VERSLAS: TEORIJA IR PRAKTIKA / BUSINESS: THEORY AND PRACTICE
ISSN 1648-0627 / eISSN 1822-4202
http://www.btp.vgtu.lt
2016 17(2): 167–177
doi:10.3846/btp.2016.624

ANTECEDENTS OF ORGANISATIONAL CREATIVITY: A MULTI-LEVEL APPROACH

Ritu GUPTA[1], Pratyush BANERJEE[2]

OB & HRM Department, IBS Hyderabad, IFHE University,
Shankarpally Road, Hyderabad – 501203, Telangana, India
E-mails: [1]gritu@ibsindia.org (corresponding author); [2]pratbanerjee@gmail.com

Received 25 February 2015; accepted 15 October 2015

Abstract. The purpose of this literature review is to provide a better understanding of the antecedents of organisational creativity with a multi-level approach. Organisational creativity is a sum total of the creativity accounted for by the individual employees of the organisation, the cumulative creativity of a team or group and creativity arising out of different structural components of an organisation. Some of the antecedents identified from the literature include personality, intrinsic motivation, group cohesion, social inhibition, cognitive interference, leader member exchange, organisational culture and climate, amongst others at individual, group and organisational level. Based on the literature review, suggestions for future research and research propositions have been proposed.

Keywords: organisational creativity, corporate creativity; group creativity; individual creativity; innovation; personality.

JEL Classification: M12.

Introduction

Creative ideas can be used for problem resolution, process improvements and the development of new services and/or products. Creativity may be defined as 'the formation of novel, appropriate and useful ideas by individuals or small groups' (see DiLileo, Houghton 2006). Woodman *et al.* (1993) defined creativity at organisational level as 'the creation of a valuable, useful new product, service, idea, procedure, or process by individuals working together in a complex social system'. The theory of organisational creativity suggests that when a working environment facilitates idea generation, knowledge sharing and creative problem solving, individuals in that environment are more likely to generate creative ideas that involve unique concepts or new applications of existing concepts (see Woodman *et al.* 1993).

Researchers also suggest that individual creativity is essential for organisational innovation (see Amabile 1988; Woodman *et al.* 1993), which in turn is imperative for long-term organisational survival and success (see DiLileo, Houghton 2006). In order to enhance the chances of long-term survival, organisations should focus on supporting individual creativity in the workplace (see Amabile 1988; Woodman *et al.* 1993). Executive creativity not only contributes to corporate differentiation and innovation, it also helps create an environment, which encourages creative contribution from others (see Ford 1996). Researchers have time and again provided comprehensive reviews of creativity in the past. For example, a review by Van Der Panne and colleagues (2001) on success and failure of innovation, implications of creativity in classroom setting (see Petrowski 2000) and an integrated review on creativity, intelligence and personality by Batey and Furnham (2006). In the context of organisational creativity, Andriopoulos has published a comprehensive literature review in 2001 taking only organisational level variables, and Klijn and Tomic (2010) contributed another review on organisational creativity from psychological perspective taking only

To link to this article: http://dx.doi.org/10.3846/btp.2016.624

individual level factors. However, no prior review has tried to identify and integrate the factors at individual, group and firm level which may affect organisational creativity. In past five years, no new review on creativity has been published to the best of the researchers' knowledge. In that aspect, this review provides insights from recent papers published in the domain of organisational creativity which can enhance our understanding of the processes involved behind development and sustenance of organisational creativity. Hence, we decided to conduct this literature review and provide a comprehensive insight to this issue.

For the purpose of this literature review, articles were searched from online databases EBSCO, JSTOR, Science Direct, PROQUEST and others. The key words "organisational", "occupational", "employee", "managerial", "work", "corporate" were typed with one or more of the following keywords "creativity", "creative", "creative potential", "innovative", "innovation" for the current review. Studies addressing different antecedent factors which are related to the construct of creativity at the individual, group and organisational level form the core of this review. In addition, studies providing insight about how to measure organisational creativity are also included in this review.

1. Creativity and innovation: a distinction

Creativity and innovation work together in order to give an organisation competitive advantage. However, there is a clear distinction between the two. While creativity is the generation of novel and original ideas (see DiLileo, Houghton 2006), innovation is the implementation of the same in the work settings (see West 2002). There are different stages of innovation implementation, namely, the initiation stage, implementation stage, adaptation stage and stabilisation stage. Creativity forms an essential component of the first stage of innovation, i.e., the initiation stage (see West 2002). Researchers now have empirical evidence that creativity may be an essential component of imaginative capability (see Liang, Chia 2014).

1.1. Antecedents of organisational creativity

Previous researchers have pointed out several organisational factors, which act as a catalyst of fostering organisational creativity. Woodman and others (1993) developed an interactive model of organisational creativity in their study. The authors identified the factors influencing organisational creativity at three different levels- individual, group and organisational level. For each level, the authors listed down the possible antecedents and facilitators of individual, group and organisational creativity.

– ***Individual level antecedents of organisational creativity***. Four salient antecedents of individual creativity have been identified by Woodman and colleagues (1993) in their study. These are – personality, cognitive style, intrinsic motivation and domain knowledge. By creative personality is meant the continuous thirst for curiosity, attraction towards complex and abstract matters and a capability to think in an out of the box non-conventional manner.

Woodman and colleagues (1993) have suggested that the personality of an individual has a strong influence on individual creativity. However, it is difficult for organisations to have a customised model to imbibe creativity in an individual's personality as it is a trait-based approach. In an empirical study, Aguilar-Alonso (1996) tried to correlate several components of creativity such as originality and fluency with personality dimensions like big five personality traits. Where, extroversion and psychoticism were found to have positive influence on the creative productivity of individuals. Other studies have validated the impact of personality variables on creative idea generation such as a study by Furnham and colleagues (2008) on influence of "Big Five" personality traits and hypomania on creativity and by Fisher and associates (2004) who investigated the impact of positive schizotypal personality (a nature of individuals to come up with unusual thoughts and ideas) on the cognitive behaviour of individuals and how this makes them more creative. Therefore, from an organisation's context, employees with creatively inclined personalities should be considered as essential for fostering organisational creativity.

