

TEAM INNOVATIONS

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Purpose: The aim of the paper is to analyze the team innovation processes in industrial enterprise.

Design/methodology/approach: Critical literature analysis. Analysis of international literature from main databases and polish literature and legal acts connecting with researched topic.

Findings: The publication concentrate on problems connected with various aspects of team innovations. In the paper we presented the system of interactions which exist between negotiators in team especially from innovativeness point of view. Also we analyzed problems connected with team creativity and boasting it because team creativity is indispensable to boast innovativeness in industrial company. On the basis of the literature analysis it can be pointed out that the satisfying level of innovativeness can be achievable without appropriate level of creativity. To enhance it within company we need to give the people enough freedom and appropriate leadership adjusted to the culture of people. Also it is important to integrate creativity concepts and methods enhancing creativity into day-to-day operation of the organization. The organization should careful plan the division of the resources between innovative tasks.

Originality/value: Detailed analysis of all subjects related to the problems connected with team innovation in an industrial enterprise.

Keywords: Industry 4.0; innovation, industrial enterprise, team innovation, research and development.

Category of the paper: literature review.

1. Introduction

The issues of innovation are very important for the modern economy (Wolniak, 2016; Czerwińska-Lubszczyk et al., 2022; Drozd, Wolniak, 2021; Gajdzik, Wolniak, 2021, 2022; Gębczyńska, Wolniak, 2018; Grabowska et al., 2019, 2020, 2021). In this paper there is an analysis of problems connected with preparing and enhancing team innovation in today economy.

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2. Team negotiations

We can distinguish four interaction processes in teams that promote team innovations:

- exchanging innovation,
- learning,
- motivating,
- negotiating.

We have described those function in the table 1.

Table 1.
Interactions in team negotiations

Interaction	Characteristic
Exchanging negotiations	Exchanging information refers to the accumulated individual inputs of information, knowledge, and experience necessary for team functioning. Exchange of information expands knowledge and experience resources available to team members, improves the analysis of the problem, and allows better assessment of the usefulness of potential solutions all of which are important in regard to innovation. In implementing innovation, information exchange leads to a more complete and accurate specification of the needs of the different parties, to interventions and solutions that suit the characteristics of the organization, and to more realistic expectations. Nevertheless, information exchange is not sufficient for innovation, because it does not ensure changes in subsequent behavior.
Learning	The learning function is defined as the extent to which team members overtly reflect on the team's objectives, strategies, and processes for the purpose of creating a team-level intellectual product that initiates change. Empirical evidence indicates that organizational and collective learning is a prerequisite for the development and adoption of innovation at the organizational level. Although not directly investigating innovation, research has revealed that team learning results in improvements in detecting and identifying problems, scanning the environment, and producing creative solutions, all of which might be crucial to team innovation.
Motivating	Motivating focused on the cognitive processes whereby team members become committed to their innovative goals. The issue of motivating innovation is complex. Empirical research has indicated that external rewards can often serve to diminish creativity. Hence, in describing the motivation of those involved in an innovation process, process-oriented motivation theories offer more support than those that are mostly based on reinforcement or oriented to the content of motivation. This approach led researchers to focus more on the cognitive motivating processes that foster innovation, as suggested by Locke and Latham's goal-setting theory. In the context of innovation, research findings have emphasized the role of team participation in goal setting to establish a high level of acceptance of goals, to overcome resistance, and to generate commitment to team projects.
Negotiating	The negotiating function constitutes the political dimension of team interaction and is evident when team members strive to express their opinions, which allows mutual influence. Although not directly examining the negotiating process, research has shown that teams exposed to minority views prove to be more original and use a greater variety of strategies to invent novel solutions. In addition e can say that allowing opposing opinions within teams promoted mutual influence of team members and, consequently, team effectiveness and innovation.

Source: On basis: (Drach-Zahawy, 2001).

3. Attributes of innovations

The enhancing innovative solution in teams depends on the attributes of innovations – we described them in the table 2. Those attributes have an impact on the innovativeness and dissemination of innovative solutions in teams.

