

Creativity Versus Innovativeness: Exploring the Differences between the Two Constructs May Lead to Greater Innovation in Large Firms

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Abstract

Several individuals from top management seem to be confused about the difference between creativity and innovativeness. Amabile (1997) suggests that while innovation begins with creative ideas, creativity by individuals and teams is only a starting point for innovation. Individual creativity is necessary but not sufficient to yield breakthrough innovation in organizations. This can sometimes cause confusion in employee development efforts and actions taken by management. Companies often look for ways to hire and retain creative employees and at the same time they are also interested in establishing a creative environment for knowledge workers... but should creativity be the primary focus? These firms hope that creativity enhancing steps will eventually lead to greater innovation and therefore help it to achieve sustained competitive advantage. This paper attempts to demonstrate that there are potentially other dimensions beyond creativity related to innovativeness, which should be considered at the individual level in order to foster innovation in firms. Empirical results in this study support the idea that intrinsic motivational orientation, sociability and political astuteness are enhancers to employee innovativeness while perfection seeking behavior detracts employee innovativeness. These findings may serve to extend Amabile's (1997) componential framework to center on the "innovativeness" construct versus creativity to help explain how firms need to hire, cultivate and retain the right talent.

Keywords: creativity, innovativeness, individuals, teams, knowledge, intrinsic motivational orientation, sociability, political astuteness

1. Introduction

As identified by the componential model of creativity (Amabile, 1997), organizations can become good by enhancing employee creativity skills, providing support for those who are intrinsically motivated, and building domain specific expertise within the firm, this should lead to a much higher probability of success in efforts to achieve game changing innovation. The componential model is extremely useful in guiding systematic management tactics aimed at enhancing individual creativity in firms with the overall goal of greater firm level innovative output.

Creativity is certainly a desirable attribute in support of innovation, but is it enough? Creativity is very important to ideation and discovery, as well as in support of the problem solving process used as new hurdles are encountered along the path to implementation but is it enough? Given that creativity is a key building block, there must be other individual orientations and skills (beyond creativity alone), which may also enhance or detract from individual level innovation success. Increased employee innovativeness level should theoretically contribute to all aspects of the innovation framework; enhancing discovery, incubation and acceleration activities in pursuit of breakthroughs (O'Connor, 2008).

This paper attempts to extend the componential theory proposed by Amabile to consider innovativeness skills and characteristics, which will support a more encompassing view of individual contributions to firm level innovation. A key premise of this work is aptly proposed by Van de Ven and Angle (1989). They state, "Innovation requires more than the creative capacity to invent new ideas; it requires managerial skills and talents to transform the new ideas into practice". Effective managerial skills and talents are worthy of a great deal of research and discussion.

2. Background

Before looking beyond creativity it is important to consider the conceptual definitions of creativity, innovation, and innovativeness. This will allow a common understanding of the boundaries of the constructs and where new elements may fit.

2.1 Creativity, Innovation and Innovativeness

The ability of Leonardo da Vinci to imagine a helicopter over 500 years ago can be compared to the work of Edison to develop the light bulb and/or more recently, Steve Jobs to develop the personal computer. These examples all highlight the importance of creativity and innovativeness to the introduction of society improving innovations. It could be stated, that although da Vinci was quite creative in conceptualizing / inventing the helicopter design, he fell a bit short as compared to the other two when it came to bringing his idea to life. The latter two examples may better illustrate the concept of innovation since these ideas were brought more quickly to commercial reality which is a necessity when it comes to innovation. In fact, one may say that in the case of Da Vinci, he was extremely creative, and in the case of Jobs, he demonstrated a high level of innovativeness. What is the difference? Let's first examine to construct "Creativity". Despite growing academic interest in the nature of creativity there remains no unambiguous, generally accepted definition (Amabile, 1994). However, the most accepted definitional measures of creativity come from work done in the 1970s. Torrence (1974), whose work established measures for creativity, centered on the following elements in his scale construction to quantify creative thinking: (Fluency, Flexibility, Originality and Elaboration). Using these dimensions, it is clear that creative thinking provides individuals with the ability to put forth a fountain of ideas... but what about implementation and exploitation of those ideas? This is where the concept of innovativeness begins to transcend creativity. Creativity does not seem to capture all the necessary spectrum of characteristics required for delivery of innovation. Given that these accepted creativity measures focus primarily on the snap shot in time where an idea is born, one might imagine that a great deal of highly creative output based on the above measures may result in little innovation if the ideas are not moved forward (implemented) and acted on (exploited). Amabile (1997) states in her theory that organizational creativity, in addition to the classic definition, makes the assumption that the idea is useful as well.