Cognitive styles and abilities also play an important role in shaping individual creativity. Abilities like fluency of thoughts, divergent thinking and emotional cognition have been found to be effective in creative idea generation. Howard-Jones and Murray (2003) conducted a series of experiments to examine the idea generation process of individuals. The results showed that individuals with higher fluency of thought and imagination were able to produce ideas over a considerable longer period and came up with more solutions. Those who were quickly out of any further ideas were further indulged into the problem by giving advice on changing their perspective for the problem. The researchers concluded that fluency is a prerequisite for creative idea generation and it can be increased by giving proper guidance on how to think out of the box.

In 2005, Amabile and colleagues conducted an experiment to investigate the relationship between positive affect and creative behaviour. Their results showed that there exists a positive linear relationship between positive affect and individual creativity. Another significant cognitive factor, which affects employee creativity, is a trait called creative self-efficacy (see Farmer *et al*. 2003; Chiravuri, Ambrose 2007; Benham 2008), the belief in the individual to come up with novel ideas. From organisational perspective, these factors should be considered as essential antecedents of organisational creativity.

Domain specific knowledge has been considered a chief criterion for creativity. Rietzschel and colleagues (2007) examined this relationship empirically on 93 psychology students of the University of Amsterdam. They subjected one group to prior information related to a brainstorming topic and did not disclose any information to the other group. It was found that the group, which received prior knowledge about the topic related to the brainstorming, came up with higher quality of ideas.

Intrinsic motivation is another vital antecedent, which spurs creativity in individuals (see Amabile 1998; Dewett 2007; Eisenberger, Shanock 2003). Further, this relationship is mediated by an individuals' willingness to take more risks (see Dewett 2007). Finally, self-determination is also an individual level factors which influences creativity (see Sheldon 1995).

– *Group factors influencing creativity.* Organisations are composed of groups of individuals who come together to work towards a common, shared objective. Therefore, in the organisational context, the creativity of the group is of greater concern. Researchers who have studied the different antecedents of group creativity have proposed the following factors: group cohesiveness, group composition, and group structure (see Woodman *et al.* 1993) as major antecedents of group creativity. Studies examining the impact of various antecedent factors on group creativity have justified the impact of group characteristics on team creativity (see Paulus, Yang 2000; Moore 2000; West 2002). Groups with high inter-group cohesions, leadership and diversity stimulate higher creativity among the group members. Garfield and colleagues (2001) suggest that individual differences such as personality and type of creativity stimulating technique affect creative idea generation at group level, and idea generation is enhanced with exposure to other group members' creative inputs.

Moore (2000) examined the impact of group cohesion and group leadership on the creativity of small teams and individuals working alone. The author varied group cohesion, leadership and knowledge about a particular subject related to a particular task to see the impact on the group's creative performance. The study shows that high group cohesion and the presence of an able leader are necessary for groups to be highly creative.

At a macro level, Goncalo and Staw (2006) studied the impact of national culture on group creativity. The authors investigated how individualism, a cultural trait among nations, influences the creativity of group members. The authors have argued that, it has been traditionally accepted that collectivism brings in-group cohesion and thereby increases its creativity, whereas individualism may also be beneficial for group creativity as it brings a sense of uniqueness. This will help in developing divergent modes of thinking among group members, which will in turn, increase creative output.

Other factors which have been found to affect group creativity include ethnic diversity in group composition (see McLeod *et al.* 1996), social inhibition (see Paulus, Yang 2000) and group cognition (see Hargadon 1999). At an individual level of analysis, Bechtoldt *et al.* (2012) explored impact of individual self-construal and collectivistic value on creative idea generation in groups and found that groups with collectivistic value orientation generated more ideas than groups with individualistic value orientation. In another study, Pearsall and colleagues (2008) made an attempt to examine effect of demographic factors such as gender diversity on team creativity. Results showed that if group members advocate gender faultiness (perception of difference in competence based on gender of group member), then it may lead to emotional conflict and tension among the group members, this in turn hampers group creativity.

A study by Wiltermuth (2009) suggested that if group members are buoyed by dominance complementarities, then creative idea generation is reduced in the group. This was supported by Kaplan and colleagues (2009) and Bolinger *et al.* (2009). Interestingly, Nemeth *et al.* (2004) have identified conflict as a positive factor behind group creativity arguing that healthy difference of opinion among group members can foster better idea generation. Certain antecedents which facilitate group creativity are beyond monitoring by management such as individual personality and cultural values, on the other hand, there are certain factors which can be controlled by managers to ensure some level of standardisation in group creativity performance. For instance, team and group leaders should monitor the following factors while monitoring the creative climate within groups- there should not be too much dominance complex among group members; the group members should conform to rather than differ in their ideas; identify who should play the glue role; group members should not advocate gender faultlines; ensure a healthy conflict of opinion exists among team-members

– *Organisational factors influencing creativity.* Organisation specific factors include organisational culture (see McLean 2005), policies (see Kenny, Reedy 2007), leadership and resource allocation capacity, which are important determinants of overall organisational creativity. Organisational culture plays a vital role in fostering organisational creativity in that it injects a shared belief among the organisational members about the importance of having a creative culture (see Woodman *et al.* 1993).

Chatman *et al.* (1998) have examined the influence of organisational culture and demographic factors on creative work outcomes. The authors hypothesised that employees coming from different demographic backgrounds are less likely to interact with each other frequently. The degree of interaction will further be influenced by the type of culture prevalent in the organisation. Thus, in an individualistic

organisation, interaction will be much less than in an organisation nurturing collectivist culture. Results obtained at the end of the experiment showed that the extent to which organisational members work in an interactive manner is a function of the organisation's culture and the demographic heterogeneity of the organisation.

Sundgren *et al.* (2005) analysed the impact of information sharing on organisational culture and intrinsic motivation of employees, which in turn helps in the fostering of a creative work climate. Results indicate that information sharing has a positive influence on the organisational culture and the latter mediates the relationship between information sharing and organisational creativity. However, intrinsic motivation of employees was not found to have any significant impact on this relationship.

