

The Entrepreneurial Organization: The Effects of Organizational Culture on Innovation Output.

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Abstract

As organizations face growing economic pressures, leaders need to create work environments that support and encourage entrepreneurial behavior in their workforce in order to drive organizational innovation and growth. In this vein, the current paper examines the effect of an entrepreneurial culture on an employee's innovation output, and explores three mechanisms by which this may be achieved. In a sample of 523 working adults, the relationship between entrepreneurial culture and innovation output was fully mediated by work engagement. Furthermore, entrepreneurial culture positively moderated the relationship between an individual's entrepreneurial personality and innovation output. These findings contribute new theoretical insights to the corporate entrepreneurship literature, and has important practical implications for organizations aiming to become more entrepreneurial.

Keywords: Organizational Culture, Innovation Output, Entrepreneurial Personality, Work Engagement.

1. Introduction

In order for organizations to compete in the 21st Century, they must engage in entrepreneurship if they want to remain competitive in both the present and the future (Lumpkin, 2007). Arising from pressures such as technological disruption and innovation (Zahra, 1995), a lack of talent within the workforce (Hayton, 2005), limitations in established management practices (Hornsby, Kuratko & Zahra, 2002), and drastic changes in the global marketplace (Hodgetts, Kuratko & Kuratko, 1998), organizations that adopt an entrepreneurial strategy are more likely to gain and sustain competitive advantages (Kuratko, Hornsby, & Covin, 2013; Lumpkin, 2007; Thornberry, 2001). Accordingly, becoming more entrepreneurial and innovative has become a major goal for most organizations (Accenture, 2013).

A significant body of research has been conducted to identify the internal organizational factors and conditions needed for organizations to become more entrepreneurial (Rauch, Wiklund, Lumpkin, & Frese, 2009). A number of factors have been proposed over the years, including corporate venturing, strategic entrepreneurship, and entrepreneurial orientation (Thornberry, 2001). The domain that has been dedicated to address this question is known as ‘corporate entrepreneurship’. Covin & Slevin (1989) define corporate entrepreneurship as the enabling and promotion of workers’ abilities to innovatively create value within the organization. Accordingly, an underlying premise within the field is that for organizations to become more entrepreneurial and prosper, an “innovation friendly” internal environment, or *culture*, that facilitates entrepreneurial behavior needs to exist (Ireland, Kuratko, & Morris, 2006). That is, employee perception of an innovative environment is critical for corporate entrepreneurship (Hornsby, Kuratko, Shepherd, & Bott, 2009). Indeed, there is a consensus in the literature that organizational culture

is the foundation for successfully implementing corporate entrepreneurship (Ireland et al., 2006). Accordingly, the managerial challenge becomes that of designing the workplace in a way that develops an innovation friendly (i.e. entrepreneurial) culture.

Research has made a significant contribution to our understanding of antecedents of an entrepreneurial culture. For instance, Hornsby, Kuratko, Holt and Wales (2013) identified four influences on the development of an organizational climate in which entrepreneurial behavior could be expected: (1) *management support* (the willingness of managers to facilitate and promote entrepreneurial behavior, including the championing of innovative ideas and providing the resources people require to behave entrepreneurially), (2) *work discretion/autonomy* (manager's commitment to tolerate failure, provide decision-making latitude, freedom from excessive oversight and to delegate authority and responsibility to middle- and lower-level managers), (3) *rewards* (developing and using systems that reinforce entrepreneurial behavior, highlight significant achievements and encourage pursuit of challenging work), and (4) *time availability* (evaluating workloads to ensure that individuals and groups have the time needed to pursue innovations and that their jobs are structured in ways that support efforts to achieve short- and long-term organizational goals). According to Hornsby et al. (2013), these dimensions enable organizations to assess, evaluate, and manage the firm's internal work environment in ways that support entrepreneurial behavior.

The aforementioned research originated from the entrepreneurial orientation construct (EO; Covin & Slevin, 1991), which represents the extent to which an organization's formal policies and practices support entrepreneurial strategies, decision-making and actions (Rauch et al., 2009). As proposed by Covin and Slevin (1991), organizations who have high levels of EO can be described as being

innovative (a tendency to engage in creativity & experimentation), *risk taking* (a tendency to make bold & uncertain decisions) and *proactive* (a tendency to be opportunity seeking & competitive). As enacted by key decision-makers (i.e. senior leaders, executives & business owners), these three tendencies orientate the organization's strategy towards the identification and exploitation of opportunities to innovate and create value, and thus shape the internal operations and work practices experienced by employees (Lumpkin & Dess, 1996). A recent meta-analysis by Rauch et al. (2009) found that the relationship between EO and firm performance was moderate ($r = .24$; $N = 14, 259$), thereby demonstrating that the extent to which an organization's work environment is strategically aligned with the firm's pursuit of innovation and growth, is indeed beneficial to organizational performance.

1.1. Gaps in the literature

Although these efforts have made a significant contribution to our understanding of antecedents of entrepreneurial activity within organizations, there remain a number of significant gaps in the literature (e.g. Hornsby et al., 2013; Fayolle, Basso, & Bouchard, 2010). First, the scope of existing corporate entrepreneurship measures has been suggested to be too narrow to capture the complexity of entrepreneurial organizational cultures. For instance, Rauch et al. (2009) criticized existing entrepreneurial culture constructs and measures (e.g. EO) as being overly focused on *formal* organizational factors that pertain to how work is conducted and rewarded (i.e. strategy & work design; Rauch et al., 2009), at the expense of *informal* factors (i.e. collective norms, assumptions, and beliefs) that are likely to be of equal importance when motivating and enabling individuals and organizations to engage in entrepreneurial activities (Kuemmerle, 2008; Licht & Seigel, 2008; West, 2007). Indeed, previous research has demonstrated socio-cognitive factors to have a significant impact on entrepreneurial activity (Frese &

Gielnik, 2014) and work-related innovation within organizations (Anderson, Potočník, & Zhou, 2014; Amabile, Conti, Coon, Lazenby & Herron, 1996). Accordingly, it is likely that a broader conceptualization and operationalization of organizational culture, that captures both formal *and* informal components, is needed in order to get a more comprehensive understanding of the antecedents of entrepreneurial activity within organizations.