Innovation requires useful ideas that are then exploited. According to US Department of Commerce (April 2007), innovation is:

"The design, invention, development and/or implementation of new or altered products, services, processes, systems, organizational structures, or business models for the purpose of creating new value for customers and financial returns for the firm."

This definition certainly expands the concept of innovation beyond creativity and the words like "development" and "implementation" accentuates this. The inclusion of the phrases "customer value" and "financial returns for the firm" in the definition also indicate more than design and invention for the sake of creative pursuit alone.

Innovativeness is a concept, which describes characteristics, which enhance innovation. Leavitt and Walton (1975, 1988) state that "Innovators are open to new experiences and novel stimuli; because it possess the ability to transform information about new concepts, ideas, products, or services for their own use; and as having a low threshold for recognizing the potential application of new ideas." In their view, innovativeness has more to do with recognition and application of ideas rather than the creation of the idea itself. "Cognitive style is defined as the strategic, stable characteristic- the preferred way in which people respond to and seek to bring about change" (Kirton, 2003). More adaptive individual tends to utilize the existing structure while solving problems and he or she feel enabled by the structure. More innovative people do not utilize the generally accepted structure while solving problem and may feel restricted by what exists. The key point made by the discussion in the previous paragraphs is that innovativeness and creativity are somewhat different concepts, with innovativeness being the wider of the two.

2.2 Intrinsic versus Extrinsic Motivation

If the differences between creativity and innovativeness can be acknowledged, then it is now possible to investigate whether or not the accepted research involving ways to enhance employee creativity also hold true for employee innovativeness. Amabile's (1986) work relating to the motivational forces supports organizational creativity. In her componential theory of organizational creativity, she indicates that enhanced intrinsic motivation along with domain specific know how and creativity skills are the three key components required to ensure organizational creativity.

Amabile (1997) espouses the importance of creating a work environment, which supports the three components, especially intrinsic motivation. Actions by management, which attempt to motivate behavior, can sometimes misfire. There are many articles that discuss how to best establish an environment for innovation and also articles that offer stern warnings (Seely-Brown & Duguid, 2000, 2001). The question here arise that can employers create an environment which will support employee innovativeness and does the relationship observed by Amabile relative to employee creativity hold true for innovativeness as well?

2.3 Time Pressure, Tension, Perfectionism

In order to compete in this competitive environment and attain competitive advantage organizations need to innovate and this comes unavoidable tension (Dougherty, 1996). It is not an easy task to implement required change at the pace necessary. Given the current industrial landscape, there is an ever increasing pressure for firms to innovate, and be first to the market with new breakthrough products (Dror et al., 1999). This often puts heavy time pressure and job tension on those employees tasked with innovation. Tensions cannot be eliminated because they are inherent in [product development] activities and help power the innovation process according to Dougherty (1996). In any innovation project, individuals involved must cope with time pressure, job tension and the desire to exactly meet the objective in question (striving for perfection). People with personality characteristics, which are more risk averse, may have difficulties venturing into innovation contexts where improvisation is required (Dror et al., 1999).

