Emotional Infection of Management Infrastructure Projects based on the Agile Transformation

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Abstract. The article deals with the problems of emotional infection of the stakeholders of the infrastructure project in a crisis. In the process of managing innovative projects, managers try to model creative behaviour and are based on creative technologies. Emotional infection is considered as a social and psychological mechanism of transferring the mental mood of the manager to other stakeholders of the innovative project, emotional impact in the face of direct contact, and the inclusion of the individual in certain mental states that affect the effectiveness of management. The main object of creative technology is the manager or group, the task was to educate, educate and create the organization of new behaviour in adverse, deadly and aggressive external conditions. In times of crisis, the emotional behaviour of the project manager and his infection with the project team is exacerbated by external uncertainty. The stakeholder infection model is based on an understanding of the life cycle of the project manager, which is presented as a curve for personal changes of the manager of innovative projects and programs. Emotions are considered in content, reflecting the various aspects and meanings that caused them. To apply the psychophysiological formula for assessing the impact of the emotional state of the stakeholders of innovative projects, these influences have been transformed into a competent model for managing innovative projects. Examples of changes in the competence of the manager and the project team in the case of a wall and asthenic emotions are given.

Keywords: emotional infection, infrastructure project, creative behavior, agile transformation.

1 Introduction

The vast majority of human-created technologies are based on the imitation and copying of various natural processes and phenomena. Innovative technologies and projects are no exception. In management processes, teams try to model the creative behaviour of managers and build on the deep historical traditions of different cultures. Previously, the main subject of various innovative technologies was a separate manager or group, the task was to educate and create the organization of new behaviour in adverse, deadly and aggressive external conditions. The traditions of

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these schools cover various aspects of activity: philosophy, commerce, intelligence, diplomacy and politics. Due to the rapid development of information technologies, a new association has emerged, which is to use computer systems and networks more deeply in innovative activities: artificial systems, databases, processing of large amounts of data and emotional intelligence. The trend of such penetration is growing and expanding, so there is a need for a new organization of innovative activities with broad involvement of information technology and management of emotional intelligence.

Creatively, innovative thinking is the most valuable, open-ended part of human thinking that manifests itself in the form of certain emotions. The health of innovative thinking is a delicate balance between the order and the chaos of stakeholder behaviour. Behaviour is often manifested through a variety of emotions. Scientific advances in this field are limited and far from complete, but at the same time, several common features inherent in this process and the behaviour of innovative project managers can be distinguished. Mission (goal structure) is defined as the result to which the activities of managers are directed. The goals are arranged in a certain sequence, which regulates the rational and emotional activities of the manager. As soon as one of them is reached, a new one arises and so on until the final goal is reached. Each step towards the main goal has a local purpose. Therefore, thinking can rationally organize (profile) the mission. Such an organization serves to manage actions in an infrastructure project. Many goals and stages of their achievement are profiled in the form of a graph having the structure of a tree. The behaviour of a modern project manager is organized in such a way that thinking is the cause, and action is the consequence (think first, then do it), though it is often the other way around. The peculiarity and a priori uncertainty of the infrastructure goal is its new quality. In turn, the innovative qualities of the purpose of the concept are relative and depend on subjective evaluation, experience, erudition, emotional intelligence, the benevolence of expertise, public recognition.

Typically, infrastructure projects contain components of different nature, some of which are information technology. Therefore, agile transformation can become a driver in the implementation of infrastructure projects.

In times of crisis, the emotional behaviour of the project manager and his infection with the project team is exacerbated by external uncertainty in the creating of infrastructure projects.

The paper examines the model of emotional infection of stakeholders of infrastructure projects and programs in a crisis.

The purpose of the article is to formulate a model of emotional infection of stakeholders of infrastructure projects and programs in a crisis to form rational structures and management processes.

2 Theoretical Studies

Human consciousness contains and uses a wealth of data and knowledge. Human nature reveals the taste and needs to acquire new knowledge and apply it to behavior in new, circumstances and situations arise every minute. In general, intelligence can be modeled by a pair of sets, or a set of facts and rules, or methods of applying them

to achieve a goal. This model was called productive and was used in the early stages of artificial intelligence development [1, 2]. Examples of facts and rules: fact - work is paid; the rule is that if you do the job, you can be rewarded. Here, the rule is conditional: if a condition is met, then some action will occur. The rules establish the necessary sequence of cause and effect to achieve the intended consequence, that is, the result. The facts and rules have different complexity and are organized into a knowledge base. To achieve this goal, you need to be able to link complex sets of facts and rules. The mission of innovative projects is often unclear, so intermediate goals are also vague, if they are bound by fuzzy rules, the task of achieving such a goal is significantly complicated and unclearly achievable [2, 12, 19, 20]. This circumstance influences the emotional state of the manager and requires certain competencies to handle uncertainty in the context of emotional infection of stakeholders. This creates the conditions of creative risk. Such risks are critical in times of crisis when an innovative project is adversely affected by external factors [3, 4]. Here, it is almost impossible to abandon the simplification, the selection of the main, most essential features of the facts and rules and the rejection of minor ones [16, 17, 18].

