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**EXPLORING THE EFFECTS OF TOLERANCE OF AMBIGUITY,
PERSEVERANCE, AND SELF-CONFIDENCE ON CREATIVITY IN
IRAN'S NATIONAL INSTITUTIONS OF
RESEARCH AND DEVELOPMENT**

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ABSTRACT

Considering the importance of "creativity" in "the organization's success", this article intends to explore the effect of "personality traits" on creativity of the researchers employed in "national institutions of research and development". According to the review of the literature, the author concluded that "tolerance of ambiguity", "perseverance", and "self-confidence" is the most relevant traits with respect to creativity. The samples- the researchers of national research and development institutions - were first asked to complete the questionnaires designed for the evaluation of research variables. Then they were gathered, controlled, and finally 291 of them selected. The data extracted from the questionnaires, entered into SPSS and LIZREL environment respectively, and after execution of their validity, exploratory factor analysis, confirmatory factor analysis, execution of their convergent and divergent reliability, we tested the data based on the research hypotheses, and using path analysis and multiple regression methods. The results of the tests on Iran's research and development environment based on the scientific resources, accomplished tests, and index of goodness of fit, shows that the three personality traits – *ambiguity tolerance, perseverance, and self confidence*- have a positive and meaningful effect on creativity, accounting for more than 48 percent of its changes.

Keywords: *Creativity, Tolerance of Ambiguity, Perseverance, Self-confidence*

INTRODUCTION

Creativity can be seen as a human trait necessary to help them to conform and fulfill their wishes during their lifetime in a successful manner (Rothenberg, 2006). Moreover, today organizations encountering with rapid environmental changes, have to be continually creative in order to succeed in competition. This could not take place unless rich ideas and new solutions represented (Dooley, 2005). It is understood that the only resource for solutions and ideas are individuals (Redmond *et al.*, 1993). The creative ones not only propose new ideas helpful for productions, methods, and organization activities (Shalley and Gilson, 2004) and therefore creative participation of the individuals make them more responsive to potential fortunes (Lee and Emmelia, 2012), but they could discover chances for fresh productions as well. A creative person would find more applications for new methods and equipments, and represent practical ideas relevant for business of the organization. Not only solutions represented for the problems by the creative ones are more creative than those given by ordinary people, but also they would create suitable programs for the fresh ideas (Gumusluoglu and Ilsev, 2009). Regarding the fact that human creativity is the basis for economic growth (Shneiderman *et al.*, 2006; Wong and Ladkin, 2008), business growth (Batey, 2007), organization development (Lee and Emmelia, 2012; Hassan *et al.*, 2013), and profitability of the organization (Hassan *et al.*, 2013), and enables the organization to adapt for the environmental variations (Zhou and Shalley, 2010; Lee and Emmelia, 2012), creativity must be expanded, and this makes supporting creativity unavoidable. Nevertheless, as emphasized by some scholars, prior to any measure in support of creativity it is necessary to understand how the organizations influence creativity (Isaksen and Lauer, 1999).

There is an increasing agreement as to the effect of personal diversities on human creativity (Batey, 2007). One of the most important individual differences affecting creativity, which has long been studied by researchers, is the issue of personality. In addition, attempts have been made to understand the

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relationship between personality and creativity (Furnham and Nederstrom, 2010; Fink and Woschnjak, 2011). The results in most of these attempts show that the existence of some of personality traits in some individuals results in more creativity in comparison to the others. One of the investigators (Feist, 1998) reviewing studies so far performed by scientists and artists concluded that some of personality factors have a great influence on creativity, so that the individuals with a high degree creativity can be easily distinguished from those of low degree of creativity.

It can be said therefore that in any comprehensive evaluation of creative performance, some researchers (Feldhusen and Goh, 1995) have emphasized the significance of personality traits. Likewise, some researchers believe that considering personal traits could be helpful in recognizing individuals who represent creative, high-quality solutions for new, semi-structured works (like research and development organizations) (Mumford *et al.*, 1993). Yet, personality could be related to creativity in different ways (Batey and Furnham, 2006). Other studies (Batey and Furnham, 2006; Sapranaviciute *et al.*, 2010) argue that the interrelationships between personality and creativity are affected by some moderator variables such as the individuals' profession. For instance there is a relationship between some personality traits and creativity in one profession, but not in the others. Of course, where the relationship exists, it may be of a positive or negative type.

