner/manager characteristics may influence the implementation of such controls. Part of this divergence in the literature may be due to the theory basis used to explore such efforts (Davila et al., 2009). Since universal solutions to strategy implementation and control for small businesses is unavailable, contingency theory may provide an updated and useful lens for examining these phenomena. In particular, contingency theory has been studied and applied in a variety of contexts including large and small firms for 60 years (Lawrence & Lorsch, 1967; Thompson, 1967; Tosi & Slocum, 1984; Woodward, 1965). It is based on the idea that fit between organizational structural variables, such as formalization, decentralization, etc. and contextual variables, such as technology, individual predispositions, the external environment, culture, etc. are critical to organizational success.

We examine four mediator models couched in contingency theory for 185 small firms in the Southeastern United States. We first explore the role of financial management control mechanisms as a media-

tor between the IEO level of the firm's owner/manager and the different innovation approaches reported for the firm. We then follow with an exploration of the mediating role (or lack thereof) of non-financial, primarily human resources oriented, management controls on the relationship between owner/manager IEO and reported innovation levels for the firm. Our results suggest that although higher levels of IEO are significantly associated with greater levels of management control, non-financial controls, (i.e., human resources-oriented controls) do partially mediate the relationship between IEO and different innovation approaches. Given these results, it appears that investments in management control of personnel issues plays a substantial and important role in facilitating innovative activity within the firm.

The remainder of the paper is organized as follows. In the subsequent section, we provide a theoretical basis and develop hypotheses for analysis. Then, we outline the methods employed in our analyses, followed by presentation of the results. Finally, we conclude with a discussion, outlining both academic and practical implications of this research, as well as limitations and opportunities for future research.

Theory And Hypothesis Development

Contingency Theory

Contingency theory has been one of the most widely utilized theories in organizational research, dating back to the 1960s. The fundamental assumption is that there is no one best way to manage an organization. According to Tosi and Slocum (1984), organizational outcomes are the consequence of the fit between several structural and contextual variables. Van de Ven, Ganco, and Hinings provide a critical examination of contingency theory and state "contingency theory proposes that performance outcomes of an organizational unit are a result of the fit between the unit's external context and internal arrangements" (Van de Ven et al. 2013, p. 394). Contingency theory has been one of the dominant theories in management control research for many years. In particular, research suggests that there is not one universally appropriate control system that works in every situation. In fact, control systems must be carefully and uniquely aligned with other organizational factors (Fisher, 1995). The theory has also been

used to explain various relationships involving innovation (Fernandes & Solimun, 2017; Huang, 2009; Teasley & Robinson, 2005). Chen, Liu, and Cheung (2014) use contingency theory in their examination of managerial ties, radical innovation, and market forces. In particular, they produce a model that suggests managerial ties have a positive impact on radical innovation and that market forces may have a positive or negative effect on these relationships. Van de Ven, et al. (2013) suggest that technology (i.e. innovation), in particular, is a critical boundary that needs further examination under the contingency theory lens.

Finally, while contingency theory has mainly focused on large organizations, it has been applied in various contexts to small businesses.

"Complex relationships exist among environmental, organizational, and individual/group variables, and these relationships and their salience change with the strategic and organizational design choices made by members of the dominant coalition" (Tosi & Slocum, 1984, p. 9).

For small businesses, the dominant coalition is usually the small business owner, and as stated earlier, individual predispositions are a contextual variable that are often included in contingency theory-based research. In particular, the IEO of the small business owner likely impacts the innovation levels of the firm. As such, we suggest that contingency theory is most appropriate when examining the relationship between IEO, managerial control systems, and innovation.

Small Business Context

Although there is much research on innovation and small businesses, there is a noticeable gap specifically examining variance in incremental versus radical innovation among small businesses as well as the effect of control systems on small business innovation. Innovation in general has been shown to have a positive effect on small business performance (Keskin, 2006). However, given that incremental innovation focuses on extensions to and building on current product or service offerings (Subramaniam & Youndt, 2005), while radical innovation focuses on disrupting current product or service offerings (Subramaniam & Youndt, 2005), differential performance effects are possible. Past research, however, does suggest that radical and

incremental innovation are highly correlated, with 90% of firms in a study conducted by Plotnikova, Romero, and Martínez-Román (2016) reporting that incremental innovation complements their radical innovation processes. As such, it is unsurprising that small firms engage in both types of innovation, with positive effects often found for both, depending on the context.

In their study, Keskin (2006) surveyed 157 Turkish SMEs and measured innovativeness and firm performance using a model from Calantone, Cavusgil, and Zhou (2002). Keskin (2006) found that when SMEs frequently try new ideas, seek out new ways to do things, develop new product/services, and try to be creative in their methods of operations, they become more profitable, get higher market share, and grow at a higher rate. These findings are consistent with those found in similar studies (Forsman & Annala, 2011; Saunila, Ukko, & Rantanen, 2014).

Bhaskaran (2006) examined incremental innovation in 87 seafood retail SMEs in Australia. Results of this study suggest incremental innovation positively associated with both profitability and sales growth. In their study of 108 UK SME's in manufacturing, technology, and information industries, Oke, Burke, and Myers (2007) found that these SMEs tend to focus on incremental innovations and that such innovations are positively related to sales growth.

Additionally, research has attempted to identify controls and forces that influence the innovation level of small businesses. While it has been found that many external factors such as government policy, resource scarcity, and economic climate can have a significant effect on innovation in small businesses, there is a noticeable lack of research focusing on internal factors and controls (Foreman-Peck, 2013; Madrid-Guijarro, García-Pérez-de-Lema, & Auken, 2016; Woschke, Haase, & Kratzer, 2017).