Second, most theory and research in the field of corporate entrepreneurship has focused on establishing the factor structure (i.e. the dimensions) of an entrepreneurial culture (e.g. Rauch et al., 2009), and/or the direct link between these dimensions (e.g. processes, strategy, and culture) and organizational outputs (e.g. introduction and transformation of products, services, strategies etc., and financial and non-financial performance metrics). However, few studies have looked at the *mechanisms* by which organizational culture factors produce such organizational outputs. That is, there is little in the literature to inform us both how and why entrepreneurial cultures produce high performance or innovation. Yet, given that corporate entrepreneurship does not occur in a vacuum, understanding these mechanisms is critical. Processes, strategies, or cultures cannot in themselves affect performance. Rather they do so through the behavior (and ideas) of people and employees (Hornsby et al., 2009). Accordingly, understanding how, and the conditions under which, cultural factors influence employee's behavior to produce organizational outputs is imperative. Such an understanding would be desirable, if not necessary, to allow organizations to a) formulate more precise investment strategies on cultural interventions, b) make more informed decisions about when and where to introduce or amend cultural factors, and c) have systematic capacity to understand, and therefore avoid, potential failures of cultural interventions. For instance,

organizations may want to analyze the relative benefit of cultural interventions aimed at increasing entrepreneurial activity and innovation output. For instance, making selective investments in entrepreneurial cultures when, or in places where, the right workforce is in place. Similarly, organizations will want to understand why certain interventions fail, or do not work. Without an understanding of why and how entrepreneurial culture factors influence employee psychology and behavior (and in turn organizational output) it would be difficult to provide answers to these questions.

There may be a number of mechanisms by which entrepreneurial cultures influence organizational member's entrepreneurial outputs. Here we posit three that are likely to be essential to this relationship, namely: *reinforcement*, *engagement* and *person-organization (P-O) fit*. Below we describe the theoretical rationale for each of these psychological mechanisms.

1.2. Psychological mechanisms

It can be hypothesized that entrepreneurial cultures will influence employee's outputs (e.g. entrepreneurial activity & innovation output) directly, through reinforcement of behavior, or as behaviorists call it, "*operant conditioning*". Operant conditioning principles posit that behavior is learnt by the behavior's consequences, that is, through the rewards, or lack thereof, people receive for specific behaviors (Staddon & Cerutti, 2003). For instance, where employee behavior is in line with an organization's structures, processes and culture, such behavior is more likely to be rewarded and therefore reinforced. This increases the likelihood that the employee will behave in a similar way in the future. Similarly, the inverse will happen if the behavior is not in line with such factors and is punished. Given that larger organizations are likely to be more bureaucratic (Hayton, 2005), entrepreneurial behaviors and activities (which are by definition deviant and divergent; Leutner, Ahmetoglu, Akhtar & Chamorro-Premuzic, 2014) are unlikely to be positively

reinforced if the organization's culture does not support or reward such behaviors. Conversely, a culture in which entrepreneurial behavior is reinforced (i.e. positively rewarded), is likely to strengthen the entrepreneurial behavior-reward association and therefore increase the intentions, and occurrence, of that behavior (Kautonen, Van Gelderen & Tornikoski, 2013). Thus, we posit that there will be a direct relationship between increased perceptions of entrepreneurial culture perceptions and an employee's level of entrepreneurial activity and innovation output.

H1: There will be a direct relationship between increased perceptions of an entrepreneurial culture and an employee's level of innovation output.

A second mechanism by which an entrepreneurial culture may influence innovation output is through *work engagement*. Work engagement can be defined as the “fulfilling work-related state of mind that is characterized by vigor, dedication and absorption” (p. 702, Schaufeli Bakker, & Salanova, 2006), and has been found to be an important predictor of heightened performance at the individual, group and organizational level (Saks, 2006). Although the literature on the antecedents of engagement stretches back several decades (Crawford, LePine, & Rich, 2010), few studies have directly examined the impact of entrepreneurial cultures on engagement. However, there is good reason to believe that entrepreneurial cultures significantly impact employee engagement and that engagement, in turn, increases entrepreneurial outputs of employees.

First, meta-analytic research has found that engagement is influenced by a number of work related characteristics; in particular, people tend to be more engaged when they have more control over how they carry out work, have opportunities to

learn new skills, are able to make decisions and interact with others in a positive manner (Crawford et al., 2010). Although job characteristics are often more formal dimensions of organizations, they are intimately linked with the informal norms and assumptions held by employees, that is, the culture of the organization (Schneider, Ehrhart & Macey, 2013). Indeed, informal components of work may arguably be equally, or even more, important than formal processes in engaging employees (Kuemmerle, 2008).

Secondly, there is also good reason to believe that engagement is likely to have a significant influence on the innovation output of employees. For instance, Harter, Schmidt and Hayes (2002) conjectured that employee engagement is a construct that fosters positive affect in individuals at work, which, in turn, leads to creativity (the precursor of entrepreneurial output). In line, a longitudinal study by Amabile, Barsade, Mueller, and Staw (2005) found that positive affect (a concept related to engagement) was positively and significantly related to creative thinking. Further support for this association is suggested by the positive relationships between job characteristics, engagement (Saks, 2006), and creative output (Bakker & Xanthopoulou, 2013). Similarly, Ahmetoglu, Harding, Akhtar, and Chamorro-Premuzic (2015), found evidence for the relationship between engagement and entrepreneurial behavior. Accordingly, we hypothesize that engagement will be a second mechanism by which entrepreneurial cultures influence entrepreneurial output.

H2: Work engagement will positively mediate the relationship between entrepreneurial culture and innovation output.

A final mechanism by which entrepreneurial cultures may influence entrepreneurial output is explained by P-O fit theory (Tett & Burnett, 2003; Westerman & Cyr, 2004). P-O fit theory emphasizes that positive work outcomes arise from a congruence between an individual's personality traits and the social norms, values and demands found within the organization (i.e. its culture). Employees who experience a high level of congruence with the culture are likely to have more positive cognitive and affective reactions, and behavioral approach, which in turn increases their output and productivity (Gregory, Albritton & Osmonbekov, 2010). Given the recent literature demonstrating the positive relationship between entrepreneurial personality traits (e.g. creativity, vision, proactivity and opportunism) and entrepreneurial and innovation output (Ahmetoglu, Leutner & Chamorro-Premuzic, 2011; Leutner et al., 2014), we would expect entrepreneurial cultures to have an influence on innovation output by having a disproportionate influence on those employees with elevated levels of such personality traits. The P-O fit theory, therefore, would predict entrepreneurial employees to fare better in entrepreneurial cultures than non-entrepreneurial employees. Such a finding is yet to be tested, but would clearly have important theoretical and practical implications for organizations aiming to become more entrepreneurial.

H3: In cultures which are entrepreneurial, employees with elevated levels of entrepreneurial personality traits will have increased levels of innovation output, in comparison to those employees with lower of levels of entrepreneurial personality traits.

1.3. *The current study*

The current study had two main aims. The first was to theoretically and empirically extend existing constructs of entrepreneurial culture to capture *informal*, in addition to formal, components of the construct. Such an objective was inspired by Rauch et al. (2009) who concluded that the strength of the relationship between EO and firm performance may increase if the EO construct is expanded to also describe other critical factors that are likely to influence an organization's, and its employee's, ability to engage in entrepreneurial activity and produce innovation. In addition to this, Cooke and Rousseau (1988) also outlined the importance of socialization in shaping organizational culture and employee behavior. As such it is argued that there is an opportunity to extend the existing corporate entrepreneurship constructs to include informal factors that describe the various socio-cognitive factors that play an important role in enabling and motivating employees to be pursue innovation (West, 2007). Given this theoretical divergence from existing corporate entrepreneurship constructs, the first step in the current study involved the validation of an inventory to assess the informal and social components of an entrepreneurial culture. We suggested four components that are fundamental to this: *Leadership Style, Employee Values, Initiative and Team Behavior*.

