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Creativity in Innovation

*Simon P Taylor*¹

¹Arts, Teaching, Business,
University of Cumbria,
England
Simon_taylor@rocketmail.com

ABSTRACT: Creativity can be seen in the context of the nature and nurture debate as either something that is learnt or inherited. It is an important part of the intervention and innovation processes which are used by professionals, practitioners, businesses as well as individuals. This article looks at the role that creativity plays in the process of innovation by looking at the interface between the two. It looks at the way creativity is applied within to the overall process of innovation. The role of creative people is examined and how they impact upon society. The development of creativity and the discussion regarding nature and nurture is looked in relation to Darwinism. The role of the individual as an important part of being creative and taking creativity forward is then looked at in relation to leadership. The article concludes by establishing the importance of ongoing research to continue to understand the link between creativity and innovation.

KEYWORDS: creativity, innovation, organization, process, people

1. INTRODUCTION

As well as the significant number of definitions of creativity many different models have been developed by researchers, academics, practitioners and others to explain the concept and processes of creativity. Not all writers agree that creativity, creative thinking and the creative process can be shown through a model. Vinacke [1] said that creativity within the artistic process does not follow a model and Wertheimer [2] saw the process of creative thinking as an integrated one that could not be represented by segments within a process creativity cannot. Within these different models there are some consistent themes that run through them including combining the development of ideas together with the use of imagination and analysis. The older models tend to look at the start of the creative process as being uncontrolled and linked to the subconscious processes within a person's brain whereas the newer models tend to lean towards it being a controlled generative process.

The term creativity has its origins in the latin word *creo*, meaning to make. Although acknowledged in early times it is not until the enlightenment period in the 17th century that we see the use of the term linked to the intelligence of and imagination of man [3]. Most early civilisations lacked a concept of creativity [3] however Boorstin [4][5][6] says that the creation of the world stated in the bible is the start of the western concept of creativity. The links with religion are strong and are shown through writings as well as art. Niu and Sternberg [7] identify that in the Judaeo-Christian tradition

creation always has been seen as the sole province of god. The idea that creation could be something undertaken by mankind changed from the renaissance and enlightenment periods. Runce & Albert [3] say that creativity was not properly developed as a concept until the 19th century and that this was inspired by the ideas of Darwin including inherited intelligence and genius. By the late 19th century and early 20th century mathematicians as well as scientists such as Poincaré and von Helmholtz started to look at the processes involved with creativity. Work undertaken by Poincaré in 1913 looked at the creative process as one that involved different stages – conscious thought then unconscious processing followed by an inspirational outcome- and it is based on this work that Wallas developed his model [8].

2. Interface – Innovation & Creativity

The interface between innovation and creativity within the literature seems to be permeable, movable, interchangeable and dependent upon the contextuality within which it is applied. Within a commercially driven environment an organisation is focused upon the development of new products, improvements on existing ones and finding ‘novel and effective ways of servicing their current customers and identifying new markets’ [9]. Creativity and innovation are linked to a process with the purpose of producing something of value that can be traded, developed and commercially exploited. Cropley et al say that they prefer the use of the term ‘value innovation’ to more accurately describe the linked process involving creativity and innovation as it is more explicit and reflective of that operative environment [9]. They see the linked process between creativity and innovation as one whereby a *duality* of approach is employed. Klein and Tremblay discuss creation and innovation within the context of urban, social and cultural development linking them as a linear process whereby ‘creation precedes innovation: and, innovation depends on the social acceptance of creation and the spread of its effects and results’ [10]. Within this context the commercial impetus is less of a driving force behind the processes of creation and innovation. These processes and their connection can be viewed in different way and not just in the linear form identified by Klein and Tremblay [10]. A linear interpretation of the relationship between creativity and innovation excludes a range of other ways through which creative activity and innovation can take place as well as imposing a structured view of how creativity and innovation takes place and interrelates. This includes ideas that come into existence randomly or accidentally as well processes that can be unstructured, random and uncontrolled.

It has been suggested by some writers, that only certain people or groupings within society are creative [11] but it has also been claimed that each individual has the capacity to be creative [12]. If it is accepted that each individual has the capacity to be creative and that the processes involved are context dependent then the unrestrictive nature of these factors would suggest that creative activity and innovation can take place through

an infinite number of ways curtailed only by the restrictive factors that are also individual and context dependent.

