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Internal company interaction on example of management accounting system in innovative project

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Abstract

In the context of the implementation of numerous innovative projects around the world, one of the urgent tasks of the modern theory of management accounting is the harmonisation of business processes within systems of various specialization (management, accounting, design and production) that form the organisational structure of the company and are at its various levels. The problem is the inconsistency of the activities of economic and design departments in the process of forming the concept of an innovative product, due to the lack of a model of the mechanism of their interaction at various stages of an innovative project. The article describes the initial stage of testing the hypothesis of the existence of an optimal model of management accounting and cost design systems (design department) interaction model at various stages of an innovation project. Within the framework of the study, a number of tasks were solved, in particular: the task of choosing the most effective research method from the list of methods used by the authors of similar scientific papers; the task of describing the mechanism of interaction of the considered intra-organisational systems in the context of the implementation of an innovative project; the task of establishing the identity of problematic issues arising from the interaction of the management accounting system and the design service at various enterprises. The purpose of the study is to test the hypothesis of the existence of an optimal model of management accounting and cost design systems interaction. Within the framework of the study with the participation of a representative group of three enterprises, the results characterising the current state of the management accounting and cost design systems were obtained. In practice, the enterprises under consideration face problems related to the management