For this reason in order to identify and encourage the individuals, and develop their creative faculty, it would be necessary to strengthen dimensions of their personality traits (Parloff *et al.*, 1968). This requires examination and precise analysis of the relations between personality traits and creativity (Sapranaviciute *et al.*, 2010). Hence this study intends to accumulate and analyze the scattered findings on the interrelationships between personality and creativity so that we could exploit them an instrument to manage these relations and finally promote creativity in the future.

First, the relationship between personality and creativity reviewed based on the existent literature on the creativity in organization, and the relevant issues worked out. Studying the issues made it clear that the three personality traits- i.e. *tolerance of ambiguity, perseverance, and self-confidence* are most impressive on creativity. Therefore, the information gathered has been organized around these traits.

Tolerance of Ambiguity: Ambiguity normally involves the absence of sufficient information on a defined field (McLain, 1993) which is characterized by such factors as newness, complexity, and unstructuredness (Kazamina, 1999). Ambiguity originates from multiple, deficient, probable, unstructured, contradictory, or uncertain meanings, as well as from lack of information, and distrust (Norton, 1975). Tolerance of ambiguity then can be defined as "willingness to understand or interpret information that is ambiguous, incomplete, multiple, probable, indefinite, unstructured, contrasting, contradictory, or vague information. Also it is understood as being inclined to comprehend information which is a potential or real resource for psychological threat (Adorno *et al.*, 1950). Ambiguous situations include "new situations", "complex situations", and "contradictory situations" (Budner, 1962).

Tolerance of ambiguity is of significance both in personality development and education (Kirton, 2004), and reflects our personality (Ehrman, 1993). It can be seen as one of personality factors relevant to creative performance (Dacey, 1989) and creative individuals (Shalley *et al.*, 2004; Chavez *et al.*, 2006), as well as a central characteristic of creative attitude (Dacey, 1989; Montuori, 2005). It has also been considered an internal condition for creativity (Maslow, 1971), a valuable resource for creativity (Sternberg and Lubart, 1995), and a prominent element of creativity development (Sternberg and Lubart, 1993). In both management and psychology, the levels of ambiguity tolerance are being considered relevant to creativity (Kirton, 2004). The studies in these areas have verified that a creative work is commonly ambiguous (Amabile, 1998), accepting ambiguity is mainly related to creativity (Tegano, 1990), and this relationship is normally positive and meaningful (Zenasni *et al.*, 2008). Reasonably a prominent feature of individuals with a high level of creativity is their endurance with ambiguity and uncertainty (Chavez *et al.*, 2006). Similar research showed that persons that are more creative are more ambiguity tolerant, compared to less creative ones (Feist, 1998).

It has been stated that tolerance of ambiguity and interest in uncertainty is a common specialty of all creative individuals (Davis, 1993). The creative excessively need unspecified situations to help them

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access new viewpoints and fresh experiences (McCrae and Costa, 1997). For instance, most ideas consist of a series of expressions, moderations, probabilities, and improvements. The creative person must be able to overcome the uncertainty he encounters in the process (Davis, 1993). Besides, in the occasions when a problem has not clearly defined, or the data are not yet coordinated, acceptance of ambiguity is essential for reorganizing and reestablishing substitutions, and interpreting them (Sternberg and Lubart, 1995). In the circumstances, external pressures start to find a quick trial for the ambiguity and set forth a pre-planned solution. Some of these pressures like time limits and expectations of the others are part of the background. External pressures may shrink the opportunity for exploring and expanding the solution (Amabile, 1990). But a highly creative person, facing with unknown situations, enjoys a high degree of conformity, and this is because of his/her high capacity in accepting ambiguities. In other words, creative deeds happen as a response to ambiguity, and find their meaning fundamentally out of ambiguity itself (Ford and Gioia, 1995). In this way, ambiguity tolerant spend more time and energy to discover new, unusual or complicated stimuli, and this causes the individual restrains himself from hasty and customary reactions encountering ambiguous situations (Maw and Magoon, 1971). Hence, the creative are able to keep a situation in mental chaos for a long time, without being obliged to get a rapid conclusion, because creativity regards future, and the future is full of diverse and numerous ambiguities, due to unprecedented changes. Therefore in order to be creative, and overcome ambiguous, highly inconsistent, unanticipated conditions in which the information available is often incomplete, unspecified, and complicated, one needs a higher level of personal power. It is possible then to inspire creativity through thinking about ambiguities (Von oech, 1983). Although tolerating ambiguity situations sometime seems exhausting and unbearable, the results however may be justifiable (Sternberg and lubart, 1991), because you can absorb all the whole knowledge required on the subject being studied, at the same time recognize and evaluate many probabilities available. In fact having an inclination to discover unknown and ambiguous entities would prepare one to accept hard, even dangerous conditions, though a creative act can lead to a complete failure (Bohm, 1998). Consequently, our first hypothesis goes as follows:

H1: *Tolerance of ambiguity has a positive effect on creativity.*

Perseverance: Among personality traits relevant to high-level creativity, we could mention perseverance (Tardif and Sternberg, 1988; Chavez *et al.*, 2006), and creative people are customarily hard-working (Shalley *et al.*, 2004). It has been believed particularly that to succeed in doing difficult works (Tighe *et al.*, 2003), and tiresome duties is thoroughly (Sternberg and Lubart, 1993) related to creativity. That is to say, creative people not only enjoy abundant stability and resistance in their career (Harris, 1988; Weisberg, 1992; Amabile, 1998; Sutton, 2001), but also persevering in developing their noble opinions (Shalley *et al.*, 2004). This perseverance and stability lets people use their knowledge and intelligence processes repeatedly (Sternberg and Lubart, 1988), and spend their time and energy interestingly enough, as much as possible. But a valuable thing will never be obtained freely and easily. Everyone needs to obtain knowledge and proficiency through research and study, and put this knowledge and proficiency into practice via thinking, experience, and examination (Harris, 1988). Consequently, in order to gain access to an important creation, one should have a steadiness to explore a problem for a long time. When someone spends a lot of time on a certain problem, more likely there will appear a wonderful and valuable achievement, because small acts accumulated through time, may lead to revolutionary advancements (Weisberg, 1992). The results of a study accomplished in America indicated that 46% of Americans believe that being wealthy is the result of perseverance of the people, and 39% of them suppose that not being rich results from the absence of perseverance, hence the Americans enumerate serious work and struggle as a leading factor of human success (Thurow, 2000). Altogether, creativity will spring from perseverance, (Ghiselin, 1985), and Perseverance can be defined as obligation toward, patience with, and resistance in doing difficult jobs as well as tolerating problems, failures, and endeavoring again and again to overcome them. Accordingly, let us set forth our second hypothesis:

H2: *Perseverance has a positive effect on creativity.*

Self-confidence: Self-confidence is another factor influencing creativity (Sapranaviciute *et al.*, 2010), and one of the basic characteristics of creative people (Shalle *et al.*, 2004; Kelly, 2005), entrepreneurs

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(Sukardi, 1991), creative thinkers (Davis, 1993), and highly creative ones (Tardif and Sternberg, 1988), which develops creativity itself (Sternberg and Lubart, 1993). A research shows that this factor is one of personal traits, which is common between creative people, whereas it is absent in individuals having lower levels of creativity (Gough, 1979). One analysis conducted on studies carried out about personality and creativity confirmed this point that creative persons enjoy more self-confidence than less creative ones (Feist, 1998). It is believed that the creative are more confident, rely deeply on their abilities and skills, and trust everything they accomplish (Ford and Gioia, 1995). They have also enough ability to convince the other people that they are right. They may never give up what they think to be correct, because they held no emphasis for the pressures others exercise to force them to obey the group. Highly self-confident people think and act independently, and despite criticism and objection of the others, bound severely to their initial positions (Sutton, 2001). This of course necessitates assigning the objectives for themselves, being interested in goals, and feeling satisfied with them (Sheldon and Houser, 2001; Sheldon et al, 2003). On the contrary, when in lower self- confident, the person accepts that he/she pursues the goal only for the sake of obtaining rewards, or avoiding external punishment (Hon, 2011). Thus:

H3: Self- Confidence affects positively on creativity.