Perfection seeking behavior is often the out crop of higher levels of risk aversion and higher focus on planning (staying in the comfort zone). According to Adderholt-Elliot (1989), perfectionism is a belief that perfection can and should be attained. In its pathological form, perfectionism is a belief that work or output that is anything less than perfect is unacceptable. Hamachek (cited by Parker & Adkins, 1994) describes two types of perfectionism. Normal perfectionists “derive a very real sense of pleasure from the labors of a painstaking effort” while neurotic perfectionists is experienced when individuals are "unable to feel satisfaction because in their own eyes they never seem to do things [well] enough to warrant that feeling". In the workplace, perfectionism is often marked by low productivity as individuals lose time and energy on small irrelevant details of larger projects or mundane daily activities.

According to an article published in *Psychology Today* (1995), this can lead to depression, alienated colleagues, and a greater risk of accidents. Adderholt-Elliot (1989) describes five characteristics of perfectionists which contribute to underachievement in work or educational contexts: procrastination, fear of failure, the all-or-nothing mindset, paralyzed perfectionism, and work-aholism. Yet some level of perfection seeking behavior must be necessary in the context of innovation to protect against the implementation of highly underdeveloped ideas. The question then becomes how we can better understand the appropriate balance between time pressure, tension and desire for perfection so as to optimally manage innovation efforts without confounding these three elements in our investigation assuming that there could be potential for multicollinearity between the measurements of these factors.

2.4 Social and Political Skills

Historically when it came to the workplace, social behavior may not have taken on a positive note. “People are not paid to socialize!” There is also a negative connotation associated with those who are politically astute in the work environment. Political and social skills may have also been neglected somewhat in the innovation literature where the focus has always been on hiring the best technical talent-talent as defined by domain specific expertise. Now, with the increasing interest in network theory and how this facilitates organizational learning, the impact of an individual’s social and political orientation in the context of high performance teams is a very active research area (eg. Seibert, Kraimer, & Liden, 2001; Borgatti, 2003; Mehra, 2001). It should be pointed out that sociability and political astuteness are differing constructs which may be easily confounded in analysis.

3. Theoretical Framework

Since the 1980s, Theresa Amabile has reinforced the individual’s impact on organizational innovation in terms of required expertise, creativity skills and motivation. Likewise she has proposed that firms must reciprocate by establishing the right environment for innovation. She proposes that feeding an individual’s intrinsic motivation (love of inventing) within a componential framework will lead to greater innovation in firms. Figure 1 shows the overall framework which links individual or team level creativity (componential model of creativity) to firm level innovation.

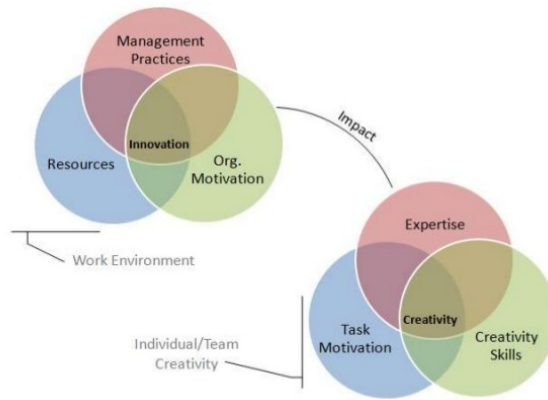


Figure 1. Impact of firm level environment on creativity (Amabile, 1997)

The firms must understand that the three components of creativity; (intrinsic) motivation along with domain specific know how and creativity skills are quite powerful. Given the obvious strength to this framework, one might ask: Can the model be extended to account for individual characteristics which feed innovation which are beyond creativity? This paper attempts to broaden the componential model to a wider, more encompassing construct: “innovativeness” which not only includes creativity but also may involve additional facets such as social and political skills. Creativity is undoubtedly a key component of innovativeness but there are potentially other individual characteristics which also promote innovation (in addition to creativity) primarily having to do with implementation and future exploitation. The basic premise of this paper is to see if the componential framework could be extended to take into account individual or team “innovativeness” as a wider construct than creativity (Figure 2).