Specifically, when describing *Leadership Style*, we draw upon the motivational and inspiring influence of a leader's vision (i.e. an idealized goal to create value, innovate and grow the organization; Ruvio, Rosenblatt & Hertz-Lazarowitz, 2010). Furthermore, *Employee Values* describes the extent to which employees share an entrepreneurial in-group social identity, in that they view risk-taking, innovation and experimentation as defining features of their organizational identity. Such a salient in-group identity is likely to promote group cohesion, loyalty and a willingness to compete with perceived out-groups (i.e. competitors) — all of

which may help increase an individual's motivation to pursue innovation and enact existing entrepreneurial talent (for a review on social identity, see Hogg, van Knippenberg & Rast., 2012). *Initiative* describes the positive socio-cognitive effect of having increased empowerment and autonomy as facilitated through leadership and middle management (Burgess, 2007; Hmieleski & Ensley, 2007). Lastly, *Team Behavior* describes the extent to which individuals and groups have social capital. That is, they have social connections that provide access to social support and expertise, in addition to novel resources, information and ideas, that can aid the development and implementation of innovation (Burt, 2004; Hülshager, Anderson & Salgado, 2009).

Although many of these components are described in some capacity by traditional measures of entrepreneurial orientation (Covin & Slevin, 1991) or the four components proposed by Hornsby et al. (2013), in the current study we operationalize these components based on related socio-cognitive factors and theories. Doing so addresses Rauch et al.'s (2009) criticism of the entrepreneurial orientation construct, while extending the aforementioned corporate entrepreneurship constructs to produce a more holistic measurement and conceptualization of entrepreneurial cultures due to the integration of relevant psychological theories. Given this, it was hypothesized that:

H4: Measures of *Leadership Style*, *Employee Values*, *Initiative* and *Team Behavior* can positively extend existing corporate entrepreneurship constructs, namely Hornsby et al.'s (2013) four factor framework.

The second aim was to examine the *mechanisms* by which an entrepreneurial culture produces organizational outputs; that is, we wanted to investigate both how and under which conditions entrepreneurial cultures influence employee's innovation output. We postulated three psychological mechanisms that are likely to be essential to this relationship, namely: *reinforcement*, *engagement* and *P-O fit*. Thus, we hypothesized that entrepreneurial cultures will influence employees' innovation output a) directly, through reinforcement, or lack thereof, of specific behaviors, consequently 'shaping' entrepreneurial behaviors, b) indirectly, by engaging employees, and as a result increasing their output, and c) indirectly, by increasing the output of a specific group of individuals within the organization, namely those with a more entrepreneurial personality.

2. Method

2.1. Participants

A sample of 523 participants (260 males) was examined. Their ages ranged from 18 to 72 years ($M = 35.74$, $SD = 12.14$; 70.3% were between 18 to 40; 18.4% were aged between 41 to 60). All participants were in some form of employment, with the majority of participants working in lower-level positions (68%). A further 20% of the sample held middle-management positions, 2% held senior management positions, and 10% were executives/directors. Data from self-employed participants was not collected given the study's focus on those individuals working within, and under the employment of, an existing organization. The participants were mostly from the USA (83%), with 17% from the European Union.

2.2. Measures

2.2.1. Innovation output (Ahmetoglu et al., 2011)

The extent to which an individual has produced, or is currently engaging in, innovation was measured via 16 dichotomous items representing three domains of entrepreneurial activity: *Corporate Innovation* (e.g. “Have you in your past or current employment invented a new product or service to be sold?”), *Social Innovation* (e.g. “In the past have you initiated activities aimed at bettering the community”), and *Technological Innovation* (e.g. “Have you in the past sought an investment for one of your inventions?”). Measures of internal consistency are displayed in Table 1.

2.2.2. Entrepreneurial Culture Inventory (ECI; Akhtar, Ahmetoglu & Chamorro-Premuzic, 2014)

The ECI is a 30-item self-report inventory that measures the extent to which an individual perceives their organization to promote and encourage entrepreneurial behaviors and practices. In particular, the items emphasize social identification with, and entrepreneurial norms found in, an organization. The instrument consists of four dimensions: *Leadership* (e.g. “Leaders have a vision that I believe in” & “Leaders value original ideas”), *Employee Values* (e.g. “People are not afraid to fail” & “Brave decisions are recognized – even if they prove to be wrong”), *Team Behavior* (e.g. “Teams and departments happily share their knowledge and expertise with each other” & “My team share the same vision of success”) and *Initiative* (e.g. “I have the freedom to choose how I do my job” & “I am encouraged to use my initiative when making decisions”). Respondents are instructed to use a five-point Likert scale that ranges from completely disagree (1) to completely agree (5). A Principal Axis Factoring with Oblimin Rotation procedure revealed four distinct factors. Measures of internal consistency are displayed in Table 1.

2.2.3. *Measure of Entrepreneurial Tendencies and Abilities (META; Ahmetoglu et al., 2011)*

META consists of 40 items and assesses four dimensions of entrepreneurial personality: *Proactivity* (e.g. “Even when I spot a profitable business opportunity, I rarely act on it”), *Creativity* (e.g. “I am always trying to find new ways of doing things”), *Opportunism* (e.g. “I see business opportunities where others do not”), and *Vision* (e.g. “Great business ideas change the world”). Participants respond to items by rating their agreement via a five-point Likert scale ranging from ‘completely disagree’ (1) to ‘completely agree’ (5). Previous studies have demonstrated the scale to have good internal consistency and concurrent validity with and innovation output (Leutner et al., 2014). Measures of internal consistency are displayed in Table 1.

2.2.4. *The Utrecht Work Engagement Survey - 9 items (UWES; Schaufeli et al., 2006)*

The UWES is a 9-item scale measuring work engagement — the positive motivational and affective states that arise when working. It features three dimensions: *Vigor* (e.g. “At my work, I feel that I am bursting with energy”), *Dedication* (e.g. “I am enthusiastic about my job”), and *Absorption* (e.g. “I get carried away when I am working”). Participants are instructed to respond to each item by rating the frequency that they experience the feelings described by each item using a seven point Likert scale (1 = never to 7 = always). Measures of internal consistency are displayed in Table 1.