MATERIALS AND METHODS

Statistical Population and Sample: The population embraces science researchers of different national institutes of research and development in Iran. The institutes include; "the Research Centre of Basic Sciences", National Centre for Scientific Research, Research Centre of Humanistic and Cultural Studies, Research and Programming Institute for Higher Education, National Centre of Oceanography, Research Centre of Theological Schools and Universities, Foundation of Great Encyclopedia of Persian Language, Organization of Scientific and Industrial Investigations of Iran, Research Centre for Polymer and Petro chemistry of Iran, Research Centre of Material and Energy, Centre for Investigations of Chemistry and Chemical Engineering, National Research Centre for Genetic Engineering and Biotechnology, Iran's Research Centre of Dye Industry, International Research Centre of Seismology, and Air- Space Research Centre.

In order to gather data, 322 questionnaires were issued among the population, using random categorical sampling method, and collected. After eliminating 31 defective questionnaires, the 291 remaining was to be analyzed. 13% of the samples are educated in humanities, 40% engineering fields, and in 41% in basic sciences. On the other hand, in view of educational level, 13% have a BA, 30% MA, and 57% doctoral degrees. Also 72% are members of academic boards, whereas % 28 are not.

Instruments: The instrument for data gathering in this study is the questionnaire. For the purpose of evaluating different dimensions of personality traits affecting creativity, different items based on the research hypotheses, extracted from the research literature. They were "caring for undefined issues", "conformity to unknown situations", "considering ambiguity as an opportunity and ability for overcoming rapidly changing conditions" (for ambiguity tolerating trait), "stability in doing hard work", "eagerness in spending energy and time to resolve complex issues" and "long term commitment for carrying out one's visions" (for perseverance trait), and "to rely on abilities in performing one's duties", not caring for pressures to obey the group", and "decisively performing tasks which seem right" (for self confidence trait). Measurement of the variable "creativity" has also carried out through questionnaires in which creativity has been defined as "finding the problem, finding solution, evaluation, and executing solutions which are all original and useful"(Sadeghi, 2010). Validity and reliability of questionnaire was approved during several researches. Reviewing validity of the type CFA showed that the share of related items in measuring concept of creativity covers the domains $0.77- 0.87$ ($12.95 < t < 15.35$) (Sadeghi mal Amiri, 2010) and $0.50-0.76$ ($18.08 \leq t \leq 25.41$) (Sadeghi, 2014). This, according to some scholars (Anderson and Gerbing, 1988), is an evidence of its validity. The reliability of questionnaire was measured through internal consistency method, especially Cronbach's Alpha, reporting it 0.92 (Sadeghi mal Amiri, 2008) and 0.90 (Sadeghi, 2010). Besides, the items were of closed answer type, and a five point Likert scale (including very few, few, middle, much, too much) used in their measurement.

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Data analysis: Data gathered from the questionnaires, having controlled and reviewed, entered respectively in SPSS and LISREL environments. Then the data were filtered, revised, and finally analyzed using the software. Validity of the questionnaire was performed through both content validity and construct validity methods. In construct validity, exploratory factor analysis, confirmatory factor analysis, convergent, as well as divergent validities has been used. In the end hypotheses were tested in a systemic model, using Covariance Structure Modeling with full information maximum likelihood.

RESULTS AND DISCUSSION

Findings

The findings have been regulated and arranged within the framework of reliability, validity, descriptive statistic(s) and hypothesis testing.

Validity: Validity is significant in order to make sure, if the series of items really indicate the hidden theoretic construct or not (Hair *et al.*, 2006). Therefore, we used Exploratory (EFA) as well as confirmatory factor analysis (CFA).