Table 2.
Attributes of innovations

Attribute	Characteristic
Relative advantage	Potential adopters want to know that an innovation will be worth the cost, in terms of time, effort, and money. Incentives and rewards can play a role by increasing the relative advantage or reducing the costs of implementation.
Compatibility	Closely related to relative advantage is compatibility—not only with professional activities but also with the values and beliefs that affect an instructor's behavior.
Complexity	complexity is negatively related to the rate of adoption, and once again his insights are consistent with experiences in the dissemination of innovations.
Trialability	This quality refers to the degree to which an innovation can be tried experimentally. In innovations generally, trialability seems more important among early adopters.

Source: On basis: (Gafney et al., 2018; Adair, 2007; Sloane, 2006).

4. Boasting team creativity

When we organize anything we can impose upon it sequential or spatial form. People or things are put together; they are fitted into their proper place in relation to one another (Ali et al., 2021; Habek, Wolniak, 2013, 2016; Hys, Wolniak, 2018). The end result of this process is an organization: a complex structure of independent and subordinate elements whose relations and properties are largely determined by their function in the whole (Liu et al., 2021; Jonek-Kowalska, Wolniak, 2021, 2022; Jonek-Kowalska et al., 2022; Kordel, Wolniak, 2021). The main important factors in the process of enhancing teams creativity are described in the table 3. We can distinguish following key point how to boast team creativity within an organization (Adair, 2007; Kwiotkowska et al., 2021, 2022; Orzeł, Wolniak, 2021, 2022; Ponomarenko et al., 2016; Stawiarska et al., 2020, 2021; Stecula, Wolniak, 2022; Olkiewicz et al., 2021):

- Order banishes chaos. Organizing reduces confusion and introduces formality into relationships. But chaos, confusion and informality are the seedbeds of creativity.
- Organizations can delegate or subcontract the work of innovation, in the form of research and development, to specialist units. They can also seek to transform themselves into innovative organizations. These options are not mutually exclusive.

- Any organization falls somewhere on the Creative/Productive continuum. It is important to establish both where you are now and where you want to be on that continuum, for it affects your whole understanding of leadership and management.
- Innovative organizations do not happen by chance. They are the end products of good leadership and management. The essence lies in getting the balance right between freedom and order, between the anatomy of the parts and the integrity of the whole.

Innovative organizations outside your field of work may hold secrets for you. Suspend your natural impulse to discard the experience of others in different walks of life as irrelevant to your purposes. In this context you can learn from other organizations that may have a much higher requirement for creativity than your own. How do they go about organizing themselves?

Table 3.
Factors enhancing team creativity

Attribute	Characteristic
Order and freedom	Now serious creative thinking demands a great deal of freedom. The less constraints you are under – subjective or objective – the better. Although creative thinking is much more of a social activity than most people imagine, creative thinkers are often markedly individualistic. They can be rather solitary, more by necessity than temperamental preference. They need fairly long periods of time on their own. Nor can they always predict when they will need to be alone with their thoughts. This is why creative thinkers do not tend to make good organizational men or women.
Integrating creativity into industry	Good communication between researchers within a large group of companies is essential, for many creative developments. To separate the functions of creating and developing new products or services from the functions of production, marketing and accounting – in the sense of having them take place in different organizations or sub-organizations within the group – does therefore offer to solve a lot of problems. It still leaves the possibility of the more commercial sides of the organization employing managers and work people who can suggest detailed and more incremental improvements in existing products and services, and actively encouraging them to do so.
Getting the balance right	There is a general trend for research organizations to become more like businesses, while at the same time industrial organizations are beginning to take on a more creative and innovative role. There are, of course, natural limits to both these processes which wise leaders will recognize and respect. No organization today is wholly creative or completely productive. The latter cannot be the case; partly because organizations employ people, and people by their nature cannot avoid thinking, and thinking in turn leads to new ideas; and partly because an organization which solely interested itself in reproducing existing goods and services, regardless of technological or market change, would soon – as we have seen – cease to exist.
Leadership for innovation	It follows from this analysis that the direction of research or ideas-oriented institutions does call for the distinctive qualities of leadership, coupled with management knowledge and abilities, especially in the areas of management finance and marketing (remembering that you have to market your services within a large group or organization as well as to outside potential clients).