EO versus IEO

EO has been widely studied (see Rauch et al., 2009 for a meta-analysis) and the subject of a special issue of *Entrepreneurship Theory and Practice* (Covin & Lumpkin, 2011). The EO scale was constructed using behaviors identified in business strategy and entrepreneurship literature (Covin & Slevin, 1989; Miller, 1983) and generally includes three to five dimensions:

innovativeness, willingness to take risks, proactiveness, competitive aggressiveness and autonomy (Lumpkin & Dess, 1996). The Rauch et al. (2009) meta-analysis looked at 51 studies with 14,259 companies and found that in the majority of the studies, only innovativeness, risk-taking, and proactiveness were used, and that the EO construct was studied as unidimensional (in 37 studies) as opposed to multidimensional (in 14 studies). Rauch et al. (2009) found EO was correlated with performance (“moderately large” $r = 0.242$) and robust to different operationalizations of key constructs as well as cultural contexts.

Research on small business strategy uses EO also. Messersmith and Wales (2013) looked at EO and the role of human resource management in young firms, and Lechner and Gudmundsson (2014) looked at EO, firm strategy, and small firm performance. In such studies, EO is measured at the firm-level where the response of one individual became the measure of EO for the entire firm. In the small business context, EO is generally studied as a firm-level construct. For example, Wiklund, (1998) defines EO as a “willingness of a firm to engage in entrepreneurial behavior” (Wiklund, 1998, p. 65) and Lumpkin and Dess (1996) suggest that EO reflects how an organization operates. Primarily studied for its relationship to firm performance, EO has been shown to explain on average, 24% of variation in performance of the firm (Rauch et al., 2009). Additionally, Rauch et al. (2009) concluded that other factors are likely and recommended examining other variables. Prior research suggests a gap between EO and entrepreneurial behavior in the organization (Kilenthong, Hultman, & Hills, 2016), such as innovation level (Kollmann & Stöckmann, 2014).

Bolton and Lane (2012) proposed measuring an individual's EO with their IEO scale. Initially using all five dimensions of EO, Bolton and Lane (2012), adapted the EO scale by asking participants to respond to Likert scale statements referring to the individual rather than to the firm (e.g., changed “my firm” to “I”). Innovativeness, risk-taking, and proactiveness emerged as three distinct factors resulting in the ten-item IEO scale which demonstrated validity and reliability. As such, this appears to be a more appropriate measure in the small-firm context, where the owner/manager sets the strategic posture for the firm (Andries & Czarnitzki, 2014; Madison, Runyan, & Swinney, 2014; Nejati,

Quazi, Amran, & Ahmad, 2017).

In their analysis, Strese, Keller, Flatten, & Brettel (2018) examined the effects of a given CEO's passion for inventing on the radical innovation of SMEs as well as a hypothesized moderating effect from shared vision, defined as "the extent to which organizational members have collective goals and common aspirations with regard to their firm's future development." Surveying a sample of 388 German SMEs, it was found that CEO's with a high passion for invention represented a strong correlation with the radical innovation of their firm, and that this relationship was strengthened by the firm's shared vision (Strese, et al., 2018). While not completely congruent, the measure of passion for invention could be stated to be comparable to that of IEO; thus, further validating the relevance of individual level constructs in the small firm setting.

IEO and Innovation Level

Innovation can vary in terms of the "newness" to the organization or unit (Dewar & Dutton, 1986). In particular, it can be categorized as radical vs. incremental. Radical innovation involves clear departures from existing technology or practice (Duchesneau, Cohn & Dutton, 1979; Ettlie, 1983) while incremental innovation is considered to be minor improvements or simple adjustments in current technology or practices (Munson & Pelz, 1979). There is a dearth of research examining the relationship between EO and innovation level and to our knowledge, no prior studies have examined IEO, management control, and innovation level simultaneously. This is particularly relevant given the importance of the owner/manager's role in a small business context. In line with the upper echelons view (Hambrick & Mason, 1984), small business research suggests that the owner/manager sets the firm's strategic posture or orientation for important arenas of operation (Aloulou & Fayolle, 2005; Chaganti, Watts, Chaganti, & Zimmerman-Treichel, 2008), including the pursuit of innovation. Given IEO has not been frequently used in such investigations, however, we develop our hypotheses based on evidence provided by the firm-level EO construct. Given that EO is the firm-level operationalization of the individual-level construct, we anticipate the same direction of effects.

Researchers have examined the EO and innovation link across different contexts, although most are

specialized contexts, such as particular industries and look only at innovation as a mediator rather than an outcome. For example, Avlonitis and Salavou (2007) investigate the relationship between EO, product innovativeness, and performance in 143 Greek firms. They found that entrepreneurs with high EO correlated with new product uniqueness and product newness to the firm, and as such indicates a relationship between EO and innovation within the firm. In their study of EO and innovation in exporting, Boso, Cadogan and Story (2013) found that EO in export behavior led to export product innovation success. In their study of EO in creative industries, Parkman, Holloway, and Sebastiao (2012) found that a highly significant association existed between EO and innovation capacity in their larger study. In their examination of the Italian and Spanish tile industries Alegre and Chiva (2013) found a positive and significant link between EO and innovation performance of the firm, although distinctions in types of innovation were not made and the ultimate goal was to examine firm performance. Although the parameters of their study differ quite markedly from most EO-innovation work, Kollmann and Stöckmann (2014) found that the three dimensions of EO significantly correlate with exploration activities within the firm. This suggests a positive relationship between EO and innovative activities. Further, Kollmann and Stöckmann (2014) argue that it is critical to examine how EO manifests into entrepreneurial behavior.