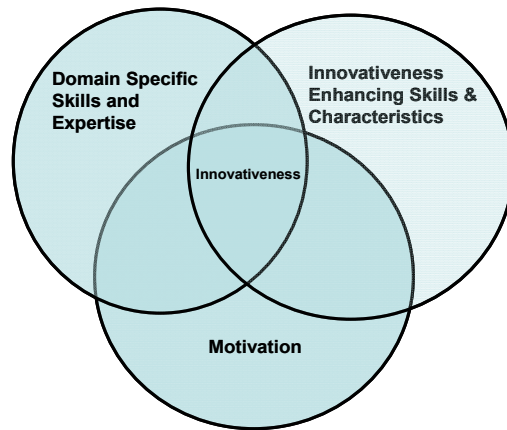


Figure 2. Substituting “Innovativeness” for “Creativity” in the componential model

In the revised theoretical model in Figure 2, we can see that the center now becomes “innovativeness” and while two of the components remain the same (motivation and domain specific skills and expertise) the third component now becomes “innovativeness enhancing skills and characteristics”. These innovativeness enhancers demonstrate skills and characteristics that may include creativity but also those which may be related to the broader construct of innovativeness focusing on execution and exploitation of ideas. This is of importance in the context of large and often complex large firm settings.

4. Hypotheses

Several hypotheses emerge as a result of the modification to the componential theory to encompass individual innovativeness (versus creativity). Figure: 3 (see Appendix) shows the hypothetical relationships which may

exist. It is important to note that in this empirical study the relationship between “expertise in domain” and innovativeness will not be tested in the interest of brevity but this does not diminish the importance of this component. It will eventually need to be tested and validated.

Domain specific expertise aside, the hypothetical focus can now be placed on the other two components. (“Innovation enhancing skills and characteristics” and “motivation”). The first two hypotheses (H1 & H2) re-checks the idea that intrinsic motivation far outweighs extrinsic motivation for innovativeness. (This has been put forth relative to creativity.) Following this line of thinking, it is postulated that those who are oriented towards intrinsic motivators are going to be more innovative as measured by innovativeness. On the other hand it is likely that those who are most focused on extrinsic motivators may demonstrate lower levels of innovativeness.

- H1: Individuals with higher preference for intrinsic motivators will demonstrate higher innovativeness.
- H2: Individuals with higher preference for extrinsic motivators will demonstrate lower innovativeness.

Hypotheses 3a, 3b and 3c looks at the effects of individual level job tension, time pressure and desire for perfection on innovativeness measures.

- H3a: Individuals reporting higher Job Tension will demonstrate lower innovativeness.
- H3b: Individuals reporting higher Time Pressure will demonstrate lower innovativeness.
- H3c: Individuals reporting higher Desire for Perfection will demonstrate lower innovativeness.

Hypotheses 4a and 4b center around the effects of sociability and political acumen on innovativeness level. It would seem that in the context of a large corporation interpersonal skills would be necessary to drive innovation given institutional forces.

- H4a: Individuals reporting higher Sociability will demonstrate higher innovativeness.
- H4b: Individuals reporting higher Political Skills Aptitude will demonstrate higher innovativeness.

There are also most likely other innovativeness enhancing (or detracting) skills and characteristics that are not considered in this study (as shown in figure 3 see Appendix) and could be investigated in the future.

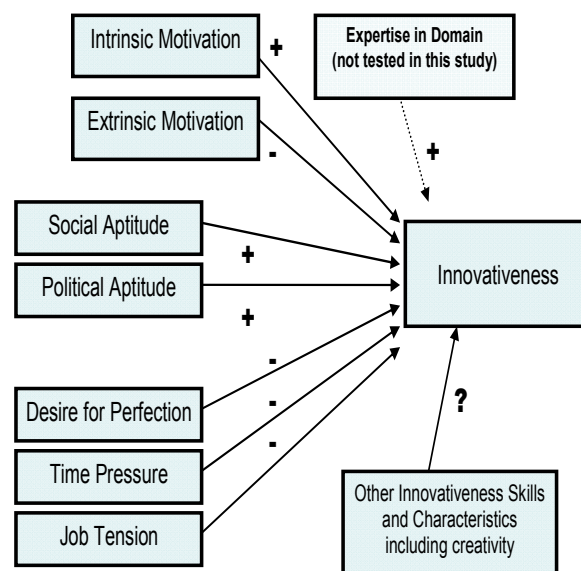


Figure 3. Hypothetical relationships, including proposed directions (+/-)