Murdock *et al.* (1993) tried to find the impact of creativity training on the performance. The experiment explored that creativity training can facilitate development of creativity among trainees. Therefore, organisations implementing such training will be able to derive more creative output from their employees. Scott *et al.* (2004), attest the findings of Murdock *et al.* (1993). They conducted a quantitative meta-analysis of training programs effect on creativity. It was concluded that well-designed creativity training programs have a positive influence on performance. They examined several factors like course content, delivery method, amongst others to see the relative effectiveness of training programs on creativity. They also found that more successful programs focused on development of cognitive skills and the heuristics involved in skill application, using realistic exercises appropriate.

The impact of leadership style on the creative efforts of employees has been documented by several researchers (see Oldham, Cummings 1996; Tierney *et al.* 1999). Here, Oldham and Cummings (1996) indicated that employee creativity was highest when they had appropriate creativity related personality characteristics, worked on complex jobs and when they were under non-controlling supervision. Tierney and others (1999) extended the single domain approach of the relationship between creativity and leadership in their study by examining a multi domain, interactionist creativity model of employee characteristics, leader characteristics and leader member exchange (LMX). The results indicated that when employees enjoy creativity-related tasks, their level of creative output is high. It also appears that when employees work with supervisors who possess a similar intrinsic motivational orientation, creative performance is enhanced. The results also indicated that high LMX leaders would tend to support the employees chosen area of performance as opposed to forcing performance in a particular realm, say creative work. This suggests that benevolent leadership style may not always foster employee creativity.

Group creativity has also been found to be influenced by leadership (see Moore 2000). Leadership can play a key role in channelising the creative potential of followers (see Deci, Ryan 1987). In particular, supervision that is supportive of employees is expected to enhance creative achievement; supervision that is controlling or limiting is expected to diminish creative performance (see Deci *et al.* 1989). When supervisors are supportive, they show concern for employees' feelings and needs, encourage them to voice their own concerns, provide positive, chiefly informational feedback, and facilitate employee skill development. These actions on the part of a supervisor are expected to promote employees' feelings of self- determination and personal initiative at work, which should then boost levels of interest in work activities and enhance creative achievement.

In a qualitative enquiry, Hender and Higgs (2004) used focus groups, repertory grid technique and critical incident technique interviews. They identified the following personality characteristics of a creative manager: open, driven, energetic, unorthodox and different, experimenting, have self-confidence, and are visionary, calm and optimistic and able to tackle conflict. They suggested that creative managers are intelligent, and have the ability to think outside the box and generate ideas and are problem solvers. A very important finding of their study was that creative managers were found to create a creative work environment, thus driving the creativity in others as well. Creative managers were found to develop other people's ideas.

Shin and Zhou (2003) tested the moderating effect of employee conservation, a personal value about tradition, conformity and security, on the relationship between transformational leadership and employee creativity. They also found supporting data regarding the mediating effect of intrinsic motivation on the relationship between transformational leadership and conservation. Thus, from the above literature review, it may be implied that creativity is a multidimensional concept.

Sundgren *et al.* (2005) posited a model of organisational creativity which helped in understanding the influences of information sharing, learning culture, motivation, and networking on creative climate. They found information sharing, learning culture, intrinsic motivation, and extrinsic motivation to be significantly related to perceived creative climate.

Gong *et al.* (2009), in their investigation, explored the relationship between employee creativity and job performance at a firm. They found that employees' creativity relates positively to supervisory ratings of their job performance and to their sales. Also, an employee learning orientation and transformational leadership predict employee creativity where leaders have followers. Finally, an employee learning orientation and transformational leadership relate to employee creativity through their influence on employee creative self-efficacy.

Gumusluoglu and Ilsev (2009) propose a model positing the impact of transformational leadership both on followers' creativity at the individual level and on innovation at the organisational level. Followers' intrinsic motivation, psychological empowerment, and perception of support for innovation mediate this effect. At the organisational level, transformational leadership positively relates to organisational innovation. Also, individual level creativity influences innovation at the organisational level. The hypotheses formulated were found to be significant in regression analysis, transformational leadership effects on creativity at both individual and organisational levels. This relationship is found to be mediated by psychological empowerment. Also, Herrmann and Felfe, 2013, validated these findings in their study. In addition, they demonstrated that personal and task characteristics such as initiative taking attitude moderated the relationship between transformational leadership and creativity.

Among other organisational level variables, Shalley *et al.* (2000) examined the impact of organisational environmental factors on employee creativity and its subsequent impact on employee satisfaction and intention to leave. Shalley and colleagues (2000) conducted structured telephonic interviews in 1993 in USA to get information on employee creativity, organisational factors, satisfaction and intention to leave. The authors hypothesised that high job complexity and supportive supervision will enhance employee creativity and increase job satisfaction. The results suggested that if jobs are high on creative demands, it may be desirable for managers both to design work environments appropriately and to continually monitor them to ensure an optimal match for creativity exists.

Hunter *et al.* (2007) conducted a meta-analysis, exploring the moderating variables in the relationship between climate and creativity. Dimensions such as support and autonomy were found to be effective predictors of creative performance; it is true for high pressure, turbulent and competitive environment. As suggested by previous literature it was found that climate dimensions provide sizable relationships with measures of creativity. Handzic and Chaimungkalanont (2004) found that socialisation among employees, whether formal or informal, has a significant positive relationship with creativity.

Zhou and George (2001) explore the conditions in which job dissatisfaction leads to creativity. They found that continuance commitment would lead the unsatisfied employees to stay with the organisation and increase their potential to be creative. Also, dissatisfied employees with high continuance commitment would be more creative if they found support and help from co-workers. Finally, perceived organisational support also led to creativity.

Regarding organisational strategies to facilitate innovation, studies have been conducted to examine the impact of rewards and risk strategies on organisational creativity (see Eisenberger, Shanock 2003; Dewett 2007). Cook (1998) focuses on the strategic view of creativity leading to competitive advantage for a company. The study shows the importance of context for ideas and how their implementation is crucial for innovative products and services.