In the study of the emotional component of the processes of managing innovative projects recognition was created by the psychophysiology PV Simonov [5] formula, in a short symbolic form represents a set of factors that affect the emergence and nature of the effects of emotions.

$$E = f\,(P * (In\text{-}Is)),$$

where E - emotion, its degree, quality and impact; P - the power and influence of the actual need; $(I_N\text{-}I_S)$ - assessment of the possibility of meeting the need based on innate and ontogenetic experience; *In* - information on cost, meeting the need; *Is* - information about existing assets that the manager actually owns.

This formula is not used to obtain specific quantitative values, but only to illustrate the very principle of the formation of positive or negative emotions of varying strength.

The factors listed above are decisive, necessary and sufficient, but a time factor should also be considered. Emotion can be either short-lived or long-lasting. At the same time, it is necessary to take into account the peculiarities of emotions and individual-typological features of managers of innovative projects. From the formula, it follows that the possibility of satisfying the need (comparing the values of IP and IT) influences the sign of emotion. A function that reflects emotions is the same as an evaluation function.

Emotional infestation is a social and psychological mechanism of transfer of mental mood to other people from one person or group of people, emotional influence in the conditions of direct contact and inclusion of a person in certain mental states.

Emotional contamination occurs in large open spaces, especially in unorganized communities, for example, in a crowd that can spread certain emotional states quickly. Most often, these conditions can be markedly enhanced by multiple reflections in the chain reaction scheme. However, unlike cognitive chain reactions, the emotional transmission is less conscious and more automatic.

Emotions are different in content, reflecting different aspects of the significance of their situations. To apply the psychophysiological formula for assessing the impact of

the emotional state of the stakeholders of innovative projects, we transform these influences into a competent dream model of managing infrastructure projects.

Consider the intensity of emotions in the implementation of infrastructure projects within the competence of the knowledge system P2M [2, 12]. Emotions may vary in intensity (strength). The stronger the emotion, the stronger its physiological manifestations. The intensity of emotion in each case is, of course, influenced by a large number of factors within the competence of managing infrastructure projects. In general, their contribution makes it possible to estimate Simon's formula.

Besides, the intensity of emotions may depend on the completeness and functional integrity of the central and autonomic nervous system of the project manager and team. Depending on the impact on the activity of the stakeholders of the infrastructure project emotions are divided into a wall (from the Greek. Έθένος - force) and asthenic (from the Greek. Ἀσθένεια - powerlessness). Stenic emotions stimulate active activity, mobilize human forces (joy, enthusiasm and others). Asthenic emotions weaken or paralyze forces (sadness, etc.).

Emotions are different in content, reflecting different aspects of the innovation project and the situations that caused them situations.

Consider how emotional infection of stakeholders in infrastructure projects is formed through the competency system of the P2M example [12].

Criteria for assessing competence in managing infrastructure projects and programs are determined based on a taxonomy consisting of 10 criteria [12].

Next criteria are the thinking criteria that are needed primarily to form a concept in program and project management.

Holistic (holistic) thinking.

Strategic thinking.

Integral thinking.

The criteria evaluate: the ability to think holistically to formulate a mission in order to create added value through penetration scenarios and to determine the intention to move from an "as is" model to an "as will" model; the ability to think strategically to execute a program or project in accordance with planned success based on the organization's added value, competitive advantage, consumer satisfaction, balanced social importance, etc.; integral thinking to represent the value of the program and to support its value, developed in the beginning, against the resistance of the environment. In defining these criteria, a system of memes is formed [18], which lays the foundation for emotional infection of stakeholders.

The following four criteria relate to the target behaviours required to successfully manage the concept of planning and executing projects and programs.

Leadership.

Planning ability (planning competence).

Ability to perform (competence of performance).

Coordination.

These qualities are necessary for the project team (program) to transform the strategy, mission and architecture of the project (program) into a conceptual plan, to organize the team and to implement the conceptual plan of the project (program). These competencies support the process of emotional infection.