5. Methods and Procedures

5.1 Sample and Setting

The current study included employee survey employees at a large industrial specialty adhesives division of a

multibillion dollar international firm. In total, the firm, internationally, has more than 50,000 employees in various geographical regions and diversified business units with approximately 10,000 who participate in its team oriented cross functional innovation processes. In order to make this study manageable, the initial population of interest was confined to one geographical region (North America) and one strategic business unit (industrial adhesives division).

Since innovation at the firm is carried out using cross functional teams, the total population involved in the innovation process at the division of interest consisted of approximately 200 workers representing more than nine functional areas such as product development, marketing, application engineering, sales, etc. Table A1 (see Appendix) shows a general comparison of the population and response sample. Roughly 65% of the target population decided to voluntarily participate in the study. Table 1 shows that the gender breakdown, respondent location and functions represented matched pretty well between those identified in the total population and those who participated. Finally, the management team at the firm examined the list of those who participated and those who did not to see if any systematic non response occurred and where not able to identify any obvious trend.

Table 1. General comparison of the population of interest to the sample respondent pool

	Population	Response Sample
Total Participants	200	131
Gender (% Males)	78.5%	81.3%
Location (% at R&D Center)	79.0%	81.7%
Functional Areas		
Product Development	33.0%	34.4%
Technical Service	21.0%	24.4%
Sales	11.0%	9.9%
Long Term Research	8.5%	8.4%
Product Management	7.0%	5.3%
Regulatory Affairs	5.5%	5.3%
Marketing	5.0%	5.3%
Quality / Manufacturing	5.0%	3.8%
Equipment Support	2.5%	0.8%
Packaging Support	1.5%	1.5%

5.2 Instrument Measures and Control Variables

In addition to the collection of control / categorical data, several publicly available validated instruments were used in this study. The list of survey questions based on publicly validated and reported instruments and the questions contained in the first survey, which are primarily aimed at gathering control or the author upon request can provide categorical information. For each instrument used, the survey the questions, reference document and also the reliability is reported for either the single item measure or the range of alpha values for multi-measure scales. Table 2 shows a summary of the constructs used, the reference for the measurement scale, number of items and the nominal value of Cronbach's alpha (Cronbach, 1951) reported by the reference authors.

Table 2. Constructs used in this study

Construct	Reference	# of Items	Cronbach's Alpha (reported)
Innovativeness	Leavitt, Clark. Walton, John.(1975)	24	0.72
Intrinsic / Extrinsic Motivation	Amabile Teresa M., Hill Karl G., Hennessey Beth A., Tighe Elizabeth M. (1994)	30	0.75
Political Skills	Ferris Gerald R., Treadway Darren C., Kolodinsky Robert W., Hochwarter Wayne A., Kacmar Charles J., Douglas Ceasar, Frink Dwight D.(2005)	18	0.83
Sociability / Social Skills	Reynolds, Kristy E. Beatty, Sharon E. (1999)	7	0.82
Perfectionism	Kopalle, Praveen K. Lehmann, Donald R. (2001)	8	0.88
Time Pressure	Beatty, Sharon E. Ferrell Elizabeth M. (1998)	7	0.66
Tension: Job induced tension	House, Robert J., Rizzo, John R. (1972)	7	0.83

In order to achieve the desired orthogonality between the related constructs, weighted factor scores were derived. Exploratory factor analysis (EFA) was conducted using Principle Component Analysis (extraction method) and Varimax with Kaiser Normalization (rotation method) to create individual factor scores for each factor and each respondent. Extracted linear scales were evaluated for internal reliability even though the resulting linear scales were not used (in favor of weighted factor scores). All questions in each EFA were used to create factor scores. Table 3 shows statistics including Cronbach's (1951) alpha for each measure derived from this study. Also shown in Table 3 is the groupings used to create orthogonal factor scores with zero pair-wise correlation. (EFA/rotations grouped a, d, e and f). The use of rotation to achieve zero correlation helps to delineate similar constructs more parsimoniously.

