REFERENCES

1. Laurer A., Hoffman E.J., Russel J.S., Cameron W.S. What successful project managers do, IEEE Eng. Manage. Rev, 2015, Vol. 43, no. 2, pp. 77– 84.
2. Custoic, E. From engineer to manager, mastering the transition: Leadership qualities, Ibid., Vol. 43, no. 4, pp. 20–22.
3. Thomas, J. Mengel T. Preparing project managers to deal with complexity, Advanced project management education, Ibid, 2014, Vol. 42, no. 1, pp. 57–72.
4. Malyi M. Kak sdelat' Rossiyu normal'noi stranoi [How to make Russia a normal country], St. Petersburg: Dmitrii Bulanin, 2003. 333 P. (In Russ.)
5. Dul'zon A.A., Vasil'eva O.M. Sistema samootsenki i otsenki kompetentsii nauchno-pedagogicheskikh kadrov [Competence (self)assessment interactive system of Tomsk Polytechnic University academic staff], Vyssh. obrazovanie v Rossii [Higher education in Russia], 2014, no. 5, pp. 61–72.
6. Kerzner H. Project management: a systems approach to planning, scheduling and controlling, New York: John Wiley, 7th ed., 2001. 1223 p.
7. El'-Marashli, Abdel'-Fattakh Istoricheskie zametki na temu: Upravlenie proektom kak ono ponimalos' v drevnikh egipetskikh proektakh [Historic notes on project management as it was in the ancient Egyptian projects] Mir upravleniya proektami [The world of project management, collection of articles edit. By Reshke, Kh. Shelle, Moscow: Alans, 1994, pp. 213–228.
8. Imkhotep – pochitali, kak boga [Imkhotep was honored as the God [Electronic resource], 2010–2016, URL: http://piramidavorever.ru/arhitektory-piramid/71-imhotep-pochitali-kak-boga.html, free, Title from the screen (Accessed 11.05.2016). (in Russ.)
9. Kurchatov Igor' Vasil'evich [Elektronnyi resurs], Wikipedia, free encycl., URL: https://ru.wikipedia.org/wiki/%D0%9A%D1%83%D1%80%D1%87%D0%B0%D1%82%D0%BE%D0%B2,_%D0%98%D0%B3%D0%BE%D1%80%D1%8C_%D0%92%D0%B0%D1%81%D0%B8%D0%BB%D1%8C%D0%B5%D0%B2%D0%B8%D1%87, free, title from the screen (Accessed: 11.05.2016). (in Russ.)
10. Beriya, L. P. Moe politicheskoe zaveshchanie [My political goodwill], Moscow: Eksmo Publ., 2012. 512 p. (in Russ.)
11. Korolev Sergei Pavlovich [Elektronnyi resurs], Wikipedia: free encycl., URL: https://ru.wikipedia.org/wiki/%D0%9A%D0%BE%D1%80%D0%BE%D0%BB%D1%91%D0%B2,_%D0%A1%D0%B5%D1%80%D0%B3%D0%B5%D0%B9_%D0%9F%D0%B0%D0%B2%D0%BB%D0%BE%D0%B2%D0%B8%D1%87, free, Title from the screen, (Accessed: 11.05.2016). (in Russ.)
12. Tupolev Andrei Nikolaevich [Elektronnyi resurs], Wikipedia: free encycl., URL: https://ru.wikipedia.org/wiki/%D0%A2%D1%83%D0%BF%D0%BE%D0%BB%D0%B5%D0%B2,_%D0%90%D0%BD%D0%B4%D1%80%D0%B5%D0%B9_%D0%9D%D0%B8%D0%BA%D0%BE%D0%BB%D0%B0%D0%B5%D0%B2%D0%B8%D1%87, free, Title from the screen, (Accessed: 11.05.2016). (in Russ.)

UDC 378

Dependence of Interdisciplinary Project Management on Difference Between Corporate Cultures

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The article discusses the influence of corporate culture on a large interdisciplinary project organization. In particular, the case when large organizations involved in a project have a vertical linear structure and unique corporate culture. The article describes the project "The opening of the research and educational center "Modern manufacturing technologies" as an example.

Key words: interdisciplinary projects, management, corporate culture, networking.

The world is rapidly changing due to development of new technologies. It primarily influences the management sphere. Nowadays, the management models which did not exist 50 years ago are used, the management theory itself appeared only in the middle of the previous century and since then has been developing at ever evolving pace.