Additionally, some research has been conducted on the relationship between spin-offs and innovation (Scaringella, Miles, & Truong, 2017). Spin-offs are defined as business ventures stemming from technological knowledge originating from universities, research centers, and corporations (Scaringella, et al., 2017). Scaringella et al. (2017) concluded that spin-offs' ability to capture knowledge from both customers and the originating research center directly and positively affects their ability to radically innovate. Although not a direct link between IEO and innovation, Scaringella et al. (2017) provides a valuable backdrop for this study.

Despite the myriad of contexts, studies exploring EO and innovation have generally reported a significant effect for EO as a precursor to innovation of all types. As such, we hypothesize the following relationship using IEO as the individual-level operationalization of the EO construct.

Hypothesis 1A. IEO of the owner/manager is positively associated with reported incremental innovation level for the firm.

Hypothesis 1B. IEO of the owner/manager is positively associated with reported radical innovation level for the firm.

Management Control Processes

Simons (1990) states “management control systems are the formalized procedures and systems that use information to maintain or alter patterns in organizational activity” (Simons, 1990, p. 128). There have been several categorizations of MCS in the literature, ranging from formal/informal, behavioral/input/output, to financial/nonfinancial. Financial controls involve traditional accounting-based methods such as budgets, cash flow, sales, etc. Nonfinancial controls include performance evaluations, policies/procedures, and customer feedback. Companies generally begin by adopting informal and nonfinancial control systems according to Davila and Foster (2007). As they grow there is a move toward more formal and financial MCS because the constant interaction and observation required of many nonfinancial MCS become cumbersome.

MCS have evolved in ways to assist in increasing innovation. “The need for organizations to be innovative has added to the challenges for control systems to help managers accomplish innovation” (Chenhall & Moers, 2015, p. 2). Additionally, Bedford (2015) suggests that MCS play a central role in the management of innovation. MCS actually increase the capacity of an organization to derive benefits from innovation (Bisbe & Otley, 2004; Jørgensen & Messner, 2010).

Research on the relationship between MCS and innovation is generally lacking, but some studies have been conducted on the matter. Bisbe and Otley (2004) examined the effect of interactive MCS on project innovation and defined interactive control systems as “formal control systems that managers use to become personally and regularly involved in the decision activities of subordinates...” (Bisbe & Otley, 2004, p. 717). Overall, they found that MCS do not significantly affect the relationship between innovation and performance in low-innovating firms but do negatively mediate the relationship between innovation and performance in

high-innovating firms (Bisbe & Otley, 2004). As such, in highly innovating firms MCS appear to be a detriment to product innovation level.

Similarly, Dunk (2011) examined the relationship between budget controls and product innovation and performance. Specifically, he hypothesized that when budgeting is used as a control measure as opposed to a planning measure, it would have a negative effect on innovation and performance. Dunk (2011) found that when used as a planning measure, budgets had a positive effect on product innovation and performance. Conversely budgets were determined to have an adverse effect on product innovation and performance when used strictly as a control measure (Dunk, 2011). This is consistent with findings in other related research (Abernethy & Brownell, 1997; Bisbe & Otley, 2004).

When considering nonfinancial MCS, Rockness and Shields (1984) found that nonfinancial controls, such as rules and procedures, were most important in R&D when there were high levels of knowledge in the transformation process. Additionally, Abernethy and Brownell (1997) reported that personnel controls were more effective than accounting controls when task uncertainty was high within R&D. Finally, Rockness and Shields (1988) discovered that social controls can substitute for expenditure budgets in R&D settings. These findings are all relevant as R&D functions often rely on innovation.

Merchant (1990) found that financial controls resulted in a discouragement of new ideas because of the short-term focus, while Govindarajan (1988) found that product differentiation strategies, which often rely on innovation, resulted in the diminished role of budgetary controls. These studies all point towards the significance of nonfinancial MCS in the creation of innovation in firms. In fact, Chenhall and Moers (2015) conclude:

...research into the role of performance measurement in settings where innovation is important confirms that the traditional use of financial controls for evaluation is insufficient and potentially ineffective. Rather, broader controls, such as nonfinancial metrics and subjective measures, are more useful. This is because these measures are able to encourage and evaluate innovative effort, the effects of which have a longer time horizon. (Chenhall & Moers, 2015, p. 4)

Using a case study method, Chiesa, Frattini, Lamberti, and Noci (2009) found that top management utilized more informal controls throughout radical innovation projects such as belief systems, especially during the concept generation and launch phases, where such radical innovation and change were most apparent. Conversely, incremental innovation projects were defined by more formal control systems, namely diagnostic controls and quantitative indicators of performance, due to the more predictable natures and outcomes of the projects. McDermott and O'Connor (2002) found that most firms based their radical innovation projects on already familiar internal knowledge in competencies, that they then launched into new products or processes (McDermott & O'Connor, 2002). Finally, the authors noted that traditional management and controls seemed to play a minor role in these projects, with informal networks and controls serving as a much more important backdrop.

Generally, there is a lack of research oriented towards owner or owner/manager psychological frame and the implementation of financial and nonfinancial management controls. In small businesses, it is the owner/manager that determines the types of controls to be implemented. The product innovation and research and development orientation of most of the prior studies mentioned suggest that there is a relationship between strategy of the firm, management control system implementation and innovation level as the entrepreneurial strategy is manifest through such behavior. In their seminal piece, Neimark and Tinker (1986) argued that MCS are socially constructed, which suggests it is critical to consider the culture and orientation of the firm when examining these phenomena. For example, in software development, a naturally more innovative industry, Ditillo (2004) found that knowledge complexity influenced the configuration of management controls; thus, suggesting that the culture and strategy of the firm influence level of management control implementation, which then manifests in a behavioral outcome, such as innovation, software development, new product development, etc. In summary, the research suggests that the owner and/or owner/manager set the strategic posture for the firm through their IEO, and as such, the implementation of MCS, as a socially constructed phenomena will be affected. Further, MCS exhibits effects on both incremental and radical innovation levels. As such, we expect a partial mediation

effect for both types of management control systems on the relationship between IEO and radical and incremental innovation levels.