2.2.5. *Corporate Entrepreneurship Assessment Inventory (CEAI; Hornsby et al., 2013)*

The CEAI is an 18-item scale that measures an organization’s entrepreneurial orientation, in particular, their preparedness to engage in corporate entrepreneurship. It measures the extent to which an organization encourages risk taking, innovative and proactive strategies across four dimensions: *Work Discretion* (e.g. “I seldom have

to follow the same work methods or steps for doing my major tasks from day to day”), *Time Availability* (e.g. “I feel that I am always working with time constraints on my job”), *Management Support* (e.g. “My business unit supports many small and experimental projects realizing that some will undoubtedly fail.”), and *Reward* (e.g. “The rewards I receive are dependent upon my work on the job”). Given the objectives of this study — to extend corporate entrepreneurship constructs — this measure was used as opposed to the 12 item EO developed by Miller and Friesen (1983), given that it was more recently developed and captures more aspects about the way work is formally designed in order to engage in corporate entrepreneurship. The scale was found to have good internal consistency (average $\alpha = .77$; Hornsby et al., 2013). Measures of internal consistency are displayed in Table 1.

2.3. Procedure

Participants were recruited through Amazon’s Mechanical Turk service (80% of the total sample), alongside professional social network services such as LinkedIn (20% of the total sample). The limitations surrounding the use of a crowdsourced sample are discussed later. The study was hosted on an online research platform. Participants first gave their consent and completed a demographic questionnaire, then completed the battery of psychometric measures. Upon completion participants were fully debriefed.

3. Results

Before any analyses were carried out, both the independent and dependent variables were computed and then inspected to identify responses with missing data and outliers. Independent variables were also checked to ensure that they were normally-distributed. No issues were found. As the majority of the participants were from the USA and 17% of the sample were from the European Union and in order to

ensure that the following analyses are generalizable to both geographies, three independent samples *t*-tests were conducted to investigate whether there were mean differences in corporate, technological and social innovations. It was found that across each of dependent variables, European participants had a significantly higher levels of innovation ($p < .010$). Given this, only participants from the USA were used (N = 438) were used in the following analyses. With the data cleaned, the study's hypotheses were ready to be tested.

3.1. Descriptive Statistics & Bivariate Correlations

Descriptive statistics, bivariate correlations and internal consistency measures are presented in Table 1. As can be seen, all scales achieved good levels of internal consistency. Of interest were the positive correlations between the ECI subscales and measures of entrepreneurial activity, work engagement and the CEAI (labelled “entrepreneurial orientation”). Similarly, an individual's job level (i.e. how senior they are within their organization) was positively correlated with increased technological and corporate entrepreneurial activities, alongside the ECI and CEAI measures. Based on these results, additional analyses were conducted to further test this study's hypotheses.

Table 1

3.2. Confirmatory Factor Analysis

In order to test H4, a second-order Confirmatory Factor Analysis (CFA) was conducted in order to test whether the CEAI construct could be extended with the hypothesized social-cognitive factors (as measured by the ECI). In order to test this hypothesis, three CFA models were tested: the first being a second-order CFA of the

ECI (Model 1), the second being a second-order CFA of the CEAI (Model 2), and the third being a second-order CFA model containing both the ECI and CEAI items loading onto their respective latent dimensions, which were then loaded onto a single latent “Entrepreneurial Culture” factor (Model 3). The objective was to test the fit of each model. If the final model was found to fit the data, then H4 would be supported.

The fit for each of the three models were tested using the following indices: the χ^2 statistic (Bollen, 1989; which tests the hypothesis that an unconstrained model fits the correlation matrix as well as the given model; $p > .05$ is desired); the goodness of fit index (GFI; Tanaka & Huba, 1985; values above .90 are acceptable); the comparative fit index (CFI; Bentler, 1990; values above .90 are acceptable); and the root mean square residual (RMSEA; Browne & Cudeck, 1993; values of .06 or below indicate reasonable fit for the model, and values between .06 to .10 being acceptable). The results of each CFA is displayed in Table 2.

It can be seen that each model partially fitted the data as both the RMSEA and the CFI met the recommended values. Although the GFI and the χ^2 statistic suggest the models to not fit the data, the latter is sensitive is to large sample sizes (Byrne, 2013). Given that both the CEAI and ECI items were found to adequately load onto a single latent factor, it can be said that such a latent factor represents the hypothesized entrepreneurial culture. As such, H4 was supported.

Table 2

3.3. Structural Equation Modelling

In order to test H1 and H2, a saturated SEM model was specified. Based on the final CFA model, this SEM featured an exogenous a latent entrepreneurial

personality variable (i.e. the four dimensions of the META) and a latent entrepreneurial culture variable¹. This latent entrepreneurial culture featured the four dimensions of the ECI, alongside a single observed CEAI score that was used to measure entrepreneurial orientation. It should be noted that although the CEAI has four dimensions, the second CFA model presented in Table 2 demonstrated the four dimensions to load onto a scale latent factor. Given a desire for parsimony and the objectives of this paper, a single score was used. Additionally, age and gender were treated as exogenous variables, in order to control for demographic effects. Work engagement was also treated as a latent factor, and specified to be both exogenous and endogenous variables. Finally, a latent factor titled innovation output was treated as an endogenous variable. This latent factor represented three variables: technological, social and corporate innovations.

The model's fit was assessed via a handful of indices: the χ^2 statistic (Bollen, 1989; which tests the hypothesis that an unconstrained model fits the correlation matrix as well as the given model; $p > .05$ is desired); the goodness of fit index (GFI; Tanaka & Huba, 1985; values above .90 are acceptable); the comparative fit index (CFI; Bentler, 1990; values above .90 are acceptable); and the root mean square residual (RMSEA; Browne & Cudeck, 1993; values of .06 or below indicate reasonable fit for the model). Subsequently, the hypothesized model did not fit the data: $\chi^2(112) = 534.80$, $p < .001$; GFI = .87; CFI = .87; RMSEA = .09. In light of this, steps were taken to identify misspecifications. Paths were freed or added and variables removed on the basis of modification indices, expected parameter change

¹ Although existing literature commonly explores the influence of the ECI factors individually, the dimensions were loaded onto a latent factor for two reasons. The first is because the current hypothesis was interested in understanding the collective influence of an individual's perceptions of their work environment. The second is that the current data is cross-sectional, and it was not possible to reliably infer the causal relationships regarding the antecedents of an organisation's culture. As such, a single latent factor was decided to be a more conservative approach, as it placed fewer assumptions on the data.

statistics, significance levels, standardized residuals and the size of indirect effects (assessed via a bootstrapping method; number of bootstrap samples = 200, bias-corrected confidence intervals = .95). Paths were only added or freed if they made theoretical sense, and after each modification, fit indices were checked to ensure improved model fit.

These modifications resulted in the direct path between entrepreneurial culture and innovation output to be freed, as it was non-significant². Similarly, the path between entrepreneurial personality and the latent engagement factor was removed as it was non-significant. Lastly, gender was also removed from the model as it held non-significant relationships with endogenous variables. After these modifications, the model adequately fitted the data ($\chi^2(93) = 269.42, p < .001$; GFI = .92; CFI = .95; RMSEA = .06). In the model, the indirect relationship between entrepreneurial culture and TEA through engagement was found to be significant ($\beta = .11, p < .001$). Square multiple correlations revealed that a total of 17% of the variance in innovation output scores and 45% of the variance in engagement scores was accounted for by the exogenous variables.