For instance, to develop innovations a company needs a special reliable environment where one can promptly exchange ideas, thoughts, and knowledge. Besides, one of the premises for development is that in modern science the interdisciplinary issues are becoming more topical (biology, economics, philosophy, physics, etc.). Interdisciplinarity and cooperation are those keys to success for business development [5]. Thus, innovative developments in such spheres as medicine and IT do not surprise anybody, but nowadays, such sphere as bioinformatics (a discipline at the interface of mathematics, IT, and medicine) is being developed. The experts of this sphere process and analyze large amount of data in the medical laboratories, develop software to handle information, since ordinary medical professionals fail to process such a large amount of data.

Hence, it is clear that interdisciplinary projects are under development. **Interdisciplinary projects** (projects based on network cooperation) are projects uniting efforts and resources of several companies-partners on mutually beneficial terms to achieve innovative results [5].

For example, one of the interdisciplinary projects implemented in National Research Tomsk Polytechnic University (TPU) is "The arrangement of the research and educational center 'Modern manufacturing technologies' in Institute of High Technology Physics (IHTP), TPU.

The functions of "Modern manufacturing technologies" center are to develop and implement additive technologies of domestic production. The center makes complete production cycle of additive technologies: from ideas of new material development to investigation of final product. The developed technologies are demanded by aviation and space, automobile, machine-tool and ship-building industries, chemical production and nuclear engineering [6].

The project managers are both research-educational institutions, research institutes and large corporations: Institute of High Technology Physics (TPU), Institute of Strength Physics and Materials Sciences (SB RAS), All-Russian Scientific Research Institute of Aviation Materials, S.P. Korolev

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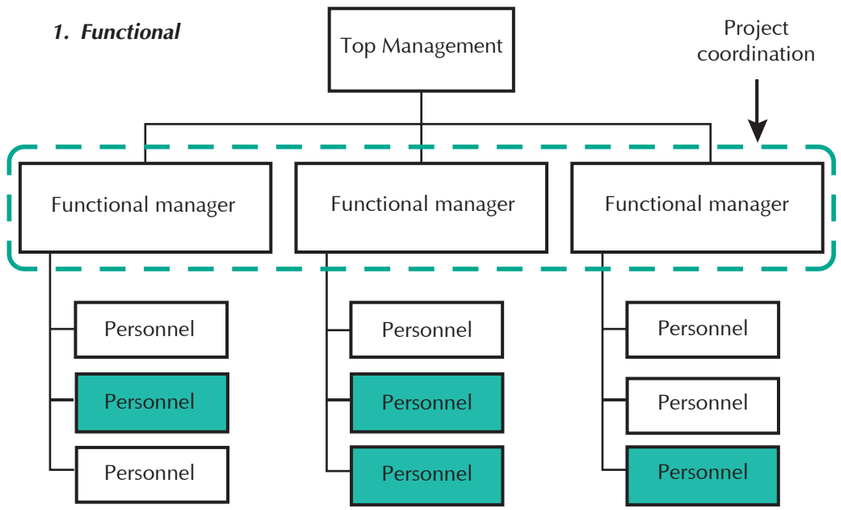
Rocket and Space Corporation "Energia", JC "United engine corporation", Department of Technology of Organic Substances and Polymer Materials and Department of Laser and Lighting Engineering (TPU) and others.

As it can be seen, the employees (in total, about 16 workers) involved from different institutions (from institutes of SB RAS, TPU departments, newly-employed staff from business companies) work in the center.

Every company or organization involved in the project has its peculiarities, its own corporate culture. Therefore, one of the major challenges is the difference in corporate cultures of participating companies. The former technologists accustomed to work in factory environment under tight time-restrictions, cannot cooperate with university researchers postponing the problem solution for an indefinite time period. Besides, the cooperation is not often established due to relative isolation of research teams, differences of cultures and traditions, lack of understanding the benefits of cooperation, and, as a consequence, reluctance to cooperate. In the course of traditional project6 it is possible to arrange a number of strategic workshops and meetings to establish common goals. Therefore, when performing such projects selection of personnel ready for cooperation is one of the key challenges on the way to success. In addition, very narrow staff specialization does not allow them to communicate in one professional language (chemists, programmer, physicists etc.). It can result in misunderstanding, which is managed by a special group within the project and, consequently, lead to absence of team spirit [2].