3. Applying Creativity

Sternberg highlighted three conditions that should be in place in order for people to habitually engage in creativity, these are;

- 'Opportunities to engage in it
- Encouragement when people avail themselves of these opportunities
- Rewards when people respond to such encouragement and think and behave creatively' [13].

External factors beyond the control of the individual can impact significantly on the potential for any creative activity to be undertaken. Sternberg and Williams [14] have highlighted that environmental factors can suppress the undertaking and development of creative activity on a habitual basis. However, Sternberg [13] also identifies that the individual and their attitudes / behaviours are important to the development of a creative approach. In the *Investment Theory of Creativity* put forward by Sternberg and Ludart [15][16][17] people who are creative are identified as the ones 'who are willing and able to metaphorically buy low and sell high in the realm of ideas' [13]. Six *resources* – intellectual abilities, knowledge, ways of thinking, personality, motivation and environment are identified as influencing the development of creativity and need to be in place to enable a high level of creativity to take place. The theory looks at the decision that is made by an individual to make the right investment of effort in taking forward an idea and being creative at the right time, in the right way, in the right place and within the right field. In comparison to a financial investment a person who has or sees the right opportunity may choose to make the investment in terms of devoting their time and energy into something that has been overlooked by others and that is undervalued to turn it into a new and creative idea. The impact of a range of factors on the ability for creative activity to take place can be seen as a framework or system that impacts upon creativity as opposed to one factor [18] [19].

External factors such as the geography, cultural and social differences influence how creativity is viewed. Niu [20] through cross-cultural research identified that in western culture creativity is seen more in terms of the individual attributes of a creative person than in China where creativity is seen more in terms of the social influence of creative people. Globalisation, advances in technology and increasing connectivity impact upon the way creativity is researched, viewed and applied. In terms of economic approaches creativity is looked at in three ways, its impact on economic growth, the way markets are developed for creativity and maximising the use of economic creativity. Schumpeter [21][22] introduced the economic theory of creative destruction in the twentieth century to describe the way in which old ways of doing things are destroyed and replaced by the new. It focused primarily on the commercial world and the development of new products through the creative

generation of ideas and their innovative application to develop markets as well as securing survival and growth. Companies have developed the right environments to enhance the creative powers of individual employees and this can be seen within the context Sternberg and Ludart's theory as an investment in creativity. Advances in technology in the later part of the twentieth and beginning of the twenty first centuries and the development of new applications during these periods can be used to demonstrate Schumpeter's and Sternberg & Ludarts theories [15][16][17][21][22]. The originating of the silicon chip and continual development in terms of size and capacity has led to the rise and fall of different appliances. Continuous development has involved companies enhancing and applying a habitual creative approach. As well as the industrial and manufacturing fields, creativity has been applied to many other fields - professions, business, commercial activities, financial services, academia, public services, government and a multitude of disciplinary areas. Creative professions include writing, art, design, theater, television, radio, motion pictures, related crafts, as well as marketing, strategy, some aspects of scientific research and development, product development, some types of teaching and curriculum design, etc.

The enhancement of business activity through the application of creativity requires three key components argues Amabile – Expertise, creative thinking and motivation [23]. Knowledge is defined by Adams as 'all the relevant understanding an individual brings to bear on a creative effort' [24]. This can reflect an expertise that has been obtained within a specific field of knowledge which could be technical, procedural or intellectual. Creative thinking is relating to how people approach problems using their personality, ability to think, to be flexible and be imaginative. Adams defined creative thinking as 'the ability to combine existing elements of knowledge or understanding in new ways' [24]. Skills that are key to this process include Motivation is defined as generally being 'accepted as key to creative production, and the most important motivators are intrinsic passion and interest in the work itself' [24] which are more effective than extrinsic ones.

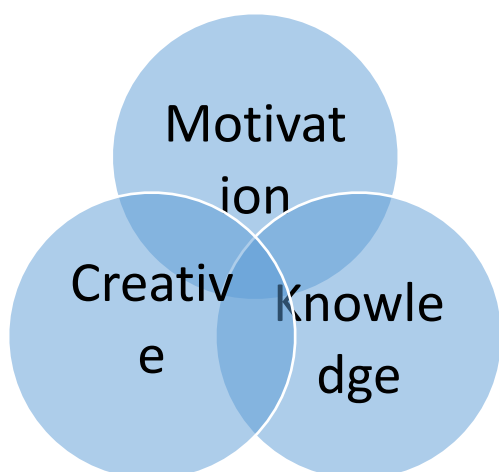


Figure 1 – Amabile's model of creativity [23]