Hypothesis 2A. Non-financial management control systems for the firm partially mediates the relationship between IEO and incremental innovation level of the firm.

Hypothesis 2B. Financial management control systems for the firm partially mediates the relationship between IEO and incremental innovation level of the firm.

Hypothesis 2C. Non-financial management control systems for the firm partially mediates the relationship between IEO and radical innovation level of the firm.

Hypothesis 2D. Financial management control systems for the firm partially mediates the relationship between IEO and radical innovation level of the firm.

Method

Sample and Procedure

Data were collected via survey over the course of two semesters across the mid-south region of the United States using a peer recruitment sampling technique known as network sampling (e.g., Ingram, Peake, Stewart & Watson, 2017; McGee, Peterson, Mueller & Sequeira, 2009). Students in entrepreneurship and human resource courses at a mid-major university were asked to identify entrepreneurs and managers affiliated with small firms as part of an entrepreneur interview project required for their respective courses. Students contacted small business owners and managers in advance of the interview to ask them to complete a survey as part of the interview process. Since students served as the initial point of contact, students were instructed on the research objectives of the survey instrument. Additionally, through this initial contact, respondents were assured that their survey responses would remain confidential and that any potentially identifiable information would be held separately from the surveys. Students were instructed that follow-up would be made with the small business owners and managers to ensure that surveys were completed as instructed.

Prior research suggests that such methods may lead to greater diversity of ethnic and socioeconomic backgrounds than traditional mail survey methods that rely on Small Business Administration databases or local Chambers of Commerce (Cooper, Peake, & Watson, 2016; Ingram et al., 2017; McGee et al., 2009; Peake, Davis, & Cox, 2015a; Peake, Harris, McDowell, & Davis, 2015b; Sequeira, Mueller & McGee, 2007). With students serving as the point of contact, researchers suggest that business owners may be identified who would not have been available via lists from entities such as Chambers of Commerce, since the personal contact made through this methodology may appeal to respondents (Ingram et al., 2017).

Using this technique, 265 surveys were returned. We only retained respondents who were owners or owner/managers active in the day-to-day operations of the firm and who indicated that s/he and his/her employees made major decisions affecting the firm, given the importance of the influence of the owner and/or owner/manager on the firm’s use of MCS, as well as its innovation levels. Additionally, to maintain focus on small firms, we deleted cases in which the total number of employees were greater than 250 (Chowdhury, Schulz, Milner, & Van De Voort, 2014; McDowell, et al., 2018; Thurik, Khedhaouria, Torres, & Verheul, 2016), as well as any survey observations where an entire construct or more was incomplete on the survey. After removing data points which did not adhere to the aforementioned criteria, 212 survey observations remained. For any analysis, when missing cases were deleted listwise, a range of 185-194 observations were utilized. Although the sample size is below $N = 200$, Paterson, Harms, Steel, and Credé (2016) determined recommended sample sizes for 0.95 statistical power in performance studies is 168. Given expected effect sizes given prior literature of (0.12 – small, 0.20 – medium, 0.31 – large), our study appears to possess the credibility to find significance.

While our sample holds many similarities to the most recent data reported by the Small Business Administration (2015) in its Issue Brief on “Demographic Characteristics of Business Owners and Employees,” we see many differences that may be a result of our sampling methodology. For example, as shown in Table 1, our sample skews younger than the SBA sample, with a higher percentage of male respondents, who are generally more educated than those reported

via the SBA. Other studies utilizing network sampling likewise report differences in similar areas (Ingram et al., 2017; Peake & Watson, 2015; Peake et al., 2015b), given that students tend to approach younger, better educated entrepreneurs. However, we do not believe these differences affect the quality of our analyses, given prior researchers likewise collected data with similar features using this methodology.

Table 1
Samples compared to SBA (2013) data

	SBA Sample* (%)	Sample (%)
Age		
Under 35	15.6	27.8
35 to 49	32.7	39.2
50+	51.7	33.0
Gender		
Male	64.6	71.3
Female	35.4	28.7
Race		
Minority	14.1	10.1
Non-Minority	85.9	88.9
Education		
High School or Less	28.0	30.0
Some College	32.8	16.7
Bachelor’s or Higher	39.2	53.4

*Source: Demographic Characteristics of Business Owners and Employees: 2013, SBA Office of Advocacy

The data collected via our survey are cross-sectional, since a single individual provided responses to the survey at a single point in time. As such, common method bias may be a concern (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). To mitigate potential concerns associated with common method bias, following Podsakoff et al. (2003), we employed procedural techniques during the survey phase. We took care that wording of items was clear and to the point, avoided the use of dichotomous scales, and ensured respondents their anonymity would be protected through the

data reporting process since results are only reported in the aggregate, and we provided careful examination of the data via statistical techniques (Podsakoff, et al., 2003). Although we cannot ensure all biases are omitted, our precautions associated with data collection, as well as our statistical procedures detailed in the Results section indicate that such biases does not impede us from meaningful analysis and interpretation of the results.