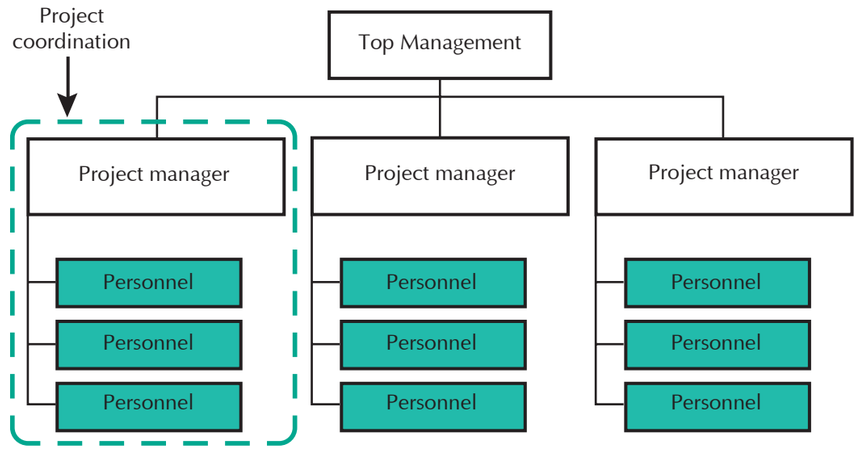
How does corporate culture influence the management of interdisciplinary project? To answer this question, one should know the different types of management structures. (Fig. 1-3).

Fig. 1. Functional management structure



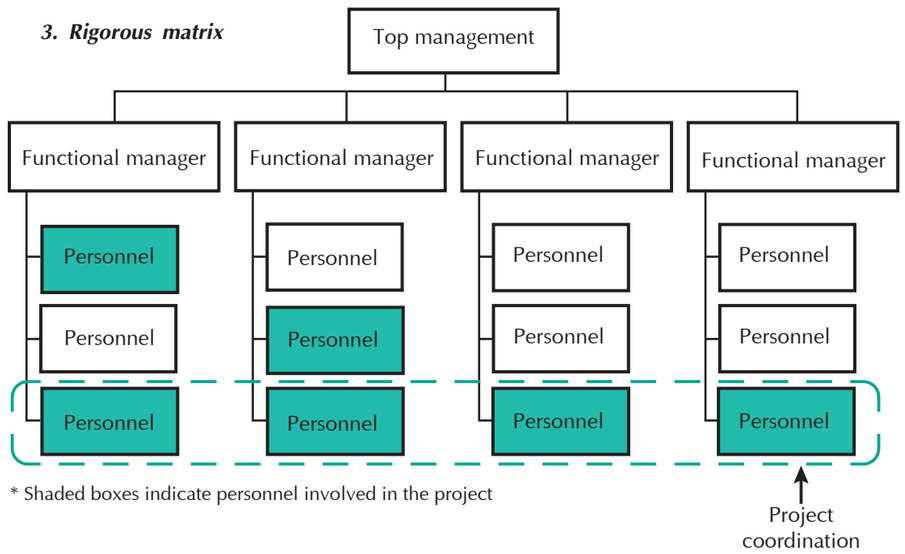
* Shaded boxes indicate personnel involved in the project

Fig. 2. Project organizational structure



* Shaded boxes indicate personnel involved in the project

Fig. 3. The example of organizational structure – rigorous matrix



* Shaded boxes indicate personnel involved in the project

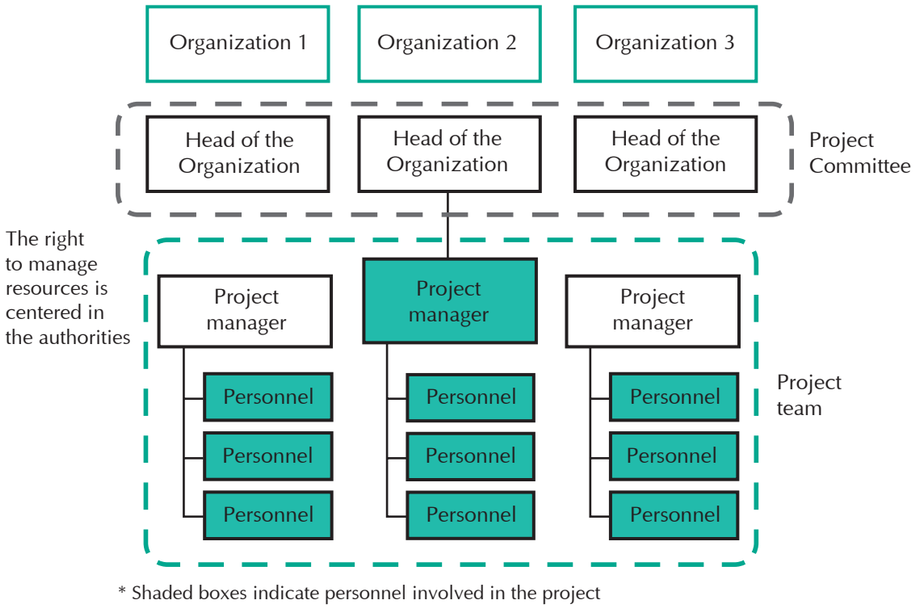
Performing the projects in the functional structure company there is a sufficient disadvantage: if a manager is appointed in one of the departments, but a project team consists of players from different departments, many problems have to be solved addressing directly to the functional manager who, in his/her turn, has to apply to the functional manager of another department. Only after that the decision is taken at the level of personnel. As a result, in such an organization structure much time is spent not on teamwork, but on solution of some bureaucratic problems via functional managers, and coordination of some issues may take too much time.