Nonaka undertook research looking at Japanese companies and highlighted that they were able to respond quickly to customers, create new markets / products and make use of advances in technology through their unique approach to 'managing the creation of new knowledge' [25]. This involves making maximum use of the staff within each organisation in terms of their insights and tacit knowledge. Tacit knowledge is knowledge that

is difficult to write down, visualise or transfer from one person to another. Examples of this include knowledge that an individual has speaking a language ride a bike as well as skills such as leadership and creativity. Within a work place this type of knowledge is inextricably linked to employees and management of this type of knowledge can be an important element to the success of the organisation in developing ideas / products and innovating [26]. Nonaka highlighted the role played by the management of each the Japanese organisations in terms of collecting the tacit knowledge and translating this into explicit knowledge that can be used throughout the organisation to create what he termed as the 'knowledge creating company' [25]. Gourlay [27] identified Nonaka's proposition regarding the transfer of tacit knowledge to explicit knowledge as flawed and proposed a new framework regarding knowledge creation. Amabile [23] identifies motivation as another one of the key components to enable creativity to take place. A person can be motivated intrinsically, from the inside through things such as satisfaction /enjoyment or they can be motivated extrinsically, from the outside through factors such as fear of redundancy or financial reward.

Staw [28] highlights the negative issues that organisations and individuals may have with creativity in terms of its departure from the norms / values that govern society. The characteristics associated with the creative person such as risk taking behaviour and becoming absorbed in their work are not conducive to the 'average person' [28]. The benefits as well as the desirability of a creative approach have been written about by a number of academic and other writers. Although some of the characteristics/skills associated with creativity and creative thinking are potentially claimed to be desirable by some organisations in reality they do not fit in with the traditional, hierarchical organization structures that are in existence. On an individual level, Staw, views that the average person would not make the same choices as the creative individual and that they would 'opt for a safer, more normal life' [28]. On an organisational level, Staw views that the 'organisational world is populated by followers rather than leaders' [28] and that they prefer to tread a conservative route although the talk of being a creative entity is pleasing to them. Overall creativity is deemed by Staw to have suffered from 'false advertising' and that in reality 'only a few individuals and organisations really want to be creative' [28].

4. Creative People

In 2002, Florida looked at creation and innovation within urban settings through what he termed as the 'creative class':

The super-creative core of this new class includes scientists and engineers, university professors, poets and novelists,artists ... and other opinion-makers. ... Beyond this core group, the creative class also includes —creative professionals who work in a wide range of knowledge-intensive industries.... Doing so typically requires a high degree of formal education and thus a high level of human capital [29].

Previously writers had discussed the link between urban areas, in particular the city, and the process of creativity [30][31](Lefebvre, 1970; Jacobs, 1984). Florida identifies that the 'creative city' depends upon the talent, technological advancement and the tolerance of certain groupings of the population (the 'creative class') to enable investment and innovation to take place [29]. This in turn generates economic growth,

infrastructure development, artistic and cultural growth. Some critics of Florida contest that his theory of a creative class is divisive in that it views talent and advancement as belonging to an elite section of society [10] [32]. Klein and Tremblay (2011), identify that the ideas put forward by Florida have 'inspired, any urban governments to invest in prestigious cultural assets' [10]. The importance of culture contributing to urban development has also been highlighted by the work of Florida [33] including the creative energy employed by cultural clusters or sectors of society to develop the new and enhance the existing within the physical and social aspects of the city. The contrasting view to Florida's regarding the creative capacity of groupings or individuals within society would be one that provides an inclusive vision embracing all and their creative capacity. A number of writers have identified that the creative ability and outputs of an individual can be harnessed, controlled and translated into enabling social innovation to take place [10][34][35]. Moulaert and Nussbaumer, 2008).

In an article written for the *Washington Monthly*, Richard Florida aligned economic growth in cities with their ability to be able to attract members of the *creative class* and use them to generate creative economic outcomes such as 'new ideas, new high tech businesses and regional growth' (P 1). He identified the *creative class* as being made up people who he saw as a new force working within the America within the early twenty first century who are 'highly educated, well paid' and 'share a common ethos that values creativity, individuality, difference and merit' [36]. He linked their performance to the development of economic growth and in turn it would be this growth that would benefit the less well off members of society. Ten years after writing his book Florida called for the development of a *creative compact* highlighting concern for the disadvantaged in society and the need to learn from the past when inequalities in society occurred alongside the advances of the industrial revolution [11]. In his compact he has identified the need to engage with the low paid and those without opportunity to develop learning, invest in human capacity as well as acknowledging that human capital - potential, knowledge, innovation and creativity drive the economy.