Measures and Validity

Innovation level. The innovation level of the firm serves as the dependent measure. This is further broken into two separate measures, *radical innovation* and *incremental innovation* per the development of the measures detailed by Subramaniam and Youndt (2005).

Radical innovation addresses innovations that disrupt the firm and its products and services (Dewar & Dutton, 1986; Meyers & Tucker, 1989; Subramaniam & Youndt, 2005), with the following items: innovations that make your prevailing product/service lines obsolete, innovations that fundamentally change your prevailing products/services, and innovations that make your existing expertise in prevailing products/services obsolete. Respondents were asked to indicate the number on a scale from 1 to 7, with 1 = much stronger and 7 = much weaker, that best represents their organization's capacity to generate innovations in products/services compared to the competition. After respondents had completed the surveys, responses were recoded to 1 = much weaker and 7 = much stronger.

Incremental innovation indicates the level to which the firm builds on and further develops its current product and/or service offering(s) (Chandy & Tellis, 2000; Subramaniam & Youndt, 2005). Items addressing incremental innovation include: innovations that reinforce your prevailing product/service lines, innovations that reinforce your expertise in prevailing products/services, and innovations that reinforce how you currently operate.

Given that radical and incremental innovation are highly correlated (0.511), yet are distinctly different approaches to innovation strategy (Forés & Camisón, 2016; Subramaniam & Youndt, 2005), we examine two separate models for the level of innovation associated with each type. Both measures exhibit solid reliability, with a Cronbach's alpha of 0.845 for the three

incremental innovation items and a Cronbach's alpha of 0.844 for the three radical innovation items.

Individual entrepreneurial orientation (IEO).

Bolton and Lane (2012) developed a ten-item IEO scale with subscales of risk-taking, innovativeness, and proactiveness all with Cronbach's alphas above the generally accepted thresholds for scale development (Nunnally & Bernstein, 1994). Averages of all scale items correlated with entrepreneurial propensity, which Bolton and Lane (2012) used to establish construct validity for the IEO scale in addition to its content and face validity and its internally consistent set of items. Respondents were asked to indicate their level of agreement with the 10 items on a 7 point Likert scale, where 1 = strongly agree and 7 = strongly disagree. Once respondents had completed the survey, responses were recoded to represent 1 = strongly disagree and 7 = strongly agree. We averaged the 10 items as developed and validated by Bolton and Lane (2012) to form a single construct, which exhibited a Cronbach's alpha of 0.875.

Management control systems. Using the management control systems (MCS) aspects of Davila et al. (2009), we examine two types of MCS, *financial management control systems* and *non-financial management control systems*. We created two measures, one representing financial management controls with four items, and another comprising non-financial management controls with eight items that have primarily a human resources orientation. (See Appendix 1 for a summary of these measures.) Respondents indicated whether or not they had implemented a particular control for each item. Items were then coded for whether the control was in place ($X = 1$) or was not in place ($X = 0$) at the time the survey was completed. Averages were calculated for each construct with regards to implementation of the item, and the averages for both items ranged from 0 to 1. Such coding has been common in the human resources literature with regards to High Performance Work Systems (e.g., Patel & Conklin, 2012). In examining reliability, the four financial monitoring items exhibited a Cronbach's alpha of 0.923, while the eight other monitoring items exhibited an alpha of 0.902. Given the high correlation between these two constructs (0.686), and the potentially different implications derived from each determined per the

literature review, we examine these measures separately for their potential effects on innovation level.

Controls. There are likely many other factors at play in the examination of the relationships about which we hypothesize. As such, we examine a number of other controlling factors that relate to both the individual owner/manager and the business itself.

Business level factors include the family business status of the firm, the number of employees, and business age. Just under 50% of the respondents indicated that their business was a family business. Given the literature's examination of innovation within family businesses versus other small businesses (e.g., Calabró et al. 2018; De Massis, Frattini, Pizzurno, & Cassia 2015), we look to family business status as a potentially important control. Further, the number of employees as a proxy for firm size is often an important controlling factor that helps to account for resources at hand. We examine the total number of employees reported by the owner/managers. We also assess the business age as a proxy for stability, as older firms have overcome the threshold for survival. The business age was reported by the respondent in terms of number of years the business has been in operation as of the time the survey was completed.

Additionally, we examine individual-level factors of the owner/manager to account for influences aside from IEO that may hold important impacts. Like many other studies in this realm, we asked respondents to report their gender, education level, and experience in previously starting a business. Prior studies suggest that gender plays an important role in managerial decisions (Kakabadse et al., 2015; Quintana-García & Benavides-Velasco, 2016). As such, there may be important gender effects for implementation of MCS. Gender of the respondent is in binary form, coded with 1 = Female and 0 = Male. Because more educated business owners may adopt higher levels of management control, respondents were asked to indicate their highest level of education completed, on a scale with 1 = less than high school and 7 = doctorate or professional degree. Since prior experience may give owner/managers more incentive to implement MCS, we examine whether the individual had previously started or owned another business, reported as yes ($X = 1$)/no ($X = 0$).

Results

To ensure the data are appropriate for undertaking our statistical procedures, we conducted precursor analyses regarding multicollinearity and common method bias. Although efforts were taken with the methods to ensure the mitigation of common method bias to the extent possible, we examined the data for such biases via a Harman one-factor test (Chen, Chang, & Lee, 2015; Roxas, Ashill, & Chadee, 2017; Virrick, Basu, & Rogers, 2015). The Harman one-factor test suggests that no single factor dominates the analysis, since the items loaded onto eight factors with eigenvalues greater than one, and no factor accounted for more than 23% of the variance. As such, common method bias does not appear to preclude meaningful analyses with our data. Additionally, multicollinearity does not appear to pose a serious limitation to the data since all VIFs were less than 1.5 and the condition index was less than the commonly accepted threshold of 30 (Hair, Anderson, Tatham & Black, 1998; Hair, Black, Babin & Anderson, 2010). Mean, standard deviation and correlations for the variables of interest are available in Table 2.