Zhou and associates (2005) have shown that organisational strategies are important drivers of organisational creativity. Results showed that various facets of strategic orientation have important linkage with organisational creativity. Scott *et al.* (2004), conducted a quantitative meta-analysis of training programs effect on creativity. They concluded that well-designed creativity training programs have a positive influence on performance. They examined several factors like course content, delivery method, amongst others to see the relative effectiveness of training programs on creativity. They also found that more successful programs focused on development of cognitive skills and the heuristics involved in skill application, using realistic exercises appropriate.

Similar results were confirmed in the study by Kenny and Reedy (2007) when they analysed the impact of mission statements on innovative practices. The findings of the study suggest that communicating the objectives of the mission statement to the employees of the organisation is crucial if such policies will impact firm performance. This implies that probability of creative outcomes may be higher when leadership is democratic and collaborative, organisational structure is organic rather than mechanistic, and groups are composed of individuals drawn from diverse fields or functional backgrounds (see Woodman *et al.* 1993).

Wong and Pang (2003) explores the job-related motivators to creativity as perceived by managers and supervisors in the hotel industry. They used in-depth interviews to identify specific motivators. They identified five factors which are based on employees' perception of level of importance, they are: training and development, support and motivation from the top, open policy, recognition, and autonomy and flexibility.

In a different study, Baer and Oldham (2006) examined relationship between creativity of individuals and creative time pressure at work. They hypothesise that there might be a curvilinear relationship between creative time pressure and creativity opposed to the linear relationship suggested by previous research. The results imply that relationship between time pressure-creativity of employees with high score on openness to experience have an inverted U-shaped while they continuously receive support for creativity.

A recent study by O'Connor and colleagues (2013) suggests an influence of beliefs among individuals about the malleable nature of creativity and the impact of such beliefs on creative problem-solving and prior creative achievements. Barrett and colleagues (2014) have however argued that it is not spirituality, but rather the intensity of adversity

and collaboration among peers at workplace which stimulates creativity.

2. Discussion

From the above literature review, it can be suggested that creativity is a multidimensional construct and it is the combined effort of can have a major impact on the creative potential of employees. There is as much story behind the curtains as much it is on stage. In addition, there is no single dimension, rather a conglomeration of different factors, which is necessary to bring out the creative best among the employees. Future research can concentrate on developing an effective creativity development framework to make employees creativity oriented.

In an attempt to address such a purpose, a model of creativity development mechanism is proposed here. The various antecedents of organisational creativity have been clubbed into three separate variables, namely individual factors, group level factors and organisational factors. The *Individual level factors are p*ersonality traits of employees, domain specific knowledge, intrinsic motivation, affect, thought fluency and imagination. At *Group level* group cohesion, social inhibition, cognitive interference, self-construal, collectivistic value orientation, gender diversity, idea exposure, glue role and healthy inter-group conflict. Finally, *Organisational Level* factors are supervisor support, leader member exchange, manager's creative personality, organisational culture and climate, level of information sharing, creativity training, organisational policies, job motivators, degree of corporate socialisation and creative time pressure.

The above factors can be incorporated into a multi-level model of organisational creativity, which has been proposed below (Fig. 1). As is evident from the literature, very few studies have attempted to link the above individual level factors with firm-level creative output. From the organisation's point of view, having employees in their ranks who possess the specific traits of a creative individual can be an added USP (unique selling point) for them, especially if the corporate strategy of the firm relies heavily on innovation and R & D. Hence, incorporating psychometric evaluations of such personality traits and individual values in the recruitment and selection procedure itself (such as MBTI etc.) can ensure that the firm is able to attract true creative talent for their manpower requirement.

At the group level, firms need to be even more diligent in maintaining a proper atmosphere for idea generation to foster creativity within work groups. As this review indicates, several factors which play a major role in either fostering or hampering group creativity requires strict monitoring by the group/team leaders, or by the department's top management. For instance, the team/group leaders in today's global business networks need to ensure that the group composition is diverse in terms of knowledge, skills, gender and even ethnicity. Such diversity needs to be reciprocated with the right level of aggression and appreciation between the group members. Management should promote a culture of social networking so that members feel at ease to discuss with each other. Dominance complementarity can also create group tension among group members and team leaders should prevent such complexes to develop among group members during the early stages of group formation itself. Certain factors such as cultural values are difficult to monitor in the context of groups since such values manifest at national level.

At the organisational level, firms need to take care to develop and nurture a creative culture and climate. Such development should have its roots in the corporate philosophies of the firms in the form of mission-vision statements. The managers should develop a trusting relationship with their subordinates through leader-member exchange. Proper training modules should be designed to foster organisational creativity. This should complement the individual and group factors discussed above. Employees involved in creative projects should be given sufficient time to generate creative output failing which they may be subject to creative time pressure.

2.1. Research propositions

The literature review helped in identifying the factors which are critical antecedents of organisational creativity. A theoretical model representing all these factors at appropriate levels of analysis has been proposed (see Fig. 1). The proposed model is similar to the Interactionist model developed by Woodman *et al.* (1993), though it retains some aspect of Amabile's (1998) Componential theory of creativity by including the training related factors. The proposed model here is more related to the Componential-Interaction model as proposed by Eder and Sawyer (2008) which suggests that creativity is an outcome of the interaction between various components which make a person creative. The proposed model can be used to evaluate specifically designed training programs for enhancing creativity. Some of the most widely practiced creativity enhancement programs are *Creative Problem Solving* (see Osborn 1957), *Productive Thinking Program* (see Covington *et al.* 1974), *Purdue Creative Thinking Program* (see Feldhusen *et al.* 1970), and *The Cognitive Research Trust* (see de Bono 1976). Using the above model as an evaluation framework, creativity trainers can identify the level of effectiveness of their training programs.

2.2. Measuring the effectiveness of the model

At the individual level, the factors, which have been identified as antecedents of organisational creativity, are cognitive thinking styles (positive affect, self-construal etc.), personality, intrinsic motivation and domain knowledge.