In order to test for the influence of common method bias, Harman's single factor test was carried out: using both exploratory and confirmatory factor analyses, a single factor that accounted for the majority of variance was not found. This suggests that common method variance was not of concern (Podsakoff & Organ, 1986). As such, the SEM analyses did not support for H1 but did provide full support for H2 and H4. The fitted model is illustrated in Figure 1.

² An additional SEM model was tested that featured just the latent entrepreneurial culture and innovation output factor. A significant path from entrepreneurial culture to innovation output was found ($\beta = .25, p < .001$; $\chi^2(18) = 55.35, p < .001$; GFI = .97; CFI = .98; RMSEA = .06). This model was tested in order to further explore H1 and whether the non-significant path found between the two factors is a result of including engagement in the model (H2).

Figure 1

3.4. Moderation

In order to test the hypothesis that entrepreneurial culture moderates the relationship between an individual's entrepreneurial personality and tendency to engage in entrepreneurial activities (H3), four hierarchical multiple regressions were specified. The dependent variables were a composite innovation output score, alongside the three innovation variables: corporate, technological and social. In order to test for moderation effects, age and gender were entered into the first model to control for demographic effects, while centered versions of entrepreneurial culture and personality scores, alongside an interaction term, were entered into the second model. The results are presented in Table 3.

Table 3

Of the three regressions tested, a significant interaction effect was only found when regressing the variables on to corporate innovation. In order to further explore this effect, Gaskin's (2012) "StatsTool" statistics package was used to produce a two-way interaction visualization. This is illustrated in Figure 2. This significant interaction, suggests that entrepreneurial culture positively moderated the relationship between an individual's entrepreneurial personality and likelihood to pursue corporate innovations. In fact, the data suggested that if an individual has low levels of entrepreneurial personality, being in an entrepreneurial culture does not increase the tendency to produce such innovations. Yet, high levels of an entrepreneurial culture can significantly increase the tendency to produce corporate innovations if the

individual has high levels of entrepreneurial personality. Together, these findings provide partial support in H3, as the moderation effect was only found for corporate innovation.

Figure 2

4. Discussion

Given that organizations are facing increasing technological and economic pressures, engaging in corporate entrepreneurship is becoming a requisite for firms looking to stay innovative, competitive and relevant (Kuratko et al., 2014). Accordingly, there has been much work exploring the way organizations can develop internal environments, or cultures, that are conducive to the pursuit of entrepreneurship and innovation. Yet, as noted by Rauch et al. (2009) such understanding is limited as it ignores other relevant factors that are likely to influence employee's cognitions and behaviors. Given this, a wealth of literature demonstrating the importance of socialization on employee behavior (Anderson et al., 2014; Cooke and Rousseau, 1988), and the increasing application of psychological theories to entrepreneurship research (Frese & Gielnik, 2014), it was argued that there is an opportunity to extend existing corporate entrepreneurship constructs (e.g. Covin & Slevin, 1991; Hornsby et al., 2013). In particular, it was argued that such constructs could be extended through the integration of socio-cognitive factors (e.g. *Leadership Style, Employee Values, Team Behavior* and the promotion of *Initiative*) in order to have a better understanding regarding both how and why entrepreneurial cultures produce high performance and innovation. Similarly, corporate entrepreneurship does not occur in a vacuum, therefore it is important to explore the various mechanisms

through which informal and formal factors influence employee's behaviors and tendency to engage in innovation. In light of these aims, and the presented findings, the following section will discuss in turn each hypothesis and highlight its implication for theory and practice.

H1: There will be a direct relationship between increased perceptions of an entrepreneurial culture and an employee's level of innovation output.

The theory of operant conditioning was hypothesized to be one psychological mechanism through which entrepreneurial culture (e.g. a combination of both formal and informal factors) influences employee behavior and their production of innovation. In particular, it was suggested that entrepreneurial cultures reward employees who behave in an opportunistic, proactive and innovative manner. Doing so, reinforces and signals what behaviors the organization expects its employees to display. In turn, this increases the likelihood that such employees will behave in a similar manner in the future and produce innovation (Kautonen et al., 2013). This hypothesis was not supported.

Although there were positive and significant correlations between the ECI and the CEAI, and innovation output, when demographic, entrepreneurial personality, and engagement factors were included in an SEM model (Figure 1), there was no significant relationship between the entrepreneurial culture and innovation output factors. This finding suggests that although rewarding entrepreneurial behaviors is likely to be important when creating and sustaining an entrepreneurial culture (as evident from the positive inter-correlations between the ECI and CEAI subscales, and the fitted CFA models), such a mechanism does not have a direct effect on an

employee's level of innovation output. As evidenced in Figure 1, the influence of supporting and rewarding entrepreneurial behavior is expressed indirectly, specifically, through the influence of work engagement.

H2: Work engagement will positively mediate the relationship between entrepreneurial culture and innovation output.

Work engagement was hypothesized to mediate the relationship between entrepreneurial culture and innovation, given that the construct is influenced by both formal (i.e. process, structures & strategies) and informal (i.e. social interaction & meaningful work) factors (Crawford et al., 2010). Given that entrepreneurial cultures can be characterized by such factors, it was thought that the motivation, commitment and dedication experienced by employees towards their work would increase, and thereby heighten the willingness to put in the effort to partake in entrepreneurial activity and develop innovation. This hypothesized was supported.

This finding suggests that entrepreneurial cultures do not have a direct effect on innovation, rather they indirectly influence such outcomes by impacting an employee's state of mind and affectivity. Such a finding is noteworthy as there is a lack of research exploring the relationship between entrepreneurial cultures and engagement, and it demonstrates the importance of using psychological constructs to understand the various mechanisms that are enacted when organizations engage in corporate entrepreneurship. Similarly, it extends Ahmetoglu et al.'s research (2015) which found a positive relationship between entrepreneurial personality and engagement. Given that 30% of individuals are leaving organizations to start their own ventures due to disengagement (Accenture, 2013), these findings are important

as they demonstrate how both formal and socio-cognitive factors are expressed, alongside their effect on employees and the pursuit of innovation.

H3: In cultures which are entrepreneurial, employees with elevated levels of entrepreneurial personality traits will have increased levels of innovation output, in comparison to those employees with lower levels of entrepreneurial personality traits.

Based on person-organization fit theory (Tett & Burnett, 2003; Westerman & Cyr, 2004), it was hypothesized that organizations who have an entrepreneurial culture, are likely to benefit from increased innovation amongst its *entrepreneurial* employees. This is the result of congruence between an employee's personality and the organization's values and social norms. This congruence not only activates relevant traits, skills and abilities, but also enables the individual to freely express their behavioral dispositions — in this case, the tendency to behave in a creative, proactive, opportunistic and visionary manner in the pursuit of innovation (Leutner et al., 2014). Testing such a hypothesis sought to build upon recent developments in the field of corporate entrepreneurship and individual differences, by demonstrating how individual and organizational approaches can be integrated and used to help organizations better support and facilitate innovation and value creation (Kautonen et al., 2013; Leutner et al., 2014; Shane & Venkataraman, 2000). This hypothesis was supported only when predicting corporate innovation, not social or technological innovation.