We tested our hypotheses via four models, with Models 1 and 2 shown in Table 3 and Models 3 and 4 highlighted in Table 4. For an overview of controlling variable effects only, please see the Model 0 regressions in Appendix 2. These two regressions suggest that the control variables do not unduly affect the associations in the analyses that follow. Model 1 explores the relationship of IEO on incremental innovation, with financial management controls as a mediator. IEO ($\beta = 0.4477, p < 0.001$) has a powerful, positive direct effect on level of incremental innovation as hypothesized. Further, IEO has a positive and significant effect on the implementation level of financial management controls ($\beta = 0.0783, p < 0.01$). However, there is no indirect effect for financial management controls on the relationship between IEO ($\beta = 0.4273, p < 0.001$) and level of incremental innovation for the firm.

Model 2 examines the effect of non-financial management controls as a mediator between IEO and incremental innovation level. This model indicates that IEO has a strong, positive effect on both the implementation of non-financial management controls ($\beta = 0.0729, p < 0.01$) and level of incremental innova-

Table 2
Means, standard deviations and correlations

	Mean	Std. Dev.	1	2	3	4	5	6	7	8	9
1. Family Business	0.45	0.50	-								
2. Gender (Female)	0.27	0.46	0.01	-							
3. Education Level	4.11	1.59	-0.15*	0.09	-						
4. No. of Employees	18.94	28.89	-0.10	-0.11	0.19*	-					
5. Business Age	21.13	27.24	0.06	0.02	0.02	0.34**	-				
6. Owner Experience	0.39	0.49	0.03	-0.06	-0.05	0.14	-0.13	-			
7. IEO	5.60	0.88	-0.01	-0.11	0.02	-0.04	-0.11	0.20**	-		
8. Financial Mgmt. Controls	0.78	0.36	-0.18*	-0.05	0.10	0.10	-0.15*	-0.01	0.22**	-	
9. Other Mgmt. Controls	0.65	0.36	-0.17*	-0.06	0.13	0.30**	-0.10	-0.08	0.18*	0.68**	-

* $p < 0.05$, ** $p < 0.01$

tion ($\beta = 0.4486, p < 0.001$). Further, as hypothesized, non-financial management controls ($\beta = 0.6551, p < 0.01$) partially mediates the relationship between IEO ($\beta = 0.4008, p < 0.001$) and level of incremental innovation, such that the direct effect is lessened but still significant.

In Model 3, we see that IEO exhibits a significant and direct effect on both the adoption of financial management controls ($\beta = 0.0844, p < 0.01$), as well as on radical innovation level ($\beta = 0.4477, p < 0.001$). Financial management controls, however, do not mediate the relationship between IEO ($\beta = 0.5000, p < 0.001$) and radical innovation level.

Model 4 exhibits a strong direct effect of IEO on the implementation of non-financial management controls ($\beta = 0.0742, p < 0.01$) and level of radical innovation ($\beta = 0.5116, p < 0.001$). The implementation of non-financial management controls ($\beta = 0.5988, p < 0.05$) exhibits partial mediation of the relationship between IEO ($\beta = 0.4672, p < 0.001$) and level of radical innovation.

Our results indicate support of both Hypotheses 1A and 1B in that IEO is positively and significantly associated with incremental and radical innovation, respectively. Further, we find support for Hypotheses 2A and 2C, given that non-financial management controls partially mediate the relationship between IEO of the owner/manager and incremental and levels of radical innovation, respectively. Although owner/manager

IEO is positively and significantly associated with implementation of financial management controls, there is no indirect relationship of financial management controls between the relationship of owner/manager IEO and either form of innovation. As such, we fail to find support for Hypotheses 2B and 2D.

Discussion

Academic Implications

Our results indicate that IEO is an important strategic posture to promote both radical and incremental innovation levels within small firms. Further, IEO shows a positive and significant association with the implementation of both financial and nonfinancial MCS. However, only nonfinancial MCS partially mediate the relationship between IEO and innovation level (both incremental and radical). Financial MCS do not exhibit an effect on innovation level, and as such, do not have an indirect effect. To our knowledge, our study is the first to explore the relationships among IEO as a strategic posture, MCS, and innovation level in the small firm context. We believe our results hold important implications both from academic and practical perspectives.

Financial MCS suggest a control of resources, and greater access and control of financial resources can be expected to promote innovation within the firm. Our