Project organizational structure is, to some extent, ideal or the most appropriate to implement interdisciplinary projects. Within the organization, a project manager is appointed. He/she has a direct supervision over project personnel, distributes the tasks. The personnel are involved into a definite project. Decisions are taken effectively. An intermediate decision is a rigorous matrix where there is a functional manager who performs definite blocks of job and supervisor of project managers who provides administrative support.

In this structure a project manager has more influence and control as compared to that in the functional structure. It should be noted that most structures, such as TPU, Rocket and Space Corporation "Energia" are of functional type. When we are in the frame of one structure, we have a number of challenges when performing project work. They are conditioned by the fact that structure of the organization is not often fully adjusted to the network cooperation. The process becomes even more complicated when we deal with several organizations.

Let us consider the project structure as an example, in which organizations implement interdisciplinary project (Fig. 4).

Fig. 4. Organization structure of interdisciplinary project



* Shaded boxes indicate personnel involved in the project

The companies implement project using a united pool of resources. The scheme includes heads of organization that are a part of in Project Committee and are project managers. Moreover, one of the organizations takes the primary responsibility in managing, the main project manager is selected, he has personnel involved in the project. The other organizations select their project managers from the organizations with delegated authorities and competencies, possessing required resources – a project team. The rights to manage resources and take decisions are given to top management, i.e. the Project Committee. Therefore, main project manager does not have an authority to manage resources of two neighboring organizations. To manage the resources, he has to appeal to the project manager of his organization for project manager, in his/her turn, to discuss the topical issues with the organizations-neighbours and give instructions to the project managers of neighboring organizations.

The chain is rather complicated and, what is more, the process described above takes much time which is highly valued nowadays. Project manager can easily manage his personnel, but to manage the personnel of the neighboring organization he has to deal with facilitators – project managers of this organization. The personnel do not have significant communicative resources to contact each other; therefore, knowledge management is often ineffective in the project [3].

Hence, it is seen that to implement project based on network cooperation is much easier that to do it alone. But there are some underdeveloped issues in network cooperation that impede successful project implementation.

In 2015 at the International Congress the urgent issues related to project management were discussed.

The Table 1 shows the principle criteria for successful project implementation which should be specially considered when organizing team network cooperation.

Professional community becomes remote from hierarchy, team, and control. They are replaced by authoritarianism limitation and interdisciplinary cooperation, flexible organization, and international supply chains [1].

When updating success criteria for interdisciplinary projects, one should take into consideration the corporate culture typical for an organization:

1. Clan (family) culture:

- Key value is team.
- Attention is paid to internal respect, friendship, traditions.
- Absence of official rules, the base of the culture is feelings and trust.

Table 1. Current trends in interdisciplinary project management

Yesterday	Today
■ Hierarchy development ■ Team and control ■ Cost management ■ Staff table management ■ Project process management	■ Authoritarianism limitation ■ Interdisciplinary cooperation ■ Flexible organization ■ Leadership ■ Expenditure ■ International supply chains ■ Time-table ■ Project process management

Such a culture is often common for educational institutions, including university departments.

2. Adhocracy culture. It typical features are:

- Promotion of innovation and initiatives.
- Flexibility in decision taking.
- Willingness to take risk.

As a rule, such a culture is typical for start-ups.

3. Market culture:

- Developed, as a rule, at the stage of company rapid growth.
- Focus on the result, success.
- Competitive workplace.

The main thing in the given type of culture is to gain result. Therefore, if a team player does not have required competencies for a current position, he/she can be promptly replaced as a result of developed competitive system. In market culture there is hardly any "family" relations. An employee not meeting certain criteria and requirements for the position he/she occupies is treated by the company and staff as an unwanted element since he/she is not ready for achieving results.