The prerequisite for EFA are Kayser-Meyer-Olkin Measure of Sampling Adequacy, and Bartlett's Test of Sphericity. Since $KMO=0/822$, then Adequacy of the samples selected for factor analysis is acceptable. The results of the second test show that Chi- Square in Bartlett's Sphericity is 564.173 with the freedom degree of 36, which is meaningful in Alpha level of 0.0001. This proves that there is a correlation between test items, thus we are authorized to use factor analysis.

Based on what have been said EFA was performed using *principal component analysis* and *rotation of factors* (table 1). According to some authors (Dunteman, 1989), the special value for selection of a factor must be higher than one, having performed the principal component analysis method, we found three factors with this range of value, which could explain 59.596% of measurement variance of personality traits influencing creativity. The results show that perseverance (with 20.709%), tolerance of ambiguity (with 20.066%), and self-confidence (with 18.821%), affect the variance explanation.

Some other studies (Abdi, 2003) indicate that rotation of factors simplifies their structure, and this, in turn, makes their interpretation easier. It was based on these findings that we performed rotation of factors. To this end, for applying the research findings, based on matrix of rotated items, we used Warimax method, and the content of each factor was extracted on the basis of factor loading of each item in each factor (Table 1).

Table 1: Exploratory factor analysis results

Items	Component		
	1	2	3
1	.804	-	-
2	.596	-	-
3	.780	-	-
4	-	.615	-
5	-	.730	-
6	-	.704	-
7	-	.535	-
8	-	-	.740
9	-	-	.801
Total Eigen values	3.254	1.103	1.007
Variance Explained	20.79	20.066	18.821

We used CFA in order to review and study exploratory factors more precisely. In this analysis, the relations between items and the three traits, as well as the relations between them and the concept of personality affecting creativity was tested. Inspecting standard factor loading (Table 2), and relevant goodness of fit statistics ($df=24$; Chi- Square = 40.85; $RMSEA=0.047$; $CFI=0.97$; $AGFI=0.95$;

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GFI=0.97) indicated that not only all items are placed on in all three factors, and measure them, but the personality traits have a considerable effect on the measurement of the concept of personality influencing creativity, and in this way the validity of the construct is verified.

To be sure completely of construct validity, we executed divergent as well as convergent validity. For convergent validity CR was used which in order to be approved, should be higher than 0.60. In case it is less than 0.60, would indicate that the incompatibility of the items has been assumed hidden when measuring the construct (Hair et al., 2006). As shown in table 2, CR of constructs is more than 0.637. This gives evidence of convergence of the items or observed variables in measuring the relevant construct. Divergent validity of the constructs has been carried out through accounting and comprising the correlation between the constructs. There are researches (Tabachnick and Fidell, 2007) showing that correlation less than 0.90 between variables could be considered a reason for the existence of a divergent validity. As can be understood from Figure (1), divergent validity is being supported, because the domain of correlation between variables varies from 0.39 to 0.45.

Table 2: Standard factor loading, t-value and errors, and CR personality traits

Dimension	Items	Loadings	Standardized			CR	CR
			t-value	Error	CR		
Tolerance of ambiguity	1	.65	-	.57	.648		
	2	.53	4.99	.72			
	3	.50	4.70	.75			
	4	.56	7.22	.69			
perseverance		.83	8.41	.31	.681	.84	
	5	.54	-	.69			
	6	.61	7.34	.63			
Self-confidence	7	.77	7.82	.41	.638		
		.79	8.91	.38			
	8	.74	-	.45			
	9	.61	7	.63			
		.79	7.24	.38			

To determine reliability and internal consistency of the items Cronbach’s α has been used. Total reliability is 0.77; self-confidence 0.67; tolerance of ambiguity 0.64; perseverance 0.67; and creativity is 0.90.

Descriptive Statistics: Table 3 demonstrates descriptive statistics and test results. The domain of mean traits differs from 3.55 to 4.02, which is meaningful and higher than the average scale. The standard deviations of the traits cover the domain from 0.59 to 0.66.