The following three competency criteria complement the 7 criteria mentioned above.

Relationship Skills.
Focus on achieving results.
Self-realization.

These criteria focus on individual values, psychology and ethics. Criterion VIII evaluates communication skills, leadership ability and team members' motivation. Criterion IX is a behavioral model on which concentration on achievement is evaluated, while criterion X evaluates self-realization and self-discipline. These competencies are drivers of emotional infection.

The concept of a community project or its intellectual space emerged in the global development of management science. The project community includes members of the project team and other stakeholders, organically shapes the value of the project mission, and participates in the implementation of the project, using the combined competence of all members of the community. It is a virtual, motivational space in which the stakeholders devote themselves to the project, being in different geographical, cultural, specialized and organizational environments; and build interaction and collaboration within the project through an exchange of views on project content, planning, control and information engagement in the project. The possibility (or impossibility) of the project to create an active intellectual space significantly influences the project implementation.

When a project is implemented with the help of an international consortium, there are often misunderstandings and contradictions within it that are caused by cultural differences between project participants from different countries. If you do not work out the issues involved in overcoming such differences and finding a common language for the members of the project community, the risk of project failure can increase significantly.

In today's virtual project team, in which team members collaborate mainly virtually through electronic Internet networks, a common understanding of the project's goals and interest in working on it is the basis of communication. In this process, the ability to correct professional communication comes first. Regardless of the geographical, temporal or cultural environment to which project team members belong, in general, the configuration of the connections between them forms the essence of the intellectual space of the project.

Agile management methodology is focused on creating a balanced value in development information technology (IT) projects as the part of infrastructure program, not a planned schedule. The work is performed in the form of short cycles, instead of implementing a waterfall approach, and constant attention is paid to development and quality [12].

While there are framework models that provide some direction for the development, each organization has its interpretation of agile work. Agile working is a philosophy. It is the foundations that support such a philosophy. Instead of adopting agile methodologies in transition organisation, people become Agile and this requires a fundamental change in thinking and leadership. Thus, even plan-oriented projects can also benefit from agility [6].

Agility determines how the structure of the organizations themselves changes greatly. In this case, each form has its frame of reference or development paradigm. Modern organizations no longer share power from top to bottom, but associate it with specific roles in such a way that there is a significant level of correction. An example

is a transition to flat organizational structures with holocratic management. It is very often apply for development IT products. There are difficult for leaders who apply different development paradigms to share ideas. Therefore, the agile leader should be able to move freely between these paradigms [8].

Value creation, loss prevention and cost savings not stop at the boundaries of a team or organization. Agile executives know and take into account the context in which they function. Accordingly, compliance with laws and rules is a must for the leader. In addition to complying with laws and regulations, they are also aware of the interests of society [8].

Agile teams promote the culture and values in which participants enter into agreements with each other about how they will interact. They encourage individual members to adhere to this and do not always allow their interests to prevail.

An agile organization is a social network that in turn leads to self-observation. The composition of this network is dynamic, but people make clear agreements about how they work together. Agile leaders give direction to part of the network, but not as a helper, not as a ruler. They build relationships in which the other creates an understanding of what is happening around him or her to make his or her functioning online more valuable. This increases the social capital of an agile organization [8].

Agile is based on equality, autonomy and self-determination. Personal leadership of people in such an environment is critical to choosing direction, motivation, and encouraging people so that they can achieve the desired organizational goals in the development IT projects. The leader takes the position of assistant, whose interests are central to the group or organization. The leader does this primarily by setting an example and helping build relationships with, or work with, the people he leads. The degree of self-determination a team receives depends on their skills and abilities. Leadership quality is determined by the level of integration of specific team members to achieve project goals. An agile leader is one who proactively removes obstacles and allows teams to deliver value.

Four key principles: focus on customer satisfaction, foregrounding, teamwork, and focus on excellence, have been imported into project management and are the prevailing principles of intellectual project space [6, 7, 8]. Adherence to these key principles directs the efforts of the project team and assists them in creating new, unique management ideas and methods [9, 10]. For example, the desire of the project team to comply with the terms of the contract to avoid litigation and compromise with the counterparty can lead to both positive and negative results. However, the negative can be minimized if the intellectual space of the project works properly [11, 13, 14]. Good and balanced teams are a good example to follow and a lesson for colleagues in other projects.

The project stakeholders are:

- sponsor of the project (or otherwise the project owner);
- investors (if external project financing is used in the project);
- financiers;
- consultants of the project owner.

Not only members of the project team, but also other participants involved in the project in one way or another, including service companies, agencies responsible for forming a temporary staff, etc. - all of them is directly affected by the project product, or the project implementation process. The stakeholder is, therefore, a generic term

that defines all institutions, companies and individuals who are directly or indirectly affected by the project.

A project manager is a mission-oriented professional with the necessary authority to manage and integrate the project; its role is to detail the mission of the project on goals and objectives, to formulate a strategy for its implementation, and to form a project team consisting of experienced professionals to perform work on a project that has certain limitations and conditions for implementation.

The skills, models, and management techniques used in a project depend on whether conventional management methods can be used, or for maximum efficiency and effectiveness, eleven separate project management areas need to be applied.

During the implementation of the program, professionals from different fields of knowledge with different skills cooperate to achieve the mission of the program [15, 16]. The community is a space of partnership and competency, in which the professional competencies of the participants are concentrated, the competence of the team is formed, as well as the cooperation between professionals is encouraged to create a strong teamwork potential.

At the program level, the most important thing is to set up interfaces for interaction between organizations and program team members.

To form a harmonious community, the following rules must be followed:

1) mutual trust in the realization of common tasks: observance of social ethics, orientation on productive cooperation and commitment in work;

2) defining the context and principles of the program - an unequivocal interpretation of the mission, tasks, roles and professional terms within the program;

3) defining the program regulations - principles of program implementation, common professional or technical language, terms for communication and standards of implementation of business processes;

4) the availability of professional skills that are implemented in the work on the program;

5) space ("Ba") is a common space used by stakeholders to support their professionalism and engagement within the program, with a minimum set of rules of engagement.

Effective community management requires visibility, usefulness and novelty. For participants to feel the usefulness of the community, it should develop and present real and clear plans for the implementation of the program, quantitative indicators and methods of interaction. Besides, the community should be able to access the application's databases and databases at any time, from anywhere. Otherwise, it will be difficult to attract first-rate professionals to participate in the program.

The stakeholder infection model is based on an understanding of the life cycle of the project manager, which is presented as a Kuber-Ross curve for personal changes of the manager of infrastructure projects and programs (Fig. 1).

On this curve, we see the initial phase of change of effective activity within three steps - "shock, surprise, reflection", "insensitivity" and "denial". This is a short-term phase where the wall and asthenic stains are infected. These infections usually do not extend beyond the project management team. The second phase is related to a significant drop in performance. These are "blaming yourself and others," "panic and fear," "depression and danger." At this stage, an asthenic infection is formed that goes beyond the project management team.

The third phase involves the transition from asthenic to wall infection of the stakeholders of the innovation project. In this phase, the following factors are formed - "acceptance of ignorance", "testing and verification", "feeling of optimism, hope and restart", "opening, learning", "feeling of satisfaction" and "integration and new understanding" of the innovation project.

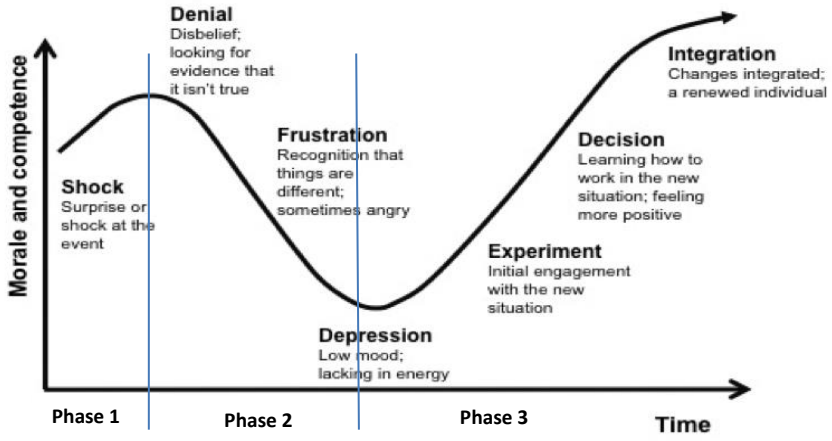

Fig. 1. The curve of personal changes of the manager of IT infrastructure projects and programs

The simulation results of the implementation of the IT infrastructure “Knowledge Base Creation Project at the Ukrainian Ministry of Finance” are shown in Table. 1 and Table. 2. At the same time, "score 1" was considered as an assessment of the current state of the innovation project before infection, "score 2", after infection of the project stakeholders. Key competencies for creating intelligent program support and stakeholder engagement for infrastructure projects are Strategic Thinking, Integral Thinking, Leadership, Coordination, Communication Skills (provided by information systems, databases and knowledge), as well as motivated, professional initiatives.

Table 1. Assessment of changes in the competence of the manager and team of the project with "asthenic emotions"

№	Criterion name	Score 1	Score 2
1	Holistic (holistic) thinking	6	2
2	Strategic thinking	5	3
3	Integral thinking	5	3
4	Leadership	6	3
5	Planning ability (planning competency)	7	6
6	Ability to perform (competence of execution)	7	6
7	Coordination	6	3
8	Relationship skills	5	4

9	Focus on achieving results	6	4
10	Self-realization	6	4

The results of the assessment of changes in the competence of the manager and team of the project with "asthenic emotions" are shown in Fig. 2.

The chart of changes in the level of competence of managers of IT projects (Fig. 2) shows significant drop incompetence in the context of the influence of asthenic emotions. In this case, the coefficient calculated as *K = (Score 1)/(Score2)* in this case is equal to 1.55, which indicates the negative impact of infection on the application of the competence of the project manager.

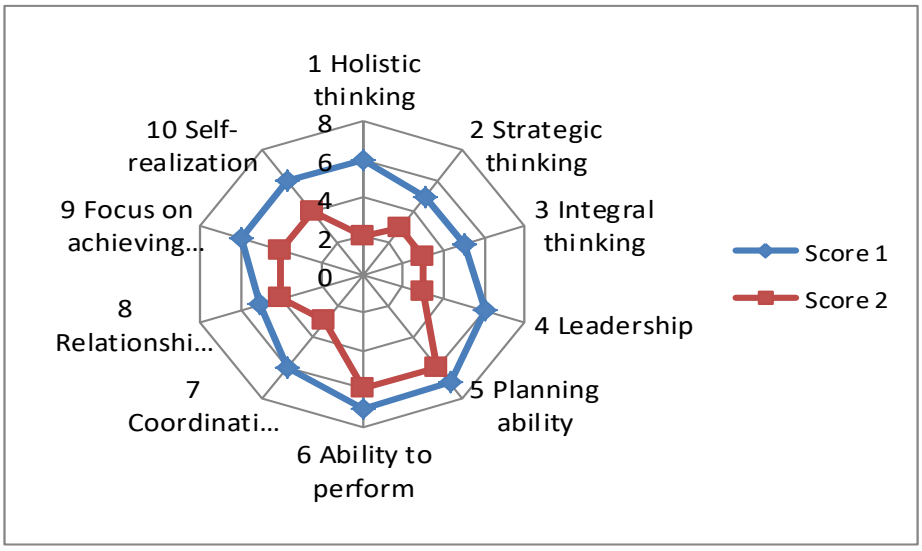

Fig. 2. Assessment of changes in the competence of the manager and team of the project with "asthenic emotions"

The graph of changes in the level of competence of managers of IT infrastructure projects (Fig. 3) shows significant increase incompetence in the context of the influence of wall emotions.

In this case, the coefficient *K* is 0.63, which indicates the positive impact of stakeholder infection on the competence of the innovation project manager.

Table 2. Assessment of changes in the competence of the project manager and team with "stenic emotions"

№	Criterion name	Score 1	Score 2
1	Holistic (holistic) thinking	5	8
2	Strategic thinking	5	9
3	Integral thinking	4	7

4	Leadership	6	9
5	Planning ability (planning competency)	6	8
6	Ability to perform (competence of execution)	6	8
7	Coordination	56	9
8	Relationship skills	5	8
9	Focus on achieving results	5	8
10	Self-realization	5	9

The application of the proposed model and the approach to assessing the competencies of the manager and team of the innovation project is conceptually understandable and fully proven as to the adequacy of the model.

Fig. 3. Assessment of changes in the competence of the project manager and team with "stenic emotions"

Conclusions

Development of an emotional infection model of stakeholders of infrastructure projects and programs in crisis conditions allows specifying the project implementation trajectories in the conditions of internal and external environment crisis.

The results of modelling in the implementation of an infrastructure Knowledge base creation project at the Ministry of Finance determined that the key competencies for creating intellectual support for infrastructure projects and stakeholder infection are strategic thinking, integrated thinking, leadership, coordination, communication skills

systems, databases and knowledge) as well as motivated, proactive and professional leaders of the program team.

Further research should be conducted in the areas of analysis of all competencies of IT project managers, including groups of strategic and practical competencies by model. In doing so, it would be necessary to investigate the differences in the patterns of flexible project leaders and heads of organizations for different project teams to create information and communication technologies and training systems within such technologies.

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