Table 3
Regression models examining incremental innovation

	MODEL 1			MODEL 2		
	Financial Mgmt Controls	Incremental Innovation Level	Incremental Innovation Level	Other Mgmt Controls	Incremental Innovation Level	Incremental Innovation Level
Family Business	-0.0932 [†] (0.0503)	-0.1271 (0.1373)	-0.1029 (0.1383)	-0.0673 (0.0487)	-0.1282 (0.1380)	-0.0841 (0.1351)
Gender (Female)	-0.0293 (0.0558)	0.0264 (0.1525)	0.0341 (0.1523)	-0.0112 (0.0540)	0.0270 (0.1530)	0.0343 (0.1492)
Education level	0.0088 (0.0160)	-(0.0160) (0.0436)	-0.0183 (0.0436)	0.0064 (0.0154)	-0.0158 (0.0438)	-0.0200 (0.0427)
No. of Employees	0.0018 [†] (0.0009)	0.0003 (0.0026)	-0.0002 (0.0026)	0.0043 ^{***} (0.0009)	0.0003 (0.0026)	-0.0026 (0.0027)
Business Age	-0.0021* (0.0010)	0.0030 (0.0027)	0.0035 (0.0027)	-0.0025 ^{**} (0.0010)	0.0030 (0.0027)	0.0046 [†] (0.0027)
Owner Experience	-0.0176 (0.0517)	-0.1521 (0.1412)	-0.1475 (0.1409)	-0.0552 (0.0502)	-0.1537 (0.1422)	-0.1175 (0.1392)
IEO	0.0783 ^{**} (0.0290)	0.4477 ^{***} (0.0792)	0.4273 ^{***} (0.0806)	0.0729 ^{**} (0.0281)	0.4486 ^{***} (0.0798)	0.4008 ^{***} (0.0792)
Financial Mgmt Controls	-	-	0.2612 (0.1999)	-	-	-
Non-Financial Mgmt Controls	-	-	-	-	-	0.6551 ^{**} (0.2032)
<i>F</i>	3.1376 ^{**}	4.7974 ^{***}	4.4272 ^{***}	5.6157 ^{***}	4.7400 ^{***}	5.6567 ^{***}
<i>R</i> ²	0.1056	0.1529	0.1607	0.1752	0.1521	0.1974
<i>N</i>	194			193		
Total, Direct, and Indirect Effects						
Total effect X on Y		0.4477 ^{***} (0.0792)			0.4486 ^{***} (0.0798)	
Direct effect X on Y		0.4273 ^{***} (0.0806)			0.4008 ^{***} (0.0792)	
Indirect effect X on Y		0.0205 (0.0205)			0.0478* (0.0319)	
Normal Theory Tests		0.0205 (0.0183)			0.0478* (0.0243)	

[†] $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

results are surprising in that financial MCS do not display a significant link to incremental or radical innovation level of the firm. Given that Dunk (2011) found that when used as a planning measure, budgets had a positive effect on product innovation and performance and that budgets were determined to have an adverse effect on product innovation and performance when used strictly as a control measure, we expected to see

some effect consistent with findings in related research (Abernethy & Brownell, 1997; Bisbe & Otley, 2004) as well.

Our descriptive statistics indicate a high level of financial MCS implementation across our sample, with an average of 0.75. This suggests that, on average, firms in the sample had incorporated three of the four financial MCS items. We believe our results may suggest

Table 4
Regression models examining radical innovation

	MODEL 3			MODEL 4		
	Financial Mgmt Controls	Radical Innovation Level	Radical Innovation Level	Other Mgmt Controls	Radical Innovation Level	Radical Innovation Level
Family Business	-0.1010* (0.0509)	0.0780 (0.1579)	0.0975 (0.1598)	-0.0829 (0.0497)	0.0845 (0.1587)	0.1341 (0.1576)
Gender (Female)	-0.0143 (0.0574)	0.1490 (0.1776)	0.1517 (0.1781)	-0.0034 (0.0558)	0.1454 (0.1784)	0.1474 (0.1757)
Education level	0.0102 (0.0163)	-0.0271 (0.0505)	-0.0291 (0.0506)	0.0108 (0.0159)	-0.0281 (0.0507)	-0.0346 (0.0500)
No. of Employees	0.0018 [†] (0.0010)	0.0023 (0.0030)	0.0020 (0.0030)	0.0043*** (0.0009)	0.0024 (0.0030)	-0.0001 (0.0031)
Business Age	-0.0023* (0.0010)	0.0009 (0.0031)	0.0014 (0.0031)	-0.0027** (0.0010)	0.0009 (0.0031)	0.0025 (0.0031)
Owner Experience	-0.0324 (0.0526)	-0.2681 (0.1632)	-0.2618 (0.1635)	-0.0626 (0.0515)	-0.2588 (0.1644)	-0.2213 (0.1626)
IEO	0.0844** (0.0292)	0.4477*** (0.0792)	0.5000*** (0.928)	0.0742** (0.0285)	0.5116*** (0.0912)	0.4672*** (0.0915)
Financial Mgmt Controls	-	-	0.1933 (0.2326)	-	-	-
Non-Financial Mgmt Controls	-	-	-	-	-	0.5988* (0.2366)
<i>F</i>	3.4423**	4.8305***	4.3057***	5.8528***	4.6891***	5.0291***
<i>R</i> ²	0.1192	0.1596	0.1629	0.1880	0.1564	0.1861
<i>N</i>	186			185		
Total, Direct, and Indirect Effects						
Total effect X on Y		0.5163*** (0.0906)			0.5116*** (0.0912)	
Direct effect X on Y		0.5000*** (0.0928)			0.4672*** (0.0915)	
Indirect effect X on Y		0.0163 (0.0239)			0.0444 [†] (0.0295)	
Normal Theory Tests		0.0163 (0.0215)			0.0444 [†] (0.0254)	

[†] $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

that financial MCS are a basis to pursue innovation, and as such do not have sufficient variability to yield significance in promoting innovation. Some research has found that both personnel and social controls serve as a substitute for accounting (Abernethy & Brownell, 1997) and budgets in R&D settings. The results of our analyses allow an opportunity to build on prior work, which suggests a substitution effect for financial and

nonfinancial MCS.

Using a contingency-based approach to manage people in organizations has been shown to be related to innovation and firm performance in large organizations. For example, Schuler and Jackson (1987) argued that firms which were more innovative used tailored HR policies that better supported their strategic goals rather than a “one size fits all” approach. A study

by Berends, Jelinek, Reymen, and Stultiëns (2014) extends this use of contingency policy implementation to the small firm context and illustrated how these types of firms were more innovative than their more structured counterparts. As such, from a contingency perspective we believe our research raises important implications for small business researchers in considering nonfinancial MCS configurations.