Cognitive styles may be measured using The Electronic Event Sampling Methodology developed by Amabile *et al.* (2005). Personality measures can be measured by Cattell's 16 personality factors (see Cattell *et al.* 1957) or the Big Five Inventory (see John, Srivastava 1999). Intrinsic motivation may be measured using the Work Preference Inventory (see Amabile *et al.* 1996). Domain specific knowledge may be measured using both direct and indirect measures. The direct measure involves applying intelligence tests, while the indirect method involves looking into the educational background of an individual (see Dilileo, Houghton 2006). The important group factors influencing creativity are group cohesion, leadership style and group diversity. Group cohesion can be measured using the Group Environment Questionnaire by Carron and others (1985). Leadership may be measured using the Multi Factor Leadership Questionnaire (see Shin, Zhou 2003). Organisational level factors such as Organisational climate for creativity can be measured using the 10 item Creative Climate Questionnaire (see Ekvall 1996) or the Situational Outlook Questionnaire (see Isaksen *et al.* 2001). Using the above standard measures, trainers can effectively analyse the level of presence of each of the antecedent factors in an organisational environment.

The outcome variables of interest in the above model can be measured using standard metrics to measure individual, group and organisational creative outcomes. Individual creative outcomes may be measured in terms of total number

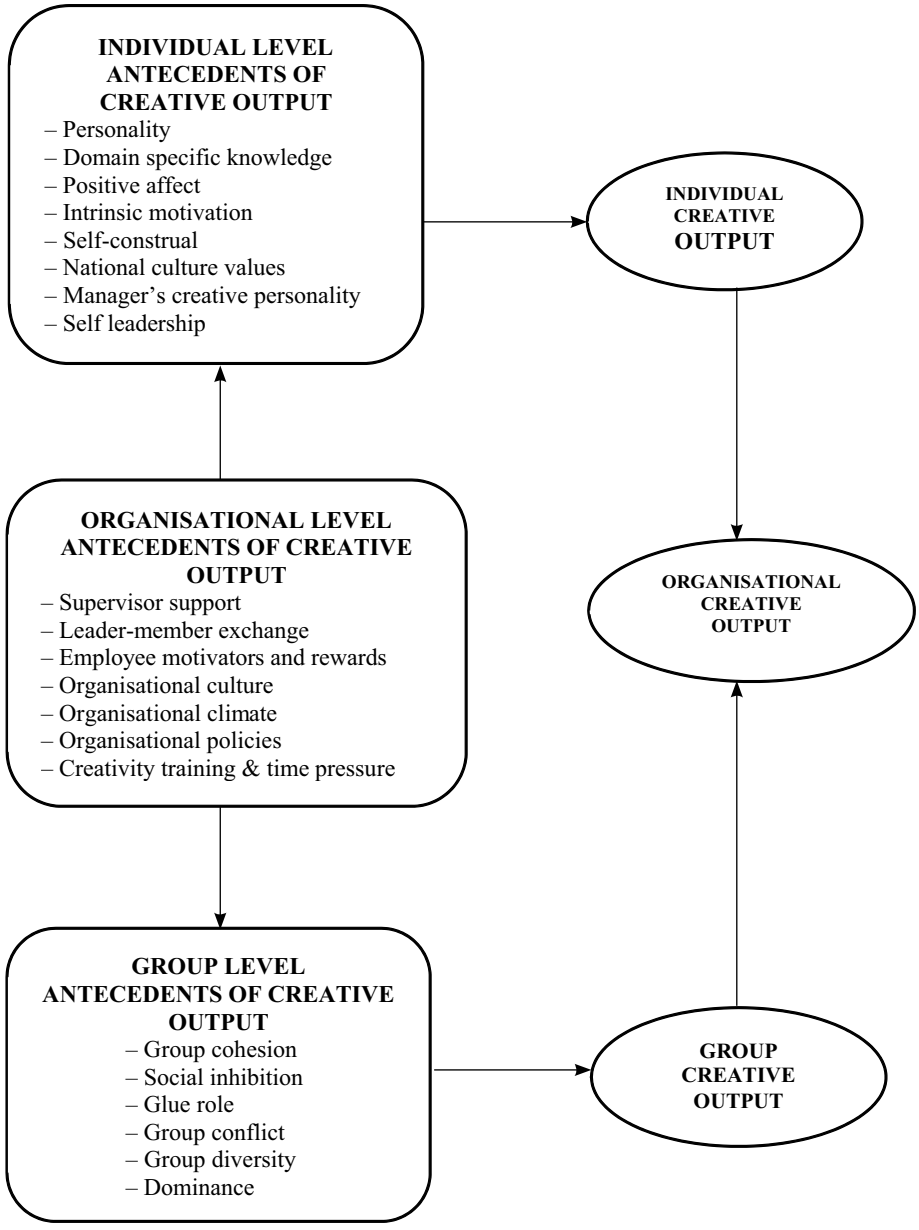

Fig. 1. A multilevel framework of antecedents for organisational creative output

of new products or processes developed over a stipulated period of time (see Pirola-Merlo, Mann 2004). Individual creative outcome can further be reflected through the total number of patents filed by individual employees within a given time period. Such outcomes can further be rated on the basis of novelty, usefulness and innovativeness. Group creative outcomes also include the parameters such as novelty, ingenuity and effectiveness of any product or process developed by a group. Additionally, some researchers have identified divergent thinking as a major yardstick for measuring group creative output (see Pirola-Merlo, Mann 2004; Goncalo, Staw 2006). At the organisational level, a very comprehensive model that is in practice to measure creativity is the High Performance Business model developed by the consultancy firm Arthur D. Little, Inc. (see Collins, Smith 1999).

The High Performance Business model can help organisations to measure creative and innovative output at the strategic, process, resource and culture level through lagging, real-time, leading and learning indicators of creative performance. An example of the various indicators at various levels of measurement is provided in Table 1.

Table 1. The Arthur D. Little Innovation Metrics (adapted from: Collins, Smith 1999)

	Lagging indicators	Real-time indicators	Leading indicators	Learning indicators
Strategies	Gross contribution of new products	NPV of idea portfolio		
Processes		Milestones completed in time		Take up rate of new processes
Resources			External alliances being pursued	
Culture	Staff turnover rate		Innovation climate	Level of inquiry

Through these propositions it is being postulated that if organisations wish to measure the creative output of the firms they may consider the factors recommended in the model and the process of measuring the constructs has also been described. This study affirms the fact that creative performance of an organisation should be measured at three different levels individual, group and organisational. The current literature review demonstrates the importance of the various antecedent factors which trigger individual, group and organisational creativity. Hence, practitioners are advised to consider all these factors while measuring creative output.