These findings are noteworthy as they demonstrate entrepreneurial culture to have a disproportionate effect on those with high levels of entrepreneurial personality.

That is, entrepreneurial people are significantly more likely to produce innovation when they are in an entrepreneurial culture. Similarly, while entrepreneurial people are still likely to innovate in non-entrepreneurial cultures (albeit to a lesser degree), this contextual influence has no effect on individuals with low levels of entrepreneurial personality. This has practical implications for organizations looking to increase its capacity for innovation through cultural or training interventions. For instance, it would appear that such efforts and resources would be most effectively spent on those individuals with high levels of entrepreneurial personality. In other words, putting entrepreneurial people in entrepreneurial environments (i.e. teams, departments & divisions) appears to be a highly effective way of fostering and producing innovation. Conversely, putting them in cultures that are not in line with their personality (e.g. bureaucratic cultures), would be substantially underutilizing their potential. Such insights are likely to be relevant for practitioners looking to build talent management strategies centered around entrepreneurial and innovative activity.

H4: Measures of *Leadership Style, Employee Values, Initiative* and *Team Behavior* can positively extend existing corporate entrepreneurship constructs, namely Hornsby et al.'s (2013) four factor framework.

This final hypothesis sought to extend corporate entrepreneurship constructs, namely entrepreneurial orientation and Hornsby et al.'s (2013) four factor model (e.g. the CEAI inventory). In particular, this paper sought to address Rauch et al.'s (2009) call for further investigation into other relevant organizational factors, alongside demonstrate the importance of socialization in shaping an individual's innovation outputs (Cooke & Rousseau, 1988), as opposed to mere focus on organizational

strategy and work design factors that are characteristic of existing models (Covin & Slevin, 1991; Hornsby et al., 2013). As such, and drawing upon the existing psychological literature that has demonstrated the influence of socio-cognitive processes on innovation (Anderson et al., 2014), four additional factors were hypothesized to be extended the existing entrepreneurial culture models. These were the role of leadership's vision (*Leadership Style*; Ruvio et al., 2010), group identity (*Employee Values*; Hogg et al., 2012), social capital (*Team Behavior*; Burt, 2004) and empowerment (*Initiative*; Hmieleski & Ensley, 2007). As demonstrated by the confirmatory factor analyses presented in Table 2 and the SEM in Figure 1, this hypothesis was supported.

The findings presented in this paper demonstrate that both formal and informal organizational factors are compatible and both are associated with positive organizational outcomes — engagement and innovation. It can therefore be said, the more an individual perceives the organization's culture to support and reward entrepreneurial activity and innovation, alongside having compatible formal operations, strategies and structures, the more likely they are to hold positive attitudes towards pursuing innovation, and thereby acquire the ability and motivation to behave in such a manner.

4.1. Limitations & Future Research

The foremost limitation with the presented studies is the use of single-source, self-report methods. It would have been ideal to include outcome measures that featured objective measures of achievement. Nonetheless, support for the use of self-report measures of entrepreneurial achievement comes from the meta-analysis by Rauch et al. (2009) who found a negligible difference between the effect sizes of organizational factors on subjective and objective measures of entrepreneurial activity and firm performance. A second limitation is that the sample used was primarily from

the USA. The findings therefore may be culture bound; previous research has demonstrated that a nation's attitude towards entrepreneurship is related to an organization's tendency to engage in entrepreneurship (Turró, Urbano, & Peris-Ortiz; 2014).

The final limitation concerns the use of crowdsourced sample, in particular Amazon's Mechanical Turk. The use of crowdsourced samples in social science is the subject of a lively debate, where their use is either questioned due to potential limitations surrounding such a sample's reliability and external validity (Harms & DeSimone, 2015), or championed as such samples have greater socio-economic, geographical and ethnic diversity (Landers & Behrend, 2015). Although this debate is far from settled, with both perspectives highlighting important issues, it is important to not only acknowledge the limitations with such a sampling method, but also justify our use of a crowdsourced sample and argue that our findings have external validity.

Firstly, although a crowdsourced sample was used for convenience reasons, we argue that it remains a suitable sample given that participants had to be in full-time employment, more specifically, participants could not work fulltime for Amazon's Mechanical Turk platform. Secondly, we were interested in how individuals perceive their organization's work environment, specifically its culture. As such, we feel that collecting data from, and comparing across, specific organizations is not needed to suitably test our hypothesis (despite being an interesting line of future research). Lastly, additional analyses found no significant differences in average entrepreneurial personality scores (as measured by META) between the participants recruited from Amazon's Mechanical Turk, and those from professional social networking sites such as LinkedIn (a subset of the sample that has arguably more external validity).

Although this finding does not guarantee our findings to have external validity, it does suggest that both samples are as entrepreneurial as each other (Leutner et al., 2014).

To address the above limitations, future research should seek to adopt objective data, targeted populations, and a longitudinal design in order to ascertain the predictive validity of the relationships identified in this cross-sectional sample. For instance, collecting such data from a variety of organizations, based in different industries and countries, would allow multi-level model levels to test within and between group variation in entrepreneurial culture on activity and innovation. Such an analysis may also shed more light on whether increased innovation is not necessarily the product of an entrepreneurial culture, but rather effective management (Bakker & Demerouti, 2008). Additionally, given that an individual's job level (i.e. how senior they are within the organization) was positively correlated to the engagement in entrepreneurial activities, future research should seek to explore how less senior employees can be encouraged and supported to engage in such activities. The most plausible interpretation of this finding is that senior members of staff have more autonomy and opportunities to engage in entrepreneurial activities (Burgess, 2012). Lastly, future research should attempt to replicate the extension of the corporate entrepreneurship constructs, in order to determine whether the social and contextual factors included in this study are appropriate and suitable in other industries and organizational settings.

4.2. Practical Implications

Notwithstanding these limitations, several practical recommendations can be made to managers and consultants looking to promote entrepreneurial behavior and innovation within organizations. As such, practitioners are recommended to consider the following points:

1. *Identify entrepreneurial talent.* Given the direct relationship between entrepreneurial personality and innovation, identifying and recruiting entrepreneurial individuals is perhaps the most effective way to facilitate an entrepreneurial culture and increase innovation output within an organization. Observing entrepreneurial talent on the job may be difficult given that entrepreneurial behaviors are often discouraged in organizations (Hayton, 2005). This can be rectified by the use of valid psychometric tests that reliably predict entrepreneurial behaviors and achievements. Of course, it may be unwise to simply fill positions with a large number of highly entrepreneurial individuals unless one has a defined system as to how to manage these individuals (Miller, 2015). Nevertheless, placing entrepreneurial individuals in strategic roles, teams, and departments, is arguably an effective way to drive innovation (Lumpkin, 2007).
2. *Leaders must communicate a vision.* The results presented here demonstrate the influence of a leader's behavior, in particular their vision, in motivating and engaging employees to behave entrepreneurially. Accordingly, practitioners must work with an organization's leadership to ensure that they support entrepreneurial practices and regularly communicate a vision for innovation, growth and progress (Ruvio et al., 2010). A leader's vision is more likely to gain buy-in and support if it is meaningful (i.e. it communicates a salient social identity) and rewarding (i.e. it is perceived to be attractive and a worthwhile pursuit; Hogg et al., 2012). It is therefore important that the vision is uniformly shared across all leadership and management (Burgess, 2012). In addition, leaders must act as role models for the rest of the organization in order to dispel skepticism and doubt.

