

Chapter 12

Psychological aspects of innovation

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Abstract

The purpose of this study is to analyse the most important psychological factors that impact on the innovation process. In psychology, the determinants of innovation are usually considered at three levels: individual, group/team and organization. When it comes to individual factors, research indicates that the variables associated with innovation are to some extent intelligence, personality traits such as openness to experience, low agreeableness and conscientiousness, and intrinsic motivation. The factors discussed at team level are group norms underlying the organizational climate and the composition of the team, with a focus on group roles. At the organizational level, the main role in the innovation process is played by the appropriate leadership and organizational factors such as autonomy, and the level of workload. This very brief overview will only serve to familiarize readers without any knowledge of psychology with the complexity of the issues facing innovation in this field.

Key words: psychology, innovation process, individual, group, organization

Introduction

Innovation is a concept most often dealt with in the field of economics and the economy, usually considered a technological phenomenon, although the latest definitions also take social innovation into account. Nevertheless, the human factor and the role of psychology in this area are often marginalized or even ignored (Kozusznik, 2010). And yet the person plays a key role in the innovation process – s/he is the author of the concept, which s/he after several stages ultimately puts into effect, but also the person is often a major barrier and obstacle to the creation and implementation of innovative ideas. Therefore, the study of innovation, and the search for the factors determining it, as well as affecting it inhibitorally must be interdisciplinary and take psychological factors into account.

Innovation issues in psychology are often considered at three levels: (i) the individual and individual resources, such as defined personality traits and cognitive abilities; (ii) the group, especially in terms of its structure, composition, standards

and atmosphere; and (iii) the organization, where special emphasis is placed on the working environment, the climate and organizational culture, and leadership (e.g. Kożusznik, 2010; Trompenaars, 2010; Patterson et al., 2009). In addition, job-level factors are discussed which relate to the contextual characteristics of the everyday work (job structure, tasks and resources) and their influence on employee motivation and innovative behaviours (Parzefall et al., 2008).

Kożusznik (2010) further distinguishes thematic areas in which research is conducted in the field of innovation in psychology, such as:

- diagnosis of psychological characteristics with particular emphasis on creativity,
- study of innovation diffusion and transfer, i.e. the analysis of the route from concept to implementation and dissemination of the inventions,
- the uptake of innovations, with emphasis on factors of resistance to change, risks and fears occurring among workers in an innovative situation, or
- the stages of assimilation of innovation.

In the traditional view, creativity and innovativeness were characteristics of a few select individuals. Nowadays, these capacities are believed inherent in every person, although this potential may remain closed or hidden in some settings, meaning that certain traits or features which fuel innovativeness in one environment may not be very helpful in another. Also different individual/team factors may be required at different stages of the innovative process (see Mathisen et al., 2008). Innovativeness is believed to be a complex issue, thus an understanding of the creative processes and innovation need a multi-level perspective – from individual, job, through team, to organizational. The role of human resources management may be critical in enhancing employee innovativeness (Parzefall et al., 2008).

The significant achievements of psychology (and management) in this area make it impossible to discuss the topic comprehensively in such a short paper. Therefore, the authors focus on the analysis of the psychological and organizational factors associated with innovation selected most often by other researchers.

12.1. Innovativeness – individual level factors

The innovations that have been used by generations over the world have thus far tended to be the work of brilliant individuals. Today, there is an era of discoveries and inventions behind which whole teams work, but that does not mean that the outstanding and creative minds in the field have ceased to matter (see: *Innovation and teamwork*). What is the difference between those people on whom the progress and development of civilization largely depends from conventionally-minded people? How do they feel and perceive reality; how do they process information? Do they perhaps have some personality traits common to creative individuals that allow them to realize often seemingly crazy ideas? Psychologists have been trying to answer these questions and researching the root causes of human genius

for over a century. Their areas of research on issues of creativity can be grouped into cognitive factors associated with the personality of the individual and their motivation.