Disclosure statement

Authors do or not have any competing financial, professional, or personal interests from other parties.

References

Aguilar-Alonso, A. 1996. Personality and creativity, *Personality and Individual Difference* 21(6): 959–969. http://dx.doi.org/10.1016/S0191-8869(96)00162-6

Amabile, T. M. 1988. A model of creativity and innovation in organisations, *Research in Organisational Behaviour* 10: 123–167.

Amabile, T. M.; Conti, R.; Coon, H.; Lazenby, J.; Herron, M. 1996. Assessing the work environment for creativity, *Academy of Management Journal* 39(5): 1154–1184. http://dx.doi.org/10.2307/256995

Amabile, T. M. 1998. How to kill creativity, *Harvard Business Review* 76(5): 76–87.

Amabile, T. M.; Barsade, S. G.; Mueller, J. S.; Staw, B. M. 2005. Affect and creativity at work, *Administrative Science Quarterly* 50(3): 367–403. http://dx.doi.org/10.2189/asqu.2005.50.3.367

Andriopoulos, C. 2001. Determinants of organisational creativity: a literature review, *Management Decision* 39(10): 834–840. http://dx.doi.org/10.1108/00251740110402328

Baer, M.; Oldham, G. R. 2006. The curvilinear relation between experienced creative time pressure and creativity: moderating effects of openness to experience and support for creativity, *Journal of Applied Psychology* 91(4): 963–970. http://dx.doi.org/10.1037/0021-9010.91.4.963

Barrett, J. D.; Vessey, W. B.; Griffith, J. A.; Mracek, D.; Mumford, M. D. 2014. Predicting scientific creativity: the role of adversity, collaborations, and work strategies, *Creativity Research Journal* 26(1): 39–52. http://dx.doi.org/10.1080/10400419.2014.873660

Batey, M.; Furnham, A. 2006. Creativity, intelligence and personality: a critical review of scattered literature, *Genetic, Social and General Psychology Monographs* 132(4): 355–429. http://dx.doi.org/10.3200/MONO.132.4.355-430

Bechtoldt, M. N.; Choi, H. S.; Nijstad, B. A. 2012. Individuals in mind, mates by heart: individualistic self-construal and collective value orientation as predictors of group creativity, *Journal of Experimental and Social Psychology* 48(4): 838–844. http://dx.doi.org/10.1016/j.jesp.2012.02.014

Benham, H. C. 2008. An empirical exploration of software development quality, *Issues in Information Systems* 9(2): 267–271.

Bolinger, A. R.; Bonner, B. L.; Okhuysen, G. A. 2009. Sticking together: the glue role and group creativity. Creativity in groups, in E. A. Mannix, M. A. Neale, J. A. Goncalo (Eds.). *Research on Managing Groups and Teams*, Vol. 12. Emerald Group Publishing Limited, 267–289. http://dx.doi.org/10.1108/s1534-0856(2009)0000012013

Carron, A. V.; Brawley, L. R.; Widmeyer, W. N. 1985. The development of an instrument to measure cohesion in sport teams: the Group Environment Questionnaire, *Journal of Sport Psychology* 7: 244–266.

Cattell, R. B.; Marshall, M. B.; Georgiades, S. 1957. Personality and motivation: Structure and measurement, *Journal of Personality Disorders* 19(1): 53–67.

Chatman, J. A.; Polzer, J. T.; Barsade, S. G.; Neale, M. A. 1998. Being different yet feeling similar: the influence of demographic composition and organisational culture on work processes and outcomes, *Administrative Science Quarterly* 43(4): 749–780. http://dx.doi.org/10.2307/2393615

Chiravuri, A.; Ambrose, P. J. 2007. Exploring the role of self-efficacy, playfulness, and creative self-efficacy in information systems development, *Issues in Information Systems* 8(2): 200–206.

Collins, J.; Smith, D. 1999. *Innovation metrics: a framework to accelerate growth* [online], [cited 14 April 2015]. Available from Internet: http://www.adlittle.de/uploads/tx_extprism/1999_q2_11-17.pdf

Cook, P. 1998. The creativity advantage-is your organisation the leader of the pack?, *Industrial and Commercial Training* 30(5): 179–184. http://dx.doi.org/10.1108/00197859810225652

Covington, M. V.; Crutchfield, R. R.; Davies, L. B.; Olton, R. M. 1974. *The productive thinking program: a course in learning to think*. CE Merrill.

De Bono, E. 1976. *Teaching thinking*. London: Penguin Books.

Deci, E. L.; Ryan, R. M. 1987. The support of autonomy and the control of behaviour, *Journal of Personality and Social Psychology* 53: 1024–1037. http://dx.doi.org/10.1037/0022-3514.53.6.1024

Deci, E. L.; Connell, J. P.; Ryan, R. M. 1989. Self-determination in a work organisation, *Journal of Applied Psychology* 74: 580–590. http://dx.doi.org/10.1037/0021-9010.74.4.580

Dewett, T. 2007. Linking intrinsic motivation, risk taking, and employee creativity in an R&D environment, *R&D Management* 37(3): 197–208. http://dx.doi.org/10.1111/j.1467-9310.2007.00469.x

DiLileo, T. C.; Houghton, J. D. 2006. Maximizing organisational leadership capacity for the future: toward a model of self-leadership, innovation and creativity, *Journal of Managerial Psychology* 21(4): 319–337. http://dx.doi.org/10.1108/02683940610663114

Eder, P.; Sawyer, J. 2008. The power to be creative at work: examining the componential model of employee creativity, 2008, in *The Eastern Academy of Management Annual Conference* in Washington, DC [online], [cited February 2015]. Available from Internet: http://www.center4oe.com/articles/Employee%20Creativity%20Conference%20Paper.pdf

Eisenberger, R.; Shanock, L. 2003. Rewards, intrinsic motivation, and creativity: a case study of conceptual and methodological isolation, *Creativity Research Journal* 15: 121–130. http://dx.doi.org/10.1080/10400419.2003.9651404