3. *Create the right environment.* As demonstrated in our results, organizations can facilitate the entrepreneurial talent (i.e. behaviors) of their employees by creating an environment that not only rewards, but also allows, the exploration and exploitation of new opportunities, creative ideas, and inspirational goals. As evident in organizations such as IDEO, aligning both the formal (i.e. job design, reward & allocation of resources) and the informal (i.e. social norms, beliefs & values) environment, produces increased entrepreneurial achievement (Thomke & Nimgade, 2000). This is because the closer these are aligned, and genuinely practiced, the more an employee will perceive their organization to support them to behave in an entrepreneurial manner (Hayton, 2005). As demonstrated in this study, doing so will increase the confidence and motivation that in turn produces entrepreneurial achievements.
4. *Invest in teams.* Teams are the engine of entrepreneurial achievement. Based on the presented evidence and the reviewed literature (Hülshager et al., 2009), teams that have a high level of interdependency in its objectives are not only more collaborative, they also produce significantly more innovation output. Practitioners can achieve this by rewarding group behavior, and not individual performance. The egalitarian nature of this type of reward structure reduces office politics and internal competition. As a result, team members are more trusting towards each other and willing to share new ideas and resources that aid the identification and exploitation of opportunities (West, 2007). Furthermore, practitioners can further increase the entrepreneurial talent of a team by ensuring that each of its members have a complementary skill set and expertise (Hülshager, et al., 2009).

5. *Build social capital.* Innovation is a product of both individual and group behaviors. As argued by Burt (2004) and De Carolis & Saporito (2006), social capital facilitates the sharing of novel ideas, information and resources. As a result, this aids the identification and exploitation of valuable opportunities. Similarly, increased social capital is positively related to more effective mentoring and knowledge management schemes, both of which improve opportunity recognition (Ozgen & Baron, 2007). Practitioners are therefore encouraged to develop an organization's social capital, by modifying its employee's social network. Using methods such as Social Network Analysis (Wasserman & Faust, 1994) to identify who does and does not have social capital, practitioners can develop interventions to modify communication channels and collaborative practices (Cross & Parker, 2004). By encouraging people to build relationships within and between their teams, workgroups and departments, the social capital of the organization will increase, alongside the number of identified opportunities that can produce entrepreneurial achievements.

4.3. *Conclusion*

This paper sought to address gaps in the corporate entrepreneurship literature, through the inclusion of socio-cognitive factors alongside investigating three psychological mechanisms through which entrepreneurial culture influences an employee's level of innovation output. In particular, work engagement was found to mediate the relationship between entrepreneurial culture and innovation output. Furthermore, entrepreneurial culture moderated the relationship between entrepreneurial personality and innovation output. It is hoped that this paper will stimulate related research to further develop both theory and practice.

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Table 1: Descriptive Statistics & Bivariate Correlations

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	M	SD	α
1. Age	—																	35.83	12.10	—
2. Gender	.10*	—																1.51	.50	—
3. Job Level	.27**	.04	—															1.45	.86	—
4. Employee Values	.07	-.05	.29**	—														3.23	.79	.89
5. Team Behavior	.04	.08	.06	.59**	—													3.66	.69	.88
6. Leadership Style	.08	.09	.23**	.58**	.59**	—												3.77	.85	.89
7. Initiative	.18**	.03	.37**	.62**	.53**	.51**	—											3.52	.84	.82
8. Entrepreneurial Orientation	.06	-.04	.30**	.78**	.61**	.51**	.64**	—										4.25	1.07	.91
9. Opportunism	-.04	-.19**	.19**	.44**	.30**	.31**	.18**	.36**	—									3.16	.79	.89
10. Proactivity	.09	.00	.23**	.15**	.21**	.23**	.23**	.16**	.40**	—								3.17	.62	.80
11. Creativity	.09	-.02	.19**	.31**	.36**	.29**	.29**	.31**	.54**	.35**	—							3.40	.59	.81
12. Vision	-.03	.03	.08	.18**	.38**	.29**	.21**	.16**	.44**	.29**	.49**	—						3.69	.58	.81
13. Vigor	.26**	-.02	.25**	.46**	.49**	.44**	.46**	.54**	.27**	.25**	.33**	.29**	—					3.42	1.49	.88
14. Dedication	.23**	.06	.20**	.43**	.53**	.44**	.48**	.50**	.22**	.23**	.34**	.31**	.85**	—				3.86	1.49	.87
15. Absorption	.17**	.09	.20**	.36**	.49**	.42**	.39**	.38**	.24**	.23**	.36**	.35**	.73**	.76**	—			3.90	1.36	.86
16. Corporate Innovation	.05	-.08	.24**	.16**	.00	.08	.09*	.13**	.19**	.01	.17**	-.01	.11*	.09	.10*	—		.16	.27	.80
17. Technological Innovation	.23**	-.03	.25**	.16**	.16**	.15**	.23**	.12**	.19**	.15**	.25**	.12**	.27**	.27**	.27**	.38**	—	.57	.34	.89
18. Social Innovation	-.10*	.03	.05	.07	.09	.07	.06	.08	.14**	.05	.19**	.13**	.07	.08	.10*	.31**	.33**	.26	.30	.82

Note: Correlations significant at the following levels: * $p < .050$ (two-tailed); ** $p < .010$ (two-tailed); *** $p < .001$ (two-tailed). Job Level: 1 = Employees, 2 = Managers, 3 = Senior Managers, 4 = Directors/Executives. *ECI* (4 – 7), *Entrepreneurial Orientation* as measured by the CEAI (8), *Entrepreneurial Personality* as measured by META (9 - 12), *Work Engagement* as measured by the UWES (13 - 15).