In the knowledge based economy place has been identified by Florida as important in attracting talented people and in being able to develop a competitive advantage through the development of innovation into business ideas and sellable products [11][29][36]. The same type of argument is made for a place in attracting creative people from within the arts and cultural sectors as well as a range of diverse groups (ethnic, racial and lifestyle) that will create an environment in that place that will attract other people who have a high level of human capital which in turn generates innovation, attracts technology industries and investment. Clifton has said that this approach suggests that politicians, policy makers and planners are looking away from 'business attraction to talent attraction' to an area [37]. Clifton took the seven index indicators that Florida had used to assess the 10 city areas in America and undertook a mapping exercise using data across England and Wales.

The indexes used were;

Number	Indicator
One	Bohemian index
Two	Cultural opportunity index
Three	Talent index
Four	Diversity index
Five	Tech-pole index
Six	Social cohesion index
Seven	Public provision index

Table 1 - Mapping Indexes [37]

Clifton identified that the creative class in England and Wales was 37.3% of the workforce compared to the figure of 30% that Florida had identified from his study in America [37]. From the ranking of areas in England and Wales under the *Creative Class*, the London achieves 3 out of the top 4 rankings, Clifton sees it as a 'genuine global city competing for creativity on the world stage' which in itself presents tensions between the local and the international in become influenced terms of jobs and funding [37]. The role of place in being able to compete for talent has become influenced by changes within the operating environment and the development of globalisation. The competition for talent and all that is associated with it is international and if this is the case what happens to the non-creative class whom make up 60% of the work force in England and Wales with the question being, 'will they be limited to those meagre trickle down benefits of creativity or can everyone become creative?' [37].

Martin-Brelot et al [38] highlighted the importance of creativity for the economic development and competitiveness of cities within today's global economy. They took Florida's *Creative Class* concept and mapped it against data collected relating to workers and 12 European cities focusing mainly upon the mobility aspect of his concept. The findings identified that there was a low level of mobility amongst the Creative Class in Europe compared to Florida's estimates of what they should be and that within the European context the personal connection factor is important to individuals (this factor was not taken into account by Florida). Martin-Brelot et al identify that the low rate of mobility amongst the European creative class is influenced by factors such as language, cultural barriers, different health / welfare systems and bureaucratic barriers. The researchers suggest that there are issues with the concept and the way it treats the geographical dimensions regarding the mobility of workers are flawed in not considering the personal connections that individuals have with specific areas. They also point out that Florida says that workers will make choices about location for a longer term move on the same basis as they would do for a short term, it underestimates the importance of choosing a specific neighbourhood in a location. They see the concept as being suitable to single people but not suitable for people with families and they also identify a need to research why creative people leave cities as well as move to them [38].

5. Creativity and Darwinism

A strand of development within the literature is that creativity is uncontrolled and occurs randomly. Campbell [39] and Simonton [40] propose that creative ideas emerge from a largely uncontrollable process of random variation and natural selection influenced by the ideas of Darwin and the theory of 'Chance Configuration' from the nineteenth century whereby variations on ideas and concepts come about through random chance. The model has a three step approach, the first being that an event occurs randomly which leads onto a second step whereby the creative process is subject to natural selection through which the random variations that are most useful are adapted and chosen. In the third step of the model the idea is preserved, reproduced and made concrete. Although the last two steps of the model are analytical in nature, the main aspect of the process is that the creative idea was initiated by chance and Simonton [40] cites the cases of the invention of penicillin and Velcro as examples of this happening. Gabora says that the theory put forward by Simonton is flawed in that Darwin's theory of *Natural Selection* has no applicability to the process of creativity. She explains that Darwin was;

Motivated by a paradox with no equivalent in creative thought the theory of natural selection, an intricate theory at the population-level change, is that acquired traits are not inherited from parent to offspring at the individual levelIf getting discarded, how does change accumulate? [41]