12.1.1. Cognitive resources

One of the forefathers of research on intelligence is the brilliant, although very controversial, Sir Francis Galton, who also dealt with issues of genius. He believed, rightly, that what connects the highly gifted individuals is their high level of intelligence. Initially it was thought that intelligence is strongly associated with creativity, as indicated by some theories, e.g. Guilford or Sternberg (in: Nečka, 2005). Later, research results slightly revised this view. Intelligence has to do with creativity only to a certain level – 115-120 IQ. Above that limit its importance is negligible (Feist and Barron, 2003), which means that among people with very high intelligence there is relatively the same number or slightly fewer creative people than among just above average intellect. These results also show that a certain level of intelligence is necessary in creative thinking to master a particular area of study. In conclusion, creativity is definitely a different research construct. Patterson, Kerrin and Gatto-Roissard (2009) made an apt analogy, comparing the relationship of intelligence and creativity more to cousins than siblings.

So what is creativity or creative thinking? The definitions of innovativeness and creativity have a lot in common, which is why in psychological studies it is often considered as a determinant of innovativeness.¹ Although researchers do not entirely agree on what exactly it is and how to treat it – is it a final product, a process, or perhaps as a feature of a person, and which criteria to adopt so that a given idea can be considered creative – many of them consider that creativity can be reduced to the production of new and useful ideas or solutions (e.g. Oldham and Cummings, 1996).

One of the first concepts of creativity was the theory by Guilford (1978), one of the greatest scholars of human intelligence. He identifies creativity with divergent thinking, which involves finding multiple solutions to one problem; however, subsequent studies have not confirmed this relationship (Barron and Harrington, 1981; Runco, 2004). Guilford also distinguished the criteria for creative thinking: fluidity, meaning the ease of generating ideas and adding to their number, flexibility, understood as the ability to change the direction of thinking, as reflected in the diversity of solutions (number of categories), and originality, or the uniqueness, singularity and inimitability of these solutions.

Because the research on the relationship of creativity and intelligence has been fairly inconsistent and has not confirmed a strong correlation between them, attention turned towards cognitive styles, or ways of processing information, of approaching and solving problems, or the “preferred way of performing cognitive functions” (Nečka,

1 However, the relationship of creativity to innovation, despite appearances, it is not at all clear. For example, Sohn and Jung's research (2010) conducted in Korean companies showed that, although the organizational variables have a bearing on creativity, its bearing on innovation in them – not.

2001, p. 125). The most common approach is Kirton's theory, which distinguishes two styles: innovative and adaptive. Adapters are described as people who "do things better;" they prefer to improve the group and/or organisation within the status quo. Kirton defines them as: those who seeking accepted solutions, maintaining high precision performance for long periods of time, or providing a secure base for the risky activities of the innovators. The innovators are people who "do things differently;" they are less focused on operating within existing structures. Kirton describes them as seemingly undisciplined, approaching problems from an unforeseen perspective, able to carry out specific tasks only in short bursts, and having a low level of doubt when generating ideas (Stum, 2009; Bagozzi, 1995). Kirton emphasizes that to achieve the objectives of the group both those presenting innovative and adaptive cognitive styles are required. The first is responsible for coming up with and introducing innovations, the second – consolidating and improving these changes.

An interesting relationship with innovation/creativity has been observed in the range of knowledge related to the subject of innovation – no or too little knowledge, but also too high a level disadvantageously affects the generation of innovative solutions (in: Patterson et al., 2009). This relationship may be due on the one hand to the inability to create something out of nothing, and on the other hand, too much information can be a kind of psychological barrier that locks the individual into the statement: "I know this like no other, and I know that in this matter, there's nothing more to think of." Such an approach may result in not making any effort in the direction of generating new solutions.

12.1.2. Personality

Is the creative mind itself enough to create something that nobody has previously invented? What distinguishes creative individuals from the rest, not only in terms of processing information, but also mode of action, relationships with others, etc.? Nęcka (2001) gives three qualities that characterize creative people: openness, independence, and perseverance. The importance and role of these characteristics depend on the phase of the creative process. These features partially overlap with the results of research on the relationship of creativity and personality traits. Of these, the most commonly taken into consideration is the Big Five Model, according to which personality can be described by five dimensions: openness to experience, extraversion, conscientiousness, agreeableness, and neuroticism. Openness to experience is also mentioned by Nęcka (2001), and means cognitive curiosity, tolerance for the new, unconventional thinking, independence of views, or the tendency to challenge authority (Zawadzki et al., 1998), and seems to be the best predictor of innovation. According to Nęcka (2001) it is particularly important in the latent phase of the innovation process, when an entity is observing, seeking, learning, verifying, analysing and synthesizing information related to the product of creativity – the result of these operations is a novel idea.