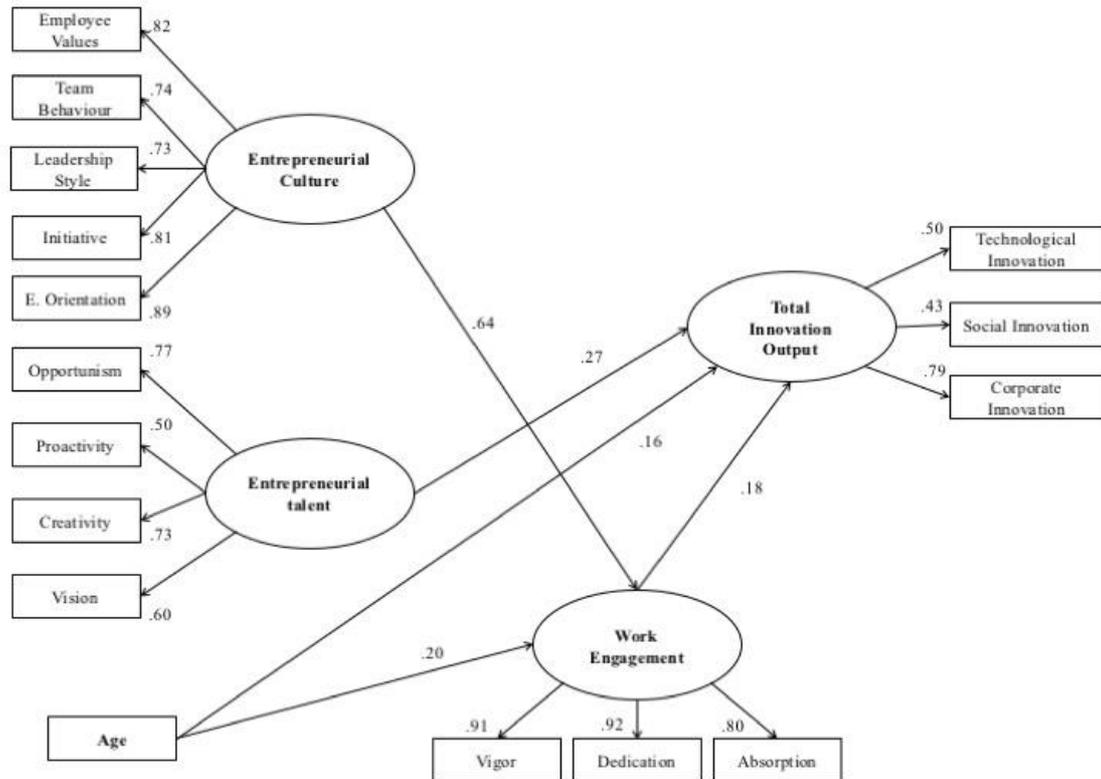


Figure 1: The Fitted SEM Model. *Note:* All paths are significant ($p < .001$).

Table 2: The Results of Second-Order Confirmatory Analyses

Model	χ^2 (<i>df</i>)	GFI	CFI	RMSEA
1. Entrepreneurial Culture Inventory	989.56 (401)***	.86	.91	.06
2. Entrepreneurial Orientation	601.40 (130)***	.86	.90	.09
3. Entrepreneurial Culture (Model 1 + 2)	2322.87 (1062) ***	.81	.90	.05

Note: *** Indicates χ^2 is significant at the $p < .001$ level. Entrepreneurial Orientation was measured by the CEAI.

Table 3: Results of Four Hierarchical Multiple Regressions Testing the Interaction Between Entrepreneurial Culture & Personality on Innovation Output.

		Model 1		Model 2		Model 3		Model 4	
		Total Innovation Output		Corporate Innovation		Technological Innovation		Social Innovation	
Variables		β	t	β	t	β	t	β	t
Step 1	Age	.11	2.55**	.23	5.25***	.10	2.22**	-.07	-1.59
	Gender	-.10	-.10*	-.10	-2.41**	-.11	-2.50**	-.02	-.34
	$F(2, 519) =$	5.35**		15.62***		5.123**		1.38	
	Adj $R^2 =$.02		.05		.02		.01	
Step 2	Age	.09	2.18*	.21	5.05***	.08	1.81	-.08	-1.86
	Gender	-.06	-1.43	-.06	-1.57	-.09	-2.01*	.02	.37
	E. Culture	.11	2.27*	.12	2.60**	.08	1.67	.04	.89
	E. Personality	.28	5.95***	.26	5.53***	.17	3.39***	.23	4.66***
	Culture*Personality	-.04	-1.02	-.09	-2.14*	.04	1.00	-.05	-1.26
	$F(2, 516) =$	16.46***		21.13***		7.51***		7.70***	
	Adj $R^2 =$.13		.16		.06		.06	

Note: E = Entrepreneurial. * $p < .050$ (two-tailed); ** $p < .010$ (two-tailed); *** $p < .001$ (two-tailed).

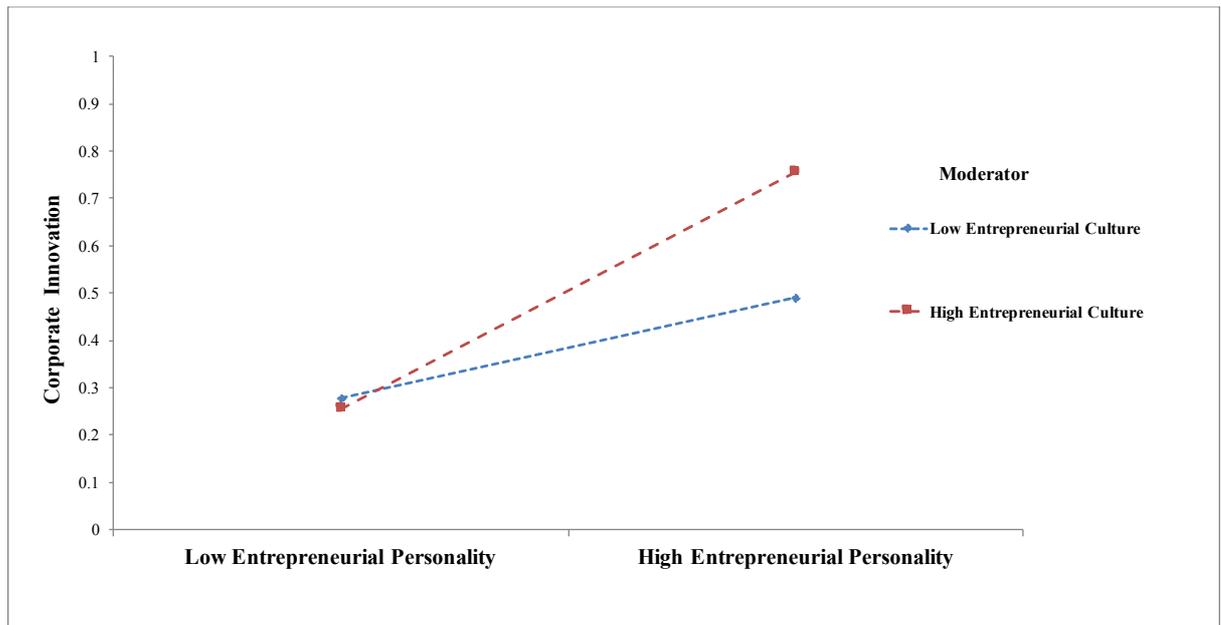


Figure 2: A Two-Way Interaction between Entrepreneurial Culture and Personality, on Corporate Innovation.