The paradox facing Darwin was in relation to change occurring within biological species and the mistake that Simonton had made is to take an explanatory theory that has been developed to solve a problem in one field and then applying it in another field where the problem or paradox does not exist [41]. The perspective of evolution is seen by Gabora as key to the explaining the development of ideas, creative thought and what she calls 'Honing theory'. This is a theory which places the same level of importance on the externally visible creative outcome as the internal cognitive change within the individual brought about by the creative process. The process is iterative and interactive in terms of the task that is dealt with and the worldview each affecting the other [42]. It is proposed by Gabora, that creative ideas and creative thought have evolved through culture with the expressions of culture being labelled as 'creative products' (dances, tools, architectural styles, traditions) that are developed as visible statements of that culture reflecting 'the states of particular worldviews that generate them' [43]. The theory considers that each individual takes different parts of worldviews that have already been expressed and 'hones' these into an individual worldview and the process of creativity stems from a need to mend this worldview if it becomes disrupted:

Just as injury to the body spontaneously evokes physiological changes that bring about healing, events that are problematic or surprising evoke cognitive dissonance spontaneously evokes streams of thought that attempt to solve the problem or reconcile the dissonance [43]

6. Creativity – Individual & Leadership

Questions have been raised about creativity in individuals in that when they are children they are very creative but by the time they become adults the ability to be creative has been lessened which is reflective of the

education system. He defined creativity as ‘the process of having original ideas that have value’ [44], views it as being linked closely with innovation which is valued highly as a concept in our society and that it leads to the generation of new ideas as well as productivity. In his book he states that he sees our schools as *killing* creativity in the children they teach which leads to a vacuum being created within the future workforce in terms of their innovative abilities, which he calls the ‘academic illusion’:

As the pressures of education continue to intensify, many students are simply not learning the personal skills they need to deal with modern life and the increased pressures of continual assessment and being examined at every level [44]

Robinson looks at the importance of a leader within an organisation as being able to take forward services and manage innovation especially in situations where it is undergoing or resisting change. He sees the creative leader as having the creative abilities ‘to facilitate a resilient relationship between the external and internal cultures’ of the organisation [44]. In an article written for the *Guardian* newspaper in 2013 Robinson highlighted a situation where the then Minister of State for Education, Michael Gove, was introducing changes to the national curriculum for teaching in schools to ultimately improve creativity amongst pupils when he appeared not to have an understanding of creativity [45]. As the governments politically appointed leader of the education sector he was failing to develop that resilient link within education between the internal culture of the teaching profession and the external environment in which the government were taking forward change within schools. He points out in the article that Michael Gove viewed it to be necessary that children to attain a level of knowledge and skill within subjects such as English, Mathematics and Music before they can be creative. Robinson suggests that Gove lacks a basic understanding of what creativity is and that the reforms that he has introduced into schools stifles creativity rather than encouraging it [45]. The approach adopted by the Government through the changes to the National Curriculum were prescriptive and view development as a linear process whereas creativity is a far less rigid process requiring imagination and a flexible approach.

Robinson identifies that creativity has its myths and its truths. The myths he includes as thinking that only special people can be creative, that creativity is just about artistic ventures and that it is all about uninhibited self-expression. The truths are that everyone has the capacity to be creative, that it is possible to be creative in whatever thing you do and to be creative requires the use of different skills as well as a disciplined approach [45].

7. Creativity & the Brain

The writing of de Bono regarding creativity highlights some of the changes in relation to the thinking and understanding about creativity and how this has become translated into analytical literature about the subject. In the 1960’s he wrote about the how the brain works in terms of processing information through nerve networks which take in information, process, store and organise it into sequences or patterns. By the 1990’s technological advances in the development of computers had meant that neuro computers were reflecting this process to some degree. Earlier writings regarding creativity seemed focused on the organising of the parts of

the thinking process which could be understood and do not seem to analyse the role of the brain whereas later writings give a greater allowance for the importance to this within the process of creativity. Other influences that have impacted upon the development of thinking about creativity and the literature that has been produced include the impact of commercial applications with examples of this being the use of the brainstorming technique within advertising and the application of de Bono's specific creativity techniques within companies [46]. The brain, says de Bono, works on the basis that its role is to set up, establish and use routine patterns from the information that it receives through its sensory receptors. The constant receiving of information by the brain changes the way things are viewed on the surface and this results in the brain putting the information received into self-organising systems which set up these patterns. There are two types of information handling systems, the passive system which is the most common and the active system. The creative process is alien to the brain as it cuts across these routine patterns causing disruption and this activity is generated within the active sphere of information handling [46].

8. CONCLUSION

Creativity has been identified by academics and researchers as being an important part of the process of innovation. There has been dispute and different opinions about the process of creation and how individuals become creative. Whatever the definition of innovation it can be said that creativity adds to the process of developing new ideas, services or products or improving them. Further research into this area will inform the body of knowledge about the links between creativity and innovation.

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