Our results showed that the use of non-financial MCS had positive impacts on innovation in small firms. Support for this can be found in previous literature from the HR domain. Studies by Ceylan (2013), Chadwick, Super, and Kwon (2015), and Chen and Huang (2009) found that using HR policies and practices that demonstrated commitment to the employees resulted in increased innovation and firm performance in large firms. We believe our results suggest what anecdotal evidence has also perceived, in that when job functions are described as relating to innovation and are measured based on their innovation output, innovation level within the firm will be higher. In addition to important academic implications, we likewise believe our work raises important implications for practitioners.

Practical Implications

The practical implications of our work are important for small business owners. Our results suggest an association between high IEO and the implementation of both financial and non-financial MCS. However, only nonfinancial MCS appear to mediate the relationship between IEO and both forms of innovation. As such, it appears that the implementation of non-financial, primarily human resources based, MCS are important to the development of both radical and incremental innovation in small businesses. As shown in Appendix 1, these items deal with clear objectives for employees and managers, with compensation linked to performance. This suggests that clearly planning managers' and employees' roles, and ensuring that meeting targets is tied to it, creates an environment in which innovation can take hold. However, additional, longitudinal data is needed to address causation rather than association.

While IEO was directly tied to the implementation of financial MCS, there was no indirect effect of financial MCS on innovation. As can be seen in Table

2, financial MCS hold an even greater positive association with IEO than nonfinancial MCS. It appears that high IEO owners and owner/managers implement such measures to monitor and control their businesses; however, the mere implementation of financial controls does not appear to provide an impetus for innovation. MCS associated with the "people" side of the business increases innovation productivity, which is an intuitive element.

The lack of significance for financial MCS does not indicate a lack of importance to innovative small firms. Quite the contrary is true. Looking to our descriptive statistics, it is apparent that the small firms in our sample indicate a substantially higher implementation of financial MCS than other MCS. As such, other MCS may serve as a key differentiator or source of variability in innovation level emanating from high IEO owners and owner/managers. Given our results and the data, the implementation of solid financial MCS may be a necessity rather than a differentiator.

Limitations and Future Research

As is the case with any research study, ours suffers from limitations. We believe there are three primary limitations. First, our data are cross-sectional in nature, and as such may be subject to common method bias (Podsakoff et al., 2003). However, precautions were taken during the data collection process to limit the impact of such bias, and statistical analyses suggest such biases do not preclude us from meaningful analysis and interpretation of the results. Further, cross-sectional data are common in small business research, given the difficulty of collecting data from small business owners (e.g., Patel & Conklin, 2012; Peake, Cooper, Fitzgerald, & Muske, 2017; Peake, McDowell, Harris, & Davis, 2018).

Second, our data collection area was constrained to the Southeastern United States, which may limit inferences to other regions. The data, however, skew similarly from the Small Business Administration (2015) data compared to other recent studies. As such, we believe some valuable generalizations may be made across the United States with our results. Implications for other countries, however, cannot be drawn since comparative data are not available. This is an important future area of investigation, given both potential IEO differences across culture, as well as varying

levels of emphasis on innovation.

Finally, our MCS measures likewise hold some limitation. Although they are derived from well-cited and recognized sources in the MCS literature (Davila & Foster, 2007), clearly they do not comprehensively address all sources of MCS within the firm. Given the basis in contingency theory, future research would benefit from more than a binary view of whether a particular MCS was implemented. For example, the degree of implementation and the owner/manager's perspective of its relative importance to other MCS measures would be helpful in showcasing perceived relative importance. Also, since the "people" side of MCS appears to strengthen the relationship between entrepreneurial strategy orientation and both incremental and radical innovation level, additional exploration of human resources controls for their effect on innovation level would prove a useful avenue of research from both academic and practical perspectives.

Conclusion

This study set out to examine the relationship between IEO and innovation in small businesses. We hypothesized the relationship being mediated by management control systems. Results indicate that IEO is indeed positively and significantly related to both incremental and radical innovation in small businesses. Additionally, we found that nonfinancial management control systems partially mediate the relationship between IEO and both incremental and radical innovation. We believe this study informs both research and practice regarding the importance of both IEO and nonfinancial management control systems on innovation in small businesses. In addition, the lack of significant results regarding financial management control systems provides opportunities for future research in order to understand what other factors may be at play.

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Appendix 1*Management control system variables*

Financial Management Controls	
Operating budget	
Cash flow projections	
Sales projections	$\alpha = 0.923$
Routine analysis of financial performance against target	
Non-Financial Management Controls	
Codes of conduct	
Written job descriptions	
Written performance objectives for managers	
Written performance evaluation reports	$\alpha = 0.902$
Linking compensation to performance	
Definition of strategic (nonfinancial) milestones	
Customer development plan (plan to develop market)	
Headcount/human capital development plan	

Appendix 2*Regression models with controls only*

MODEL 0		
	Incremental Innovation Level	Radical Innovation Level
Family Business	-0.136 (0.147)	0.074 (0.170)
Gender (Female)	-0.023 (0.162)	0.063 (0.190)
Education level	-0.010 (0.047)	-0.016 (0.055)
No. of Employees	0.000 (0.003)	0.002 (0.003)
Business Age	0.002 (0.003)	0.000 (0.003)
Owner Experience	-0.016 (0.149)	-0.097 (0.173)
<i>F</i>	0.208	0.186
<i>R</i> ²	0.007	0.006
<i>N</i>	195	186