Ekvall, G. 1996. Organisational climate for creativity and innovation, *European Journal of Work and Organisational Psychology* 5(1): 105–123. http://dx.doi.org/10.1080/13594329608414845

Farmer, S. M.; Tierney, P.; Kung-Mcintyre, K. 2003. Employee creativity in Taiwan: an application of role identity theory, *Academy of Management Journal* 46(5): 618–630. http://dx.doi.org/10.2307/30040653

Feldhusen, J. F.; Treffinger, D. J.; Bahlke, S. J. 1970. Developing creative thinking: the Purdue Creativity Program, *The Journal of Creative Behavior* 4(2): 85–90. http://dx.doi.org/10.1002/j.2162-6057.1970.tb00847.x

Ford, C. M. 1996. A theory of individual creative action in multiple social domains, *Academy of Management Review* 21(4): 1112–1142.

Fisher, J. E.; Mohanty, A.; Herrington, J. D.; Koven, N. S.; Miller, G. A.; Heller, W. 2004. Neuropsychological evidence for dimensional schizotypy: implications for creativity and psychopathology, *Journal of Research in Personality* 38(1): 24–31. http://dx.doi.org/10.1016/j.jrp.2003.09.014

Furnham, A.; Batey, M.; Anand, K.; Manfield, J. 2008. Personality, hypomania, intelligence and creativity, *Personality and Individual Differences* 44: 1060–1069. http://dx.doi.org/10.1016/j.paid.2007.10.035

Garfield, M. J.; Taylor, N. J.; Dennis, A. R.; Satzinger, J. W. 2001. Research report: modifying paradigms – individual differences, creativity techniques, and exposure to ideas in group idea generation, *Information Systems Research* 12(3): 322–333. http://dx.doi.org/10.1287/isre.12.3.322.9710

Goncalo, J. A.; Staw, B. M. 2006. Individualism–collectivism and group creativity, *Organisational Behaviour and Human Decision Processes* 100(1): 96–109. http://dx.doi.org/10.1016/j.obhdp.2005.11.003

Gong, Y.; Huang, J. C.; Farh, J. L. 2009. Employee learning orientation, transformational leadership, and employee creativity: the mediating role of employee creative self-efficacy, *Academy of Management Journal* 52(4): 765–778. http://dx.doi.org/10.5465/AMJ.2009.43670890

Gumusluoglu, L.; Ilsev, A. 2009. Transformational leadership, creativity, and organisational innovation, *Journal of Business Research* 62(4): 461–473. http://dx.doi.org/10.1016/j.jbusres.2007.07.032

Handzic, M.; Chaimungkalanont, M. 2004. Enhancing organisational creativity through socialization, *Electronic Journal of Knowledge Managemen* 2(1): 57–64.

Hargadon, A. B. 1999. Group cognition and creativity in organisations, *Research on Managing Groups and Teams* 2: 137–155.

Hender, J.; Higgs, M. 2004. The characteristics of the creative manager, *Journal of General Management* 29(4): 1–20.

Herrmann, D.; Felfe, J. 2013. Moderators of the relationship between leadership style and employee creativity: the role of task novelty and personal initiative, *Creativity Research Journal* 25: 172–181. http://dx.doi.org/10.1080/10400419.2013.783743

Howard-Jones, P. A.; Murray, S. 2003. Ideational productivity, focus of attention and context, *Creativity Research Journal* 15(2/3): 153–166. http://dx.doi.org/10.1080/10400419.2003.9651409

Hunter, S. T.; Bedell, K. E.; Mumford, M. D. 2007. Climate for creativity: a quantitative review, *Creativity Research Journal* 19(1): 69–90. http://dx.doi.org/10.1080/10400410709336883

Isaksen, S. G.; Lauer, K. J.; Ekvall, G.; Britz, A. 2001. Perceptions of the best and worst climates for creativity: preliminary validation evidence for the Situational Outlook Questionnaire, *Creativity Research Journal* 13(2): 171–184. http://dx.doi.org/10.1207/S15326934CRJ1302_5

John, O. P.; Srivastava, S. 1999. The Big-Five trait taxonomy: history, measurement, and theoretical perspectives, in L. A. Pervin, O. P. John (Eds.). *Handbook of personality: theory and research,* Vol. 2. New York: Guilford Press, 102–138.

Kaplan, S.; Brooks-Shesler, L.; King, E.B.; Zaccaro, S. 2009. Thinking inside the box: how conformity promotes creativity and innovation. Creativity in Groups, in E. A. Mannix, M. A. Neale, J. A. Goncalo (Eds.). *Research on Managing Groups and Teams*, Vol. 12. Emerald Group Publishing Limited, 229–265. http://dx.doi.org/10.1108/s1534-0856(2009)0000012012

Kenny, B.; Reedy, E. 2007. The impact of organisational culture factors on innovation levels in SMEs: an empirical investigation, *Irish Journal of Management* 27(2): 119–142.

Klijn, M.; Tomic, W. 2010. A review of creativity within organisations from a psychological perspective, *Journal of Management Development* 29(4): 322–343. http://dx.doi.org/10.1108/02621711011039141

Liang, C.; Chia, T. L. 2014. Reliability, validity, and factor structure of the imaginative capability scale, *Creativity Research Journal* 26(1): 106–114. http://dx.doi.org/10.1080/10400419.2014.873671

McLean, L. D. 2005. Organisational culture's influence on creativity and innovation: a review of the literature and implications for human resource development, *Advances in Developing Human Resources* 7(2): 226–246. http://dx.doi.org/10.1177/1523422305274528

McLeod, P. L.; Lobel, S. A.; Cox, T. H. 1996. Ethnic diversity and creativity in small groups, *Small Group Research* 27(2): 248–264. http://dx.doi.org/10.1177/1046496496272003

Moore, R. M. 2000. Creativity of small groups and of persons working alone, *The Journal of Social Psychology* 140(1): 142–143. http://dx.doi.org/10.1080/00224540009600452