Table 3. Factor rotation summary and reliability

(Likert 1-10 scales)	Scale						No of		Cronbach's	
	Mean	Min	Max	Range	Max / Min	Variance	Items	Obs	Alpha	Rotation
Innovativeness	6.5	3.8	8.2	4.4	2.2	1.6	23	119	0.775	a
Job Satisfaction	7.4	5.6	9.2	3.6	1.7	0.6	32	119	0.965	b
Leader Member Exchange	7.4	5.9	8.1	2.2	1.4	0.5	12	119	0.919	c
Intrinsic Motivation	7.3	6.5	8.4	1.9	1.3	0.3	13	119	0.834	d
Extrinsic Motivation	5.6	2.3	7.4	5.1	3.2	1.9	17	119	0.717	d
Political	7.1	5.7	8.9	3.2	1.6	0.8	15	119	0.888	e
Social	7.0	6.1	7.5	1.4	1.2	0.3	7	119	0.792	e
Perfection	5.7	4.3	7.1	2.8	1.7	0.9	8	119	0.856	f
Job Tension	4.5	2.8	7.3	4.5	2.6	2.4	7	119	0.779	f
Time Pressure	6.5	5.8	8.1	2.3	1.4	0.6	7	119	0.757	f

Note. Rotated Factor Scores (Mean=0, Var =1) Actually Used and Each Group (a-f) Uncorrelated Within.

Table 4 shows the pair-wise correlation of the factors scores. It is important to indicate that there were three construct sets where factoring was done to achieve zero pairwise correlation. Perfection, Time Pressure and Job Tension were factored so that they had zero correlation. Political and social aptitude scores were orthogonal and also this was true for intrinsic and extrinsic motivation measures.

Table 4. Pairwise correlation of the extracted factor score variables

Pairwise Correlation	Innovativeness	Intrinsic	Extrinsic	Political	Social	Perfection	Tension	Time Pressure
Innovativeness	1.00							
Intrinsic Motivation	0.59	1.00						
Extrinsic Motivation	-0.21	0.00	1.00					
Political	0.41	0.58	0.21	1.00				
Sociability	0.22	-0.01	0.05	0.00	1.00			
Perfection Seeking	0.01	0.45	0.50	0.29	-0.19	1.00		
Job Tension	-0.10	0.02	0.07	0.08	-0.32	0.00	1.00	
Time Pressure	-0.03	-0.03	0.13	0.10	0.04	0.00	0.00	1.00

6. Data Collection/Procedure

The data used in this study was collected using on-line survey techniques. The data collected consisted of approximately 70 categorical questions and also a series of roughly 135 questions based on validated instruments measuring the latent variables of interest (often with 10 point likert scale). The study consisted of two surveys. The first survey focused on categorical information and took roughly 10 minutes on average to complete and then the second survey consisted of primarily validated instruments and took in the range of 20 to 30 minutes to complete. Survey questions were randomized so that scale items were not stratified or easily identified by the subjects. Only 10 respondents completed the first survey and did not complete the second one. (<9% attrition) with still roughly 60% response rate overall.

Ordinary Least Squares Linear regression techniques were employed to analyze the data collected in this study. The study was designed to minimize threats to validity as described by Stock and Watson (2011) and various

tests were run post hoc to evaluate for methods bias.

7. Results and Discussion

Table 5 shows the results of OLS regression with the construct innovativeness as the dependent variable.