Another dimension showing a relationship with innovation is agreeableness, manifested in trust for others, sensitivity to human affairs, and cooperative be-

behaviour. Low agreeableness means self-centeredness, competition, and scepticism about other people (Zawadzki et al., 1998). Interestingly, studies indicate that innovation is more associated with low agreeableness, which explains the fact that innovators are guided by the principle of social independence, otherwise they would not penetrate with their innovative ideas, which tend to cause resistance among the “conventional thinking.” Therefore, some researchers believe that this independence of thought and action is particularly desirable, or even necessary, in the later stages of the innovation process, in bringing ideas to life. The role of autonomy in the innovation process is also mentioned by Nęcka (2001).

Conscientiousness – the next dimension of the Big Five, means scrupulousness, integrity in the performance of duties, a strong will, high motivation, and perseverance in action (Zawadzki et al., 1998), i.e. the features of an ideal employee. However, people with high conscientiousness are more resistant to change and more willing to submit to social norms, which is contrary to behaviour aimed towards creative solutions. And this dependence is confirmed by some studies that observed a relationship between low conscientiousness and innovation (Barron and Harrington, 1981; Gelade, 1997; Runco, 2004).

For the last two dimensions – extraversion and neuroticism – their relationship with innovation is much less clear. Some researchers (Feist, 1998) believe that introversion, or reserve in social interaction, lack of optimism, and a preference to be alone (Zawadzki et al., 1998) is positively correlated with innovation, as solitude and isolation may contribute to the generation of new ideas. In contrast, other studies (Patterson et al., 2009) suggest that it is the polar opposite – extraversion can be a predictor of innovative solutions. It seems that the relationship of this dimension to innovation may depend largely on the context in which the innovation process takes place. In art introversion promotes the formation of works, but in the field of management – where human contact is the essence of the work – extraversion may be a better predictor, although further studies are indicated in this direction (Patterson et al., 2009). Similarly, the relationship of innovation with neuroticism, which is experiencing negative emotions, such as fear, frustration, resentment, guilt, low stress tolerance (Zawadzki et al., 1998), is not clear and seems to depend on the areas in which new solutions are generated.

12.1.3. Motivation

A separate factor to be taken into consideration when examining innovativeness is the motivation of the individual. Crucially important here is intrinsic motivation, which in one's behaviour means the internal energy generated through positive emotions such as joy or satisfaction from performing a given activity. External incentives, such as material benefits, recognition in the eyes of others, and even those of an altruistic character of higher order, play a supporting role here. In contrast, the action itself, whether in the form of physical or intellectual activity, brings the individual joy and is the source of broader creativity having much to do with innovativeness. It seems

that intrinsic motivation is crucial in the early stages of the innovation process, such as generating ideas, but further, when the first ardour may dim somewhat, the voice of external motivators comes in the form of recognition for their efforts (Eisenberg and Cameron, 1996; Patterson et al., 2009). It is also important here to mention perseverance, which Nęcka lists (2001) as the third feature of creative people.

In summary, creative individuals are persons endowed with high intelligence, but not outstanding, broad-minded, showing considerable independence of opinion, unruly in action, not really attaching importance to any standards, rules, and legal and social regulations; driven by internal motivation consisting roughly of “satisfaction with the work being done” without any external reinforcements.

12.2. Innovativeness – job level factors

The job level factors, frequently described as job-level determinants of innovativeness are autonomy (within clearly defined goals) combined with a sufficient level of challenge and time. Stimulating and non-routine jobs are naturally positively associated with innovativeness, although too high a level of task complexity may lead to over-stimulation, exhaustion and stress, thereby overwhelming the employee and killing creativity (Parzefall et al., 2008, p. 171). This mechanism is discussed below from the perspective of Karasek’s model of stress, in which a dynamic balance between situational demands and resources is recommended, as it is believed to provide opportunities for personal growth which in turn help to promote innovativeness.