4. Hierarchical (bureaucratic) culture:

- Regulation development.
- Formal processes.
- High control level.

The examples of hierarchical culture are authority organizations which are most likely to have administrative control, subordination and strict execution of instructions [4].

Thus, we can see that the head of interdisciplinary project has not only problems with access and management of project resources, but also faces the challenges of different cultures and, therefore, the project team should strive to build homogeneous corporate culture.

One may take three organizations in different spheres as an example: a university with its clan culture, commercial company with its market culture, and administrative corporation having developed bureaucratic culture. Hence, bureaucratic culture implies power; management is performed via written orders and instructions. In clan culture there is more loyalty to the staff, one can often experience paternalism or the case when one turns a blind eye to some staff's faults. Market culture is characterized by significance of deadlines, budgets, effective commodity promotion. The project manager used to work in one culture cannot understand the rules of interaction taken from other cultures. If it is common for the bureaucratic culture to consider an important question within a week, giving a lot of documents, signatures, and seals in advance, for the market culture it is believed to be unacceptable to put off consideration of important question for a week. Hence, there is a conflict of behavior patterns in different cultures resulting in misunderstanding of project participants. As a consequence, there is lack of confidence among the staff that can lead to a conflict.

Implementing the interdisciplinary project it is necessary to arrange a project office where the key issue is origin of a person and multiculturalism of supervisor, as he/she has to be able to work in different cultures [7].

Based on the project of manufacturing technology research and educational center, one can distinguish the following lessons learnt:

- **Changeability of goal statements in the course of project.**

It is quite a typical environment for research projects. Project team seeks to develop a definite innovative technique, has no idea if it is possible to perform because many parameters are unknown as they are implemented for the first time.

- **Centralized procurement of required materials and equipment for the project.**

The best option is investments by all project organizations-participants in a particular structure. Subsequently, this source is used to fund the whole project. If the project manager does not have an access to funds, the project is drawn out due to difference in corporate cultures and procedures.

- **Analysis of staff's parallel performance of other projects and tasks.**

Apart from work under a particular project, university staff have additional responsibilities, such as teaching or research work. They can often run counter to the project.

- **Information support.**

It is difficult for managers to monitor the project, particularly, if project manager is not from this organization.

- **Development of integrated IT-communication service.**

It is necessary to involve all participants in the project. For this purpose, one needs to create an integrated information portal where project news will be published and all project participants will have access to it. In this case both team and Project Committee will keep the track of events.

All lessons learnt are also the requirements for project manager's competencies and, as a consequence, for the interdisciplinary project management.

REFERENCES

1. IPMA World Congress 2015 [Electronic resource]. News and Updates. Ipmawc 2015 Dot Com: website. [Ljubljana, 2016]. URL: http://ipmawc2015.com, free. Tit. from the screen (accessed: 10.04.2016).
2. Katukov D.D. Setevye vzaimodeistviya v innovatsionnoi ekonomike: model' troinoi spirali [Network cooperation in innovative economy]. Vestnik Instituta ekonomiki RAN[Bulletin of Economics Institute]. 2013. № 2. P. 112–121.
3. Mil'ner B.Z. Teoriya organizatsii [Theory of organization]. Moscow, INFRA-M, 2012. 848 p.
4. Persikova T.N. Korporativnaya kul'tura [Corporate culture]. Moscow, Logos, 2014. 286 p.
5. Smorodinskaya N.V. Smena paradigmy mirovogo razvitiya i stanovlenie setevoi ekonomiki [The change of world development paradigm and establishing network economy] [Electronic resource]. Ekonomicheskaya sotsiologiya [Economic sociology]. 2012. V. 13, № 4. P. 95–115. URL: https://ecsoc.hse.ru/data/2012/11/10/1249389629/ecsoc_t13_n4.pdf#page=95, free. Tit. from the screen (accessed: 19.05.2016).
6. Sovremennye proizvodstvennye tekhnologii [Modern production technologies] [Electronic resource]. Tomskii politekhnicheskii universitet: [Tomsk Polytechnic University]. Tomsk, 2015. URL: http://spt.tpu.ru, free. – (accessed: 13.02.2016).
7. Trufanov A.V. Vliyanie organizatsionnoi kul'tury na deyatel'nost' organizatsii [Influence of corporate culture on an organization activity]. Ekonomika, upravlenie, finansy: materialy III mezhdunar. nauch. konf. [Economics, management, finance: proceedings of the 3-d International Research Conference] (Perm, February. 2014). Perm: Merkurii, 2014. P. 150–153.