Table 3: One-Sample Statistics and Test (Test Value=3)

Traits	Mean	SD	df	Mean Difference	Sig (2-tailed)	t
Tolerance of ambiguity	3.55	.59	290	.55	.000	16.9
perseverance	3.95	.61	290	.95	.000	27.4
Self-confidence	4.02	.66	290	1.02	.000	27.5
Creativity	3.54	.59	290	.54	.000	17.2

Test of Hypotheses: After carrying out construct reliability and validity review, the data collected, tested in the form of a single model, using the systemic approach. See Figure (1) for the results of the test. The Figure represents the effects of personality traits on creativity as well as the structural equation, and the goodness of fit indices of the model. The quantity of the effect of each trait has been shown using two values – the effect coefficient, and the t-value. The effect of variables on each other demonstrated through dotted squares. The relation and correlation between the traits have been represented in the Figure.

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Structural equation refers to the changes of the independent variable (creativity) which is explained through dependent variables (ambiguity tolerance, perseverance, and self-confidence). The coefficient here is 0.48.

The validity of the model, as referred earlier, has systematically been tested through goodness of fit indices (RMSEA; P-Value; Chi-Square; and df). As apparent from fit indices, the model with the data gathered from the research environment enjoys a desired goodness fit. This is because if the model is to be acceptable, the RMSEA value has to be smaller than 0.05, and the closer the index to zero, the better goodness for the model. The P-value also must be more than 0.05, and whatever the value is closer to 1 would actually results in a more agreeable model.