Murdock, M. C.; Isaksen, S. G.; Lauer, K. J. 1993. Creativity training and the stability and internal consistency of the Kirton Adaption-Innovation Inventory, *Psychological Reports* 72(3c): 1123–1130. http://dx.doi.org/10.2466/pr0.1993.72.3c.1123

Nemeth, C. J.; Personnaz, B.; Personnaz, M.; Goncalo, J. A. 2004. The liberating role of conflict in group creativity: a study in two countries, *European Journal of Social Psychology* 34: 365–374. http://dx.doi.org/10.1002/ejsp.210

O'Connor, A. J.; Nemeth, C. J.; Akutsu, S. 2013. Consequences of beliefs about the malleability of creativity, *Creativity Research Journal* 25(2): 155–162. http://dx.doi.org/10.1080/10400419.2013.783739

Oldham, G. R.; Cummings, A. 1996. Employee creativity: personal and contextual factors at work, *Academy of Management Journal* 39(3): 607–634. http://dx.doi.org/10.2307/256657

Osborn, A. F. 1957. *Applied Imagination: principles and procedures of creative problem-solving.* Revised ed. New York: Charles Scribner's Sons.

Paulus, P. B.; Yang, H. C. 2000. Idea generation in groups: a basis for creativity in organisations, *Organisational Behaviour and Human Decision Processes* 82(1): 76–87. http://dx.doi.org/10.1006/obhd.2000.2888

Pearsall, M. J.; Ellis, A. P.; Evans, J. M. 2008. Unlocking the effects of gender faultlines on team creativity: is activation the key?, *Journal of Applied Psychology* 93(1): 225–234. http://dx.doi.org/10.1037/0021-9010.93.1.225

Petrowski, M. J. 2000. Creativity research: implications for teaching, learning and thinking, *Reference Services Review* 28(4): 304–312. http://dx.doi.org/10.1108/00907320010359623

Pirola-Merlo, A.; Mann, L. 2004. The relationship between individual creativity and team creativity: aggregating across people and time, *Journal of Organizational Behavior* 25: 235–257. http://dx.doi.org/10.1002/job.240

Rietzschel, E. F.; Nijstad, B. A.; Stroebe, W. 2007. Relative accessibility of domain knowledge and creativity: the effects of knowledge activation on the quantity and originality of generated ideas, *Journal of Experimental Social Psychology* 43(6): 933–946. http://dx.doi.org/10.1016/j.jesp.2006.10.014

Shalley, C. E.; Gilson, L. L.; Blum, T. C. 2000. Matching creativity requirements and the work environment: effects on satisfaction and intentions to leave, *Academy of Management Journal* 43(2): 215–223. http://dx.doi.org/10.2307/1556378

Scott, G.; Leritz, L. E.; Mumford, M. D. 2004. The effectiveness of creativity training: a quantitative review, *Creativity Research Journal* 16(4): 361–388. http://dx.doi.org/10.1080/10400410409534549

Sheldon, K. M. 1995. Creativity and self-determination in personality, *Creativity Research Journal* 8(1): 25–36. http://dx.doi.org/10.1207/s15326934crj0801_3

Shin, S. J.; Zhou, J. 2003. Transformational leadership, conservation, and creativity: evidence from Korea, *Academy of Management Journal* 46(6): 703–714. http://dx.doi.org/10.2307/30040662

Sundgren, M.; Dimenäs, E.; Gustafsson, J. E.; Selart, M. 2005. Drivers of organisational creativity: a path model of creative climate in pharmaceutical R&D, *R&D Management* 35(4): 359–374. http://dx.doi.org/10.1111/j.1467-9310.2005.00395.x

Tierney, P.; Farmer, S. M.; Graen, G. B. 1999. An examination of leadership and employee creativity: the relevance of traits and relationships, *Personnel Psychology* 52(3): 591–620. http://dx.doi.org/10.1111/j.1744-6570.1999.tb00173.x

Van Der Panne, G.; Van Beers, C.; Kleinknecht, A. 2001. Success and failure of innovation: a literature review, *International Journal of Innovation Management* 7(3): 1–30.

West, M. A. 2002. Sparkling fountains or stagnant ponds: an integrative model of creativity and innovation implementation in work groups, *Journal of Applied Psychology* 51(3): 355–387. http://dx.doi.org/10.1111/1464-0597.00951

Wiltermuth, S. S. 2009. *Dominance complimentarity and group creativity. creativity in groups*, in E. A. Mannix, M. A. Neale, J. A. Goncalo (Eds.). *Research on Managing Groups and Teams*, Vol. 12. Emerald Group Publishing Limited, 57–85.

Wong, S.; Pang, L. 2003. Motivators to creativity in the hotel industry – perspectives of managers and supervisors, *Tourism Management* 24(5): 551–559. http://dx.doi.org/10.1016/S0261-5177(03)00004-9

Woodman, R. W.; Sawyer, J. E.; Griffin, R. W. 1993. Toward a theory of organisational creativity, *Academy of Management Review* 18(2): 293–321.

Zhou, J.; George, J. M. 2001. When job dissatisfaction leads to creativity: encouraging the expression of voice, *Academy of Management Journal* 44(4): 682–696. http://dx.doi.org/10.2307/3069410

Zhou, K. Z.; Kin, C.; Tse, D. K. 2005. The effects of strategic orientations on technology-and market-based breakthrough innovations, *Journal of Marketing* 69(2): 42–60. http://dx.doi.org/10.1509/jmkg.69.2.42.60756

Ritu GUPTA is Assistant Professor in the Department of Human Resource and Soft Skill at IFHE University, Hyderabad, India. She completed her PhD in 2014 in organizational behavior studying interpersonal relationship between manager and employees. She has published research papers in journals of international repute and has presented papers in international conferences. She was a visiting scholar at Oklahoma State University from September 2011 to June 2012. Her research interests include time perspective, change management, retirement, employee engagement and qualitative research methodology.

Pratyush BANERJEE is Assistant Professor at IBS Business School, IFHE University, Hyderabad, India. He has a PhD in Human Resource Management from ICFAI University Dehradun. He has interest in the fields of cognitive psychology and qualitative research methodologies. He has published research articles in journals of international repute and has presented several papers at various international conferences.