Interesting findings have been cited in relation to the availability of material and time resources as a prerequisite for innovative outcomes. Although it seems important to have access to sufficient material resources in order to test different solutions, sometimes this may prevent employees from more creative behaviours. In reference to time constraints, however, it seems that lack of time pressure is positively related to creative solutions. Employees prefer to have enough “time to think,” to learn and experiment and to test new ways (see Parzefall et al., 2008).

12.3. Innovation and teamwork

It is believed that the era of inventions and discoveries made individually has passed. Currently, humanity is entering a more complex reality, impossible to grasp by one even mentally brilliant individual. In science interdisciplinarity has long been promoted, and in the area of management, due to the implementation of

increasingly larger and more complex, often international, projects, the emphasis is on teamwork skills. Therefore, it is important to understand the mechanisms of the group, both those that are favourable and inhibit teamwork, and especially their creative potential, which is the task of psychology and sociology. The factors that may play a role in the innovation process in the context of the team include the group norms that underpin organizational/group climate and the team roles in the context of Meredith Belbin's theory of team roles (2003, 2009).

12.3.1. Group norms

One of the basic group mechanisms determining the creation of innovative solutions are appropriate group norms that underpin the climate or culture. Norms and values provide clues for the members of the group about what is good and bad, which behaviours can expect acceptance, and which will ostracize them from the rest of the team. On the one hand, they are a kind of cement for the group, bringing a certain order, as well as a sense of security and predictability, on the other hand, too much attachment to the prevailing standards inhibits the growth of the group and may adversely affect the achievement of the purpose for which it was established (unless the norm in a team is breaking the rules). Norms may relate to the treatment of "renegades," people who have a different point of view on issues discussed from the rest of the team. Are their opinions respected, seen as an opportunity to solve the problem in an unconventional way, or just the opposite – "stepping out of line" is not welcome. In the literature a subject often discussed is the issue of the role of minorities in the group. Nemeth's studies (1986) show that a minority in the group (e.g. in terms of choice of solution options other than the remainder of the group) influences a view of the problem from another perspective by the other members and encourages them to think creatively.

12.3.2. Organizational/group climate

Group norms and values form the basis of organizational climate, defined e.g. as "characteristic of a given set of norms conditioning company employee behaviour ... and determines the framework of conduct for employees in a given organization" (Potocki, 1992, p. 32). Although the literature mainly talks about organizational climate, the very definition of the construct allows that the group may have a climate, except that the group climate is due to norms, and norms are one of the main attributes of the group (whether a few or several dozen members, which may then already be the organization).

West and Richter (2008) have identified six characteristics of the organizational climate that affect innovation at the level of the group (in: Patterson et al.,

2009). These included minority (and conflict) management in a constructive manner; and also: commitment that results from intrinsic motivation and identification with the group, participation in decision-making leading to greater cohesion within the group, the involvement of individual members, but also taking responsibility for their own actions, as well as promoting innovative ideas, and the development of a sense of security and trust within the group and “reflexivity.”

12.3.3. Group roles

An entirely different matter which may be of importance in the process of innovation for the team is its proper construction. Meredith Belbin, work and organizational psychologist, for nine years has studied a variety of factors – including personality, intelligence, and the roles in the group of individual team members – that affected the efficiency and effectiveness of their work. Eventually he came to the conclusion that the most important, and practical, is the last factor, which is to build effective teams based on the capabilities and abilities of the individuals to perform specific roles in the group. He distinguished nine of them and called them: the practical organizer, the leader, the locomotive, the evaluator, the group man, the perfectionist, the specialist, the contactor, and the creator. From the standpoint of this study the latter two roles are of paramount importance. Belbin’s long-term observations led him to conclude that the performance of the group, especially when it comes to its innovativeness, depends to a large extent on the presence of a person who has a predisposition to act as a creator, i.e. an individualist with a rich imagination, great knowledge, an unconventional look at the problems, and an introverted disposition, and a seeker of sources – the inquisitive individual, responsive to change, with the need to explore new territories, and, unlike the predecessor – with the characteristics of an extrovert. Interestingly, the number of innovators in the group has little effect on the final result in the form of innovative solutions implemented in life. Too many creative ideas are not best handled by the rest of the members of the group, which Belbin quite aptly likens to excessive use of even the best ingredient in the dish. A similar effect was observed in groups of people with above-average intelligence, called the Apollo effect (Belbin 2003, 2009).

In summary, the creative potential of individuals has a chance to develop if it falls on fertile ground in the group in which they have to work. In such a group the appropriate standards and a climate supporting innovation should dominate, through respect and tolerance of different views of all members of the group. The same group has a chance for a novel approach to the problem, provided that there are creative individuals in their ranks assisted by other members of the team, complementing the deficiencies and low levels of skills and abilities that creators and seekers of sources do not have, but needed, or even essential to the whole process of innovation.

12.4. Innovation and the organization

Current projects of an innovative nature generally require adequate funding and coordination of the efforts of many people. These conditions can only be met by organizations. However, not all organizations are innovative. What differentiates them from those that do not implement innovative ideas? The factors related to the innovation and creativity of individuals at the level of the organisation most commonly taken into account and analysed by researchers are primarily appropriate leadership, and also organizational factors, such as a sense of control, and workload. It should be emphasized that the same variables are important at the level of the group.

12.4.1. The role of leadership

Leadership in the group and the organization plays an important, not to say essential, role. The climate in the group depends largely on the leader; this is so because of their power – they select their colleagues, forms the group norms, and finally, the leader is the one who is the example for other employees to follow. Anderson and King (1991) proposed a model in which, depending on the phase of the innovation process, the leaders perform different roles (for details, see Figure 12.1).

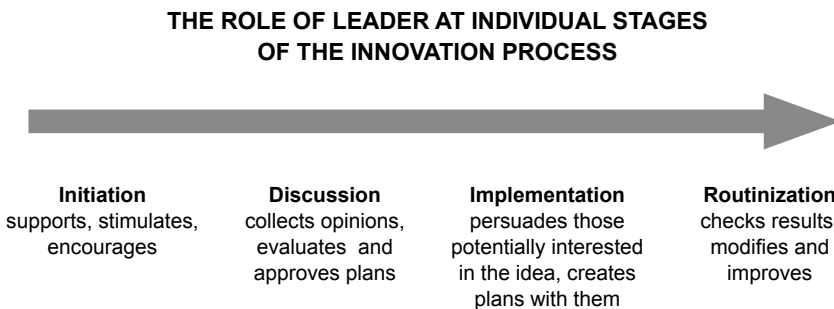


Figure 12.1. Model of the leadership role in the innovation process

Source: based on N. Anderson, N. King (1991), "Managing innovation in organizations," *Leadership and Organization Development Journal*, Vol. 12, pp. 17-21.

At the early stages of the innovation process, the basic role of the leader is to support their subordinates and colleagues, encouraging them to analyse the problem and come up with solutions. Then, it is important to create the right atmosphere in the group, in which there is no place for fear of criticism, and workers can share their ideas without interruption. After the selection and arrangement of the details of the solution of the problem, the tasks of the leader are to bring the idea to life, which involves convincing people outside the project group. At the final stage, the

role of the leader is to check the results, control and introduce possible improvements in the solution. This model is consistent with contemporary theoretical approaches to leadership, according to which not only the specific personality or intellectual traits play a role in effective and efficient leadership, but more the ability to adapt to different situations and respond appropriately depending on the circumstances (see typology of leadership styles by Boyatzis et al., 2002).

12.4.2. Organizational factors

Another factor associated with innovation at the level of the organization is the work environment and its organization. The results show that a moderate level of workload, sometime pressure, as well as giving employees more autonomy, all promote innovation. These results almost perfectly fit into the theory of job requirements – Karasek control (Widerszal-Bazyl, 2003), which assumes that employees are best motivated to work when they have a lot of responsibilities, but also control over their execution. The worst situation, increasing the risk of depression and burnout, is the case of a heavy workload with low control. Autonomy, and a sense of control are the subjects of psychological research in conjunction with many aspects of life, and the results are clear – everyone likes to control their situation, to have their “field for cultivation,” for which they will be responsible and will occupy themselves with at their own discretion. Even more important is a sense of control in the context of innovation. As indicated by the study (see above), creative individuals are those who have their own opinions and are not afraid to express them (low agreeableness), do not like to submit to standards (low conscientiousness), have broad horizons, and have a high tolerance for change (openness to experience). Most likely, these people will not feel comfortable in an environment fortified by rules, regulations and standards where only the leader/manager is right, and the work/product is to be made according to fixed rules.

In summary, innovative ideas, especially those that require large amounts of money, are only likely to see the light of day if they are implemented by organizations. These, in turn, if they want to be innovative, should ensure a culture of innovation, whereby on the one hand they place high demands upon their employees, on the other – give them a large degree of autonomy in carrying out their work. It is also important to hire the appropriate managers, able to exploit the creative potential of their subordinates.

12.5. Multiple level summary of findings

Nowadays, when tasks are increasingly complex and the turbulence of the environment is one of its main features, it is impossible to effectively discuss issues related to innovativeness from one perspective or level. Employees interact and

work within teams – not only with group members, but also contacting people from outside, such as clients. Teams are nested within organizations, thus determinants and inhibitors from each level may strongly impair others.

In the table below the findings are summarized on multiple level factors related to innovativeness, based on the literature review.

Table 12.1. Multiple level factors related to innovativeness

Level of analysis	Factors	Effect on innovativeness
Individual	Personality (Big Five Model) – openness to experience	+
	Personality (Big Five Model) – conscientiousness/extraversion/neuroticism/agreeableness	Mixed
	Goal orientation, proactivity	+
	Values – congruence of values, creativity, trust	+
	Values – conformity	–
	Thinking styles – systematic thinking	–
	Motivation – intrinsic motivation	+
	Risk avoidance (expected image of risk)	–
	Psychological states – negative affect/negative moods/emotional ambivalence	Mixed
	Job	Job complexity, job required innovativeness
Time pressure		Mixed
Rewards		+
Task and goal interdependence		+
Team	Leadership – transformational leadership, – supervisory support/supervisory empowerment behaviours/ supervisory benevolence, – supervisory expectations for creativity, – supervisory developmental feedback and non-close monitoring	+
	Co-workers – co-worker support/ creativity expectations by co-workers	+
	Presence of creative co-workers	Mixed
	Team composition – heterogeneity (diversity)/cognitive style/multidisciplinary	Mixed
	Expertise/experience/membership change	+
	Team climate participative safety/vision/support for innovation/task and goal orientation/conflict	Mixed
	Team climate – climate for excellence	+
	Team processes – information exchange/problem solving style/team participation	+

Organization	Management related factors – HR practices, – top managers' demographic characteristics (e.g., ownership, racial and gender diversity)	Mixed
	Leadership – transformational and transactional leadership/management support/top management leadership/cooperative conflict management	+
	Knowledge utilization and networks – knowledge search and spillover (transfer)/knowledge stock/social network	Mixed
	Absorptive capacity/intellectual capital	+
	Organization strategy – innovation strategy	+
	Availability of resources	Zero
	Exchange of resources/resource diversity and quality	+
	Climate Innovation climate/reflexivity climate/climate for psychological safety and personal initiative	+
	Culture – national culture (power distance, masculinity, uncertainty avoidance, individualism, social face)/empowerment	Mixed
	External environment – geographic distribution of R&D activity/environmental uncertainty/turbulence/dynamism/urbanization/community wealth/population growth/unemployment	Mixed
	Bureaucratic practices	–
	Corporate entrepreneurship as innovation	mixed

Source: literature review mainly based on: N. Anderson, C.K.W. De Dreu, D.A. Nijstad (2004), "The routinization of innovation research: A constructively critical review of the state-of-the-science," *Journal of Organizational Behavior*, Vol. 25, pp. 147–172; M.-R. Parzefall, H. Seeck, A. Leppanen (2008), "Employee innovativeness in organizations: A review on the antecedents," *Liiketaloudellinen Aikakauskirja, Finnish Journal of Business Economics*, Vol. 2, pp. 165–182.

Conclusion

The summary of this study is the model by the repeatedly cited research team here: Patterson, Kerrin and Gatto-Roissard (2009), who reviewed the study for factors that were primarily psychological in nature associated with innovation. The factors analysed were grouped into individual resources, primarily personality and intellectual traits related to the motivation of the individual and their level of knowledge in a given field, then – social, which included a network of contacts, an appropriate leadership style depending on the phase of the innovation process (see: Anderson and King, 1991), organizational, like climate and organizational culture, ways of managing human resources, as well as the working environment,

which includes autonomy and external factors, independent of the people directly involved in the innovation process, e.g. state policy, the presence or absence of competition, etc. These groups of factors fulfil different roles depending on the stage of the innovation process, of which the authors mention five, i.e. the ability to identify the problem, initiation and generation of ideas, development and the search for solutions, implementation and stage “after,” in which any possible changes and improvements are effected. Of course we may argue with the authors on the merits of assessment of some factors to one group and not another, though no doubt this model is an attempt to organize the existing research results in the field of psychology, sociology, and management for the determinants of innovation and innovativeness in contemporary organizations.

It should be noted that the authors of this model emphasize that the process of innovation does not always pass through all the stages delineated, and may not necessarily be linear, because the individual phases may overlap, and some not occur at all. Also, a given resource need not be relevant in every case. The weakness of the model is not taking into account the barriers and obstacles emerging in the way of innovative ideas.

Kozusznik (2010) cites examples of barriers which were detected after analysis of interviews with more than 500 executives of Polish enterprises. These barriers included on an individual basis, such as anxiety associated with expressing their own opinions and judgments, and the lack of a sense of security and confidence in the success of any changes; team obstacles associated with low soft competences such as an inability to conduct group discussions and group problem solving. A significant barrier to innovation focuses on managers themselves, who treats their subordinates as people who do what they are told, and not as a potential, an opportunity, involving the use of their knowledge, skills and experience to create some change. Other barriers included the communication problems related to difficulties with the clear transfer of information, organization of meetings, where issues related to the work can be discussed and clarified. The last obstacle concerns the implementation of an appropriate incentive system, involving just rewards for employees' efforts, and sometimes even noticing them by management.

The process of innovation is a very complicated phenomenon where its practitioners and researchers have more questions than answers. To be better understood, and thus, more easily and quickly run, we need to know all the determinants that condition it, as well as barriers to innovativeness, including those that are economic, political, and psychological. Psychology plays a special role because, as was mentioned in the introduction, the individual in the innovation process is the most important, along with their ability to change the surroundings/environment in which they live, as well as fear and resistance against what is new, because unknown and untested. This very brief overview will only serve to familiarize readers do not have any knowledge of psychology to the complexity of the issues facing innovation in this field.

Literature

- Anderson, N., King, N. (1991), "Managing innovation in organizations," *Leadership and Organization Development Journal*, Vol. 12, pp. 17-21.
- Anderson, N., De Dreu, C.K.W., Nijstad, D.A. (2004), "The routinization of innovation research: A constructively critical review of the state-of-the-science," *Journal of Organizational Behavior*, Vol. 25, pp. 147-172.
- Bagozzi, R.P. (1995), "Construct validity and generalizability of the Kirton Adaptation-Innovation Inventory," *European Journal of Personality*, Vol. 9, pp. 185-206.
- Barron, F.B., Harrington, D.M. (1981), "Creativity, intelligence, and personality," *Annual Review of Psychology*, Vol. 32, pp. 439-476.
- Belbin, M. (2003), *Twoja rola w zespole*, Gdańsk: Gdańskie Wydawnictwo Psychologiczne.
- Belbin, M. (2009), *Zespoły zarządzające. Sekrety ich sukcesów i porażek*, Kraków: Oficyna Wolters Kluwer.
- Boyatzis, R., Goleman, D., McKee, A. (2002), *Naturalne przywództwo. Odkrywanie mocy inteligencji emocjonalnej*, Wrocław-Warszawa: Jacek Santorski – Wydawnictwo Biznesowe.
- Eisenberg, R., Cameron, J. (1996), "The detrimental effects of reward: Myth or reality?," *American Psychologist*, Vol. 51, pp. 1153-1166.
- Feist, G.J. (1998), "A meta-analysis of personality in scientific and artistic creativity," *Personality and Social Psychology Review*, Vol. 2, pp. 290-309.
- Feist, G.J., Barron, F.X. (2003), "Predicting creativity from early to late adulthood: Intellect, potential, and personality," *Journal of Research Personality*, Vol. 37, pp. 62-88.
- Gelade, G. (1997), "Creativity in conflict: The personality of the commercial creative," *Journal of Genetic Psychology*, Vol. 165, pp. 67-78.
- Guilford, J.P. (1978), *Natura inteligencji człowieka*, Warszawa: Państwowe Wydawnictwo Naukowe.
- Kożuszniak, B. (2010), "Kluczowa rola psychologii we wspieraniu i stymulowaniu innowacyjności," [in:] B. Kożuszniak (ed.), *Psychologiczne uwarunkowania innowacyjności*, Vol. 2(35), Katowice: Wydawnictwo Uniwersytetu Śląskiego, pp. 21-50.
- Mathisen, G.E., Martinsen, O.M., Einarsen, S. (2008), "The relation between creative personality composition, innovative team climate and team innovativeness: An input process – output perspective," *The Journal of Creative Behaviour*, Vol. 42, pp. 13-31.
- Nemeth, C.J. (1986), "Differential contributions of majority and minority influence," *Psychological Review*, Vol. 93, pp. 23-32.
- Nęcka, E. (2001), *Psychologia twórczości*, Gdańsk: Gdańskie Wydawnictwo Psychologiczne.
- Nęcka, E. (2005), *Inteligencja. Geneza, struktura, funkcje*, Gdańsk: Gdańskie Wydawnictwo Psychologiczne.
- Oldham, G.R., Cummings, A. (1996), "Employee creativity: Personal and contextual factors at work," *Academy of Management Journal*, Vol. 39, pp. 607-634.
- Parzefall, M.-R., Seeck, H., Leppanen, A. (2008), "Employee innovativeness in organizations: A review on the antecedents," *Liiketaloudellinen Aikakauskirja, Finnish Journal of Business Economics*, Vol. 2, pp. 165-182.
- Patterson, F., Kerrin, M., Gatto-Roissard, G. (2009), *Characteristics and Behaviours of Innovative People in Organizations. Literature Review*, A paper prepared for the NESTA Policy & Research Unit (NPRU), London: NESTA, pp. 1-63, http://www.nesta.org.uk/sites/default/files/characteristics_behaviours_of_innovative_people.pdf [accessed 1.06.2014].
- Potocki, A. (1992), *Wybrane metody humanizacji pracy*, Wrocław: Ossolineum.
- Runco, M. (2004), "Creativity," *Annual Review of Psychology*, Vol. 55, pp. 657-687.
- Sohn, S.Y., Jung, Ch.S. (2010), "Effect of creativity on innovation: Do creativity initiatives have significant impact on innovative performance in Korean firms?," *Creativity Research Journal*, Vol. 22(3), pp. 320-328.

- Stum, J. (2009), "Kirton's adaptation-innovation theory: Managing cognitive styles in times of diversity and change," *Emerging Leadership*, Vol. 2(1), pp. 66-78.
- Trompenaars, F. (2010), *Kultura innowacji*, Warszawa: Oficyna Wolters Kluwer.
- Widerszal-Bazyl, M. (2003), *Stres w pracy a zdrowie, czyli o próbach weryfikacji modelu Roberta Karaska oraz modelu: wymagania-kontrola-wsparcie*, Warszawa: CIOP-BIP.
- Zawadzki, B., Strelau, J., Szczepaniak, P., Śliwińska, M. (1998), *Inwentarz osobowości NEO-FFI Costy i McCrae. Adaptacja polska. Podręcznik*, Warszawa: Pracownia Testów Psychologicznych Polskiego Towarzystwa Psychologicznego.