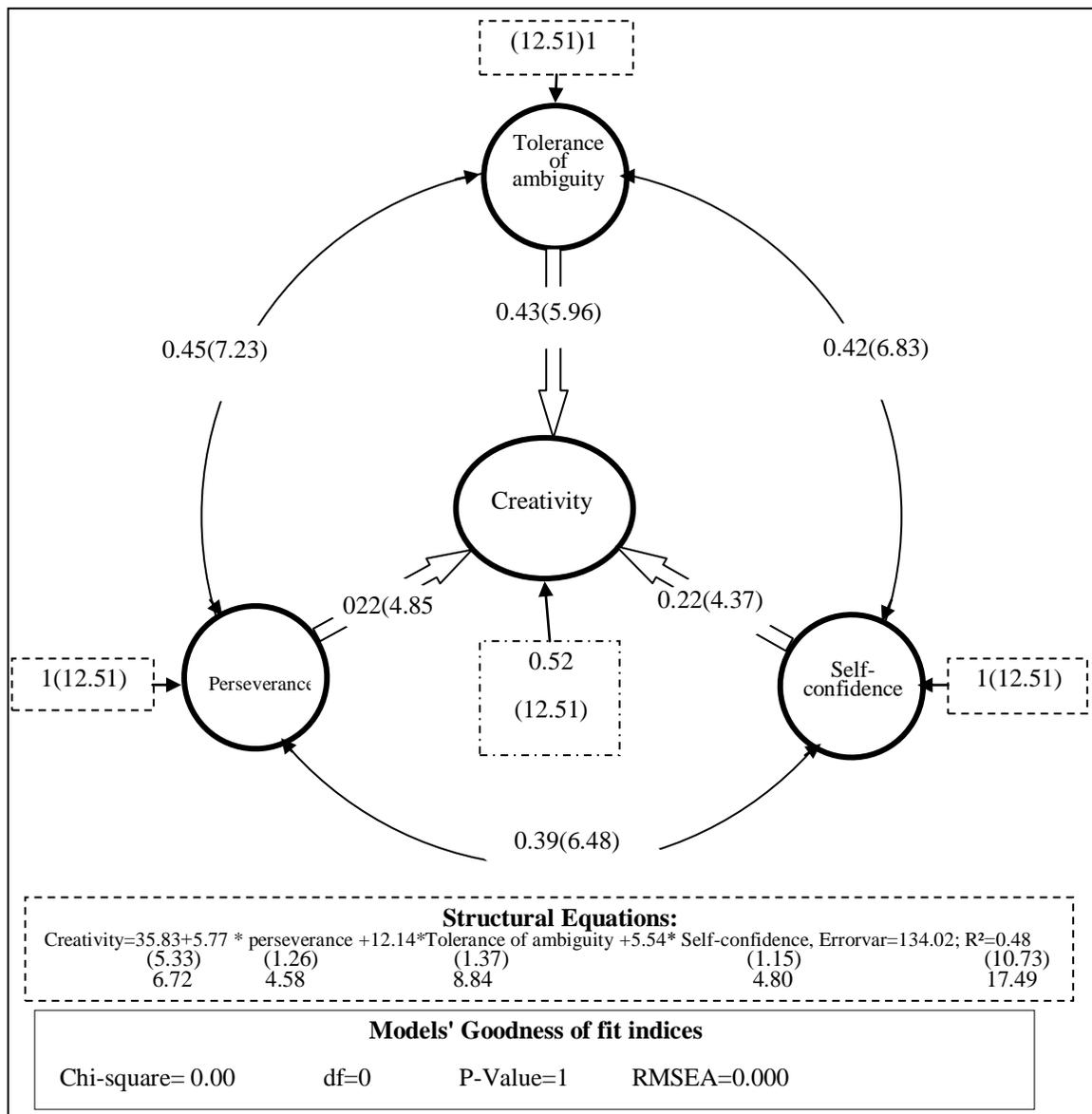


Figure 1: The Tested Model

Discussion and Conclusion

Plenty of attentions have been paid to discover and understand creativity and how to use it to the benefits of the organizations during the recent years. This originates in fact from rapid technological changes,

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competition, and lack of industrial confidence that have encountered organizations with problems which could only be resolved through creativity. Employing creativity requires understanding and regarding situations that promote creativity.

In this respect, this study was carried out in order to analyze the potential effects of personality traits on creativity in Iranian national research and development institutions. Review of literature made it clear that among personality traits, three of them (that are tolerance of ambiguity, perseverance, and self-confidence) play a considerable role in creativity.

Regarding the three traits, the research questionnaire was planned, prepared, distributed among 322 members of statistical population, completed, and collected. The data was then extracted from the questionnaires, and analyzed through *SPSS* and *LISREL* software.

Before analyzing the collected data based on the research hypotheses, validity and reliability of variables was analyzed. This is performed for the case of validity through *EFA* and *CFA*. *EFA* made possible exploration and verification of a three-factor structure of the personality traits. These three factors could explain 59.596% of variance of the items for the measurement of personality affecting creativity. The domain of share of the personality traits in explaining variance differs from 18.821% to 20.709%. Considering the level of explanation of variance, the traits can be arranged like this: self confidence, tolerance of ambiguity, perseverance. The domain of factor loading for self-confidence is (0.740- 0.801), for tolerance of ambiguity (0.535- 0.730), and for perseverance (0.596- 0.804).

The results of the *EFA* were again tested using *CFA*. For this purpose, first the relationship between items and triple traits, and then the relationship between the traits and personality was tested using a systemic approach as a single model. The results confirmed the structure of exploratory factors in *EFA*. Thus it was shown that with an assurance of 0.99 ($4.7 < t < 7.82$) all items influence on measuring the relevant traits. Also factor loading of the index of tolerating ambiguity is from 0.50 to 0.65; of perseverance is from 0.54 to 0.77; and of self confidence is from 0.61 to 0.74. On the other hand analyzing the relations between the traits and the concept of personality affecting creativity indicates that ambiguity tolerance with a 0.99 assurance ($t\text{-value} = 10.91$) to the degree of 0.69; perseverance with a 0.99 assurance ($t\text{-value} = 10.68$) 0.67; and self-confidence with a 0.99 assurance ($t\text{-value} = 7.92$) to the degree of 0.50 affect on measurement of personality concept. Altogether, standard factor loading, as well as the fit indices suggests that with the data collected from the environment of the organizations under study, the three-factor structure enjoys an acceptable goodness. This is because both factor loadings of the items in measuring personality traits, and factor loading of the traits when measuring the concept of personality affecting creativity are at desired levels.

In addition, we calculated both the convergent and divergent validity of the constructs in order to be assured of the results of *CFA*, indicating that all constructs possess both validities. In the case of convergent validity, the CR for concept of personality affecting creativity equals 0.84, while the CR for the traits varies from 0.638 to 0.681. Considering that, the CR for all variables is higher than 0.60, and regarding what researchers (Scott and Bruce, 1994) believe, it can be concluded that both the items in measuring related traits, and the three traits in measuring the concept of personality affecting creativity, are thoroughly compatible. In the case of divergent validity, the correlation threshold between the traits equals 0.45, and specifies that based on what have been said by some researchers (Tabachnick and Fidell, 2007), the three constructs are separated from each other and enjoy a divergent validity.