Source: On basis: (Adair, 2007).

Successful gig organizations plan for innovation and allocation of resources to enhance innovativeness should fulfil the following points (Sloane, 2006; Han et al., 2021; Wolniak, Sułkowski, 2015, 2016; Wolniak, Grebski, 2018; Wolniak et al., 2019, 2020; Wolniak, Habek, 2015, 2016; Wolniak, Skotnicka, 2011; Wolniak, Jonek-Kowalska, 2021; 2022):

- They identify outmoded and ageing products and processes, and schedule them for replacement. These organizations recognize that everything in business has a life cycle, and the end of a life cycle has to be anticipated so that replacements can be planned. Even systems that are running successfully and profitably today must be examined to see if it is time to replace them with something better. It is much better to make your own products obsolete by introducing superior versions than to find that the competition has beaten you to it.
- They set targets and deadlines in each area and department for the generation of new initiatives in order to replace the items selected as outworn. The general rule is that three new initiatives should be started for each new process needed. A one in three success rate for trials of new products is a good batting average, so it is best to generate a large list of ideas and then whittle down to at least three to be prototyped. Each innovation project should have a project plan, with a deadline for customer feedback and a planned date for a go/no go decision.
- They measure progress against targets for individual projects and for the organization as a whole. They monitor key metrics, including how many new products or processes have been implemented in the last year, what proportion of revenues are coming from new products or services, how many new launches are scheduled for the coming period, and so on. They also try to assess more subjective parameters, such as who is seen as the innovative leader in the industry, and how the organization compares to its competitors in innovation in the marketplace.
- They systematically search for sources of new ideas, from trends in the technology and the industry, from unexpected successes in the marketplace, from customer feedback and from input from employees at all levels.
- They apply gating processes to projects and prototypes to check that they meet their milestones. They ensure that projects pass marketing, technology and financial hurdles in order to progress and have additional financial and development resources released to them.

When you want to have a good team of innovative peoples a very important thing is a proper recruiting system. Recruiting creative people to the company is not easy (Hu et al., 2021; Sułkowski, Wolniak, 2015, 2016, 2018; Wolniak, Skotnicka-Zasadzień, 2008, 2010, 2014, 2018, 2019, 2022; Wolniak, 2011, 2013, 2014, 2016, 2017, 2018, 2019, 2020, 2021, 2022). You should look carefully for the particular traits and behaviour of people to achieve the sufficient level of creativity and innovativeness within the organization. We can distinguish

following list of main characteristics to look for during interviews of potential employees (Adair et al., 2007):

- Superior general intelligence. That includes analytical powers, as well as the ability to store and recall information.
- A high degree of autonomy, self-sufficiency and self-direction.
- Relatively little talkativeness or gregariousness. Creative thinkers tend to be ambivert: a balance of introvert and extrovert. If anything they tend towards introversion, although they need contacts with stimulating colleagues.
- Marked independence of judgement. They are resilient in the teeth of group pressures towards conformity in thinking. They see things as others do, but also as they do not.
- They often express part-truths vividly. It is their way of drawing attention to the unobserved or unrecognized. They may sound unreasonable. But remember George Bernard Shaw's provocative comment: 'The reasonable man adapts himself to the world: the unreasonable one persists in trying to adapt the world to himself. Therefore all progress depends on the unreasonable man'.
- A broad range of interests. A special interest or motivation in the kind of 'wagering' which involves pitting oneself against problems or opportunities in which one's own effort can be the deciding factor. 'There is no greater joy in life,' said the inventor Sir Barnes Wallis, 'than first proving that a thing is impossible and then showing how it can be done'.
- Sustained curiosity and powers of observation. Often they are good listeners.
- Dedication and commitment to hard work.
- A truly creative individual lives closer to his or her purposeful unconscious mind than other people. He or she listens to the truth from within, in the form of intuitions. They inhabit more the world of imagination, reverie and fantasy.
- They are able to hold many ideas – often apparently contradictory ones – together in creative tension, without reaching for premature resolution of ambiguity. Hence they can sometimes reach a richer synthesis.