Table 5. OLS regression

Model: Dependent Variable = Innovativeness	
Intrinsic Motivation	0.584^{***} (0.109)
Extrinsic Motivation	-0.144 (.0911)
Political Aptitude	0.169⁺ (.0957)
Sociability	0.172[*] (.0743)
Perfection Seeking	-0.198[*] (.0918)
Job Tension	-0.058 (.0787)
Time Pressure	-0.021 (.0703)
Intercept	7.89E-08 (.0679)
N	119
R²	0.484
Adjusted R²	0.452
F (7, 111)	19.40
RMSE	0.740

Note. ⁺ $p < 0.10$, ^{*} $p < 0.05$, ^{**} $p < 0.01$, ^{***} $p < 0.001$.

Overall, the results based on the hypothetical model, provide a moderately high level of explained variance (Adjusted R²=.45, Prob >F, .0000). As expected, given that factor scores were used, the intercept of the model was zero.

The following sections discuss the effects of independent variables in more detail.

7.1 Motivation (Intrinsic/Extrinsic)

Table A6 shows that, innovativeness level was greater in those individuals who were intrinsically motivated. Intrinsic motivational tendency had the largest effect size of all independent variables investigated. The data could not support the hypothesis that innovation was diminished in subjects that showed increased tendency to be motivated extrinsically although with a p value equal to 0.12, with more data there is a possibility that this conclusion could be drawn.

7.2 Political/Social Aptitude

Those subjects who indicated higher sociability / social aptitude and those who reported higher political proficiency each demonstrated higher innovativeness levels. It is not surprising those individuals who are able to navigate socially and politically demonstrate higher innovativeness. Beyond creativity skills, it would appear that in order to implement and exploit ideas social and political prowess would be important.

Perfection, Time Pressure, Job Tension. Once the variables time pressure, job tension and perfection seeking were isolated (uncorrelated), the negative effect of perfection seeking behavior on innovativeness is significant. Of equal interest is the fact that isolated effect of time pressure was not significant for either dependent variable. Increased perception of job tension, did not influence innovativeness scores in those who responded to the survey.

7.3 Limitations

There are various limitations associated with the generalizability of this study. The limitations are primarily indirectly related to the size of the sample. Larger sample size might help to gain greater inference with a larger more diverse set of subjects. The data was collected from one company, an industrial adhesives division, with >80% of respondents located in the state of Connecticut, so there could be systematic factors due to the homogeneity of the sample which limit generalization. On the other hand, since essentially all factors investigated were at the individual level, the fact that there was some level of homogeneity in the sampling environment aids in subject-to-subject comparability (almost like laboratory conditions). Finally, the innovativeness level of individuals will need further study to see if face validity exists related to actual innovation outcomes in large firm contexts.

8. Conclusions

Individual innovativeness can be used as a wider and potentially more telling measure than creativity when it comes to evaluating management tactics aimed at impacting firm level innovation results. Whereas creativity is very important it may not encompass additional skill sets and characteristics that facilitate integration and future exploitation of new ideas, which, in addition to creativity, are crucial in terms of innovation.

Similar to earlier findings related to creativity, there is a clear linkage between more highly intrinsically motivated subjects and level of demonstrated innovativeness.

When evaluated separately (uncorrelated), of the factors “time pressure”, “job tension” and “perfection seeking” only perfection seeking was shown to have a significantly (negative) effect on innovativeness. This finding is of great interest since it may indicate that given time pressures and job tensions alone (without perfection seeking behavior) it is possible to maintain high levels of individual innovativeness. At the same time when perfectionism is identified, managers may take appropriate action to reduce the negative impact of this characteristic.

Increased social skills and political aptitude were shown to enhance innovativeness measures (again these factors were also separated). These innovativeness “skills” are of note in the context of large complex networks that exist within large firms. These may be most important when it comes to implementation and future exploitation activities, which bring creative ideas to commercial reality.

This study can serve to support an extension of the componential model to expand the boundary of individual level contribution to firm level innovation. Firms looking to achieve breakthrough innovation must make sure that they not only hire creative and knowledgeable inventors but must also look for people who possess social and political skills. These findings could influence how firms establish team composition and leadership. Firms must also balance the desire for systematic perfection with its effect on the innovative spirit of employee.

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