The reliability of the items has been reviewed and analyzed through cronbach's α . Since the domain of reliability of the variables is from 0.64 to 0.90, and researchers confirm reliabilities higher than 0.50 (George and Mallery, 2003), the reliability of the items of the study both seem acceptable and can be confirmed.

After getting certain about reliability and validity of the variables, the data were analyzed and tested in view of the research hypotheses, the consequences verified that all hypotheses have been confirmed considering the t-value accompanying the structure coefficients. The results proved all cause and effect relationships considered between personality traits and creativity. In other words, Tolerance of ambiguity with a 0.99 assurance ($t\text{-value} = 5.96$), assumes 0.43; perseverance with a 0.99 ($t\text{-value} = 4.85$) assumes

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0.22; and self-confidence with a 0.99 (t -value =4, 37) assumes 0.22 of positive and meaningful effects on creativity.

Review of explanation coefficient of structural equations clarifies that creativity is affected by tolerance of ambiguity, self-confidence, and perseverance and these traits with a 0.99 assurance clarify 0.48 of creativity changes totally.

The triple traits positively and meaningfully affect on creativity in the environment of organizations. We can make use of this in the study of present situation of organizations, which indicates that the mean for personality traits is bigger than the test value. We could see that the difference between the mean value of the traits and the test value is meaningful, with an assurance of 0.99 ($Sig < 0.1$). The difference quantity for tolerance of ambiguity counts 0.55 ($3.55-3=0.55$); for perseverance counts 0.95 ($3.95-3=0.95$); and for self-confidence counts 0.79 ($3.79-3=0.79$).

Altogether, as the results show, in view of scientific multiple resources and the theoretical relations test in operational environment of the research (EFA, CFA, divergent and convergent validities, reliability and structural analysis) it is understood that the three personality traits cause the researchers having higher creativity to be distinguished from the ones of lower creativity. This means that scientists having a greater tolerance to ambiguity, a higher self-confidence, and are more perseverant, will be far more creative relatively.

Based on the results enumerated, it is suggested to the organizations referred at the outset, to evaluate the personality traits influencing creativity, and the role of each one in the establishment of creativity, through the proposed model representing the key personality traits. This will help the organizations to manage these traits in order to promote their employees' creativity. The traits should particularly be expanded and promoted considering the coefficients of their effect on creativity as well as their mean values. This should be carried out with respect to the traits priority, ordered respectively (tolerance of ambiguity, perseverance, and self- confidence). According to findings of some studies (Lori, 1995), no investigations have yet confirmed inherency of the traits, and as Amabile (1989) believes, where these traits are naturally absent, they could be nurtured during the adulthood. It has been indicated, for instance, that the leaders can influence on their followers using self- confidence (Weisberg, 1992; Scott and Bruce, 1994). Also some researchers (Sternberg and Lubart, 1991), suggest that in ambiguous situations the organization exercises an external pressure on the individual. There is also an internal pressure on the part of the individual himself to put an end to ambiguities prior to the right situation. On the other hand, studies show when deviating from accepted rules and tested regulations, one should expect unknown situations (Land and Jarman, 1980). Thus, leaders are able to eliminate pressures against ambiguity tolerance (especially the external ones). They can also produce and encourage the tolerance, or even expand it. It is possible for a leader to prevail the engagement of the followers for example through representing an ambiguous task, and changing it regularly, in various forms, thus more and more enforcing the ambiguity engagements (Von Oech, 1983).

Finally, with regard to the fact that the variables of this study could only explain 0.48 of creativity changes, we recommend to researchers to carry out fresh studies to express the effects of other variables not covered in this research, particularly the remaining personality variables. Meanwhile, taking into consideration that the effects of personality traits are not limited to direct ones, it would be preferred to investigate the indirect influences in future studies too.

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