In the process of creating innovation it is important to engineer the complex system of measuring the team performance towards innovations (Meinel, Leifer, 2020; Hu, Zheng, 2021; Gajdzik, Wolniak, 2023). This team performance is a complex phenomenon that involves person, behaviour and environment parameters interacting with and influencing each other over time (Sonalkar et al., 2018). Besides mentioned points it is important to use following points to increase the level of team innovativeness within your organization (Sloane, 2006):

- Hold meetings that are focused on opportunities rather than problems. Communicate the benefits to the whole organization of investing in innovation.
- Set targets for innovation in products, services and processes.
- Identify existing products and processes that are scheduled for retirement.

- Target three new initiatives for every innovation needed.
- Set up cross-functional teams with clear innovation objectives, and motivate them to be radical and take risks.
- Put prototype implementation into a separate department or function (the ‘innovation incubator’) staffed by go-getters who have a good diversity of skills.
- Set goals and deadlines.
- Implement a gating procedure to evaluate ideas and prototypes using a system such as Stage-Gate (a trademark of R G Cooper and associates).
- Measure innovation performance for people, products and processes against targets. Put someone with clout and prestige in charge of innovation efforts.
- Encourage people to move laterally within the organization from department to department to cross-fertilize ideas and cultures.
- Put your best people on innovation projects, and ensure that such projects are seen as good for career development.

The conceptions of enhancing team innovativeness are very useful because of the increasing complexity of the scientific and technical innovations required to address social, economic, health, energy, defence, and others national problems (Bozeman, Boardman, 2014). In the case of strategic approach to team management boasting innovativeness, senior executives must remember that (Russell, Shane, 2016; Mitchell et al., 2021):

- Every authorized program and project clearly supports an approved strategic objective of the organization.
- All significant innovations are achieved through application of the principles of project, program, and portfolio management.
- Each project’s risks are identified, evaluated, and managed using currently available methods and systems.
- All projects are evaluated, prioritized, and approved on the basis of the same corporate criteria.

5. Open and close innovations and team approach

The team management to create innovative environment should go towards open innovations (Lei et al., 2021). Open innovation is commonly seen in contrast to closed innovation (we compared them in the table 5). Closed innovation refers to an innovation model where a company develops, evaluates, test and commercialises only internal innovations using only internal resources and employees (Riedl, 2011; Ziegert, Dust, 2021; Mitchell, Boyle, 2021).

Table 5.
Close innovation versus open innovation

Close innovation	Open innovation
The smart people in our field work for us.	Not all the smart people work for us. We need to work with smart people inside and outside our company.
To profit from R&D, we must discover it, develop it, and ship it ourselves.	External R&D can create significant value; internal R&D is needed to claim some portion of that value.
If we discover it ourselves, we will get it to market first.	We don't have to originate the research to profit from it.
The company that gets an innovation to market first will win.	The company that gets an innovation to market first will win.
If we create the most and the best ideas in the industry, we will win.	If we make the best use of internal and external ideas, we will win.
We should control our intellectual property, so that our competitors don't profit from our ideas.	We should profit from others' use of our intellectual property, and we should buy others' intellectual property whenever it advances our own business model.

Source: (Riedla, 2011).

6. Conclusion

The publication concentrate on problems connected with various aspects of team innovations. In the paper we presented the system of interactions which exist between negotiators in team especially from innovativeness point of view. Also we analyzed problems connected with team creativity and boasting it because team creativity is indispensable to boast innovativeness in industrial company. On the basis of the literature analysis it can be pointed out that the satisfying level of innovativeness can be achievable without appropriate level of creativity. To enhance it within company we need to give the people enough freedom and appropriate leadership adjusted to the culture of people. Also it is important to integrate creativity concepts and methods enhancing creativity into day-to-day operation of the organization. The organization should careful plan the division of the resources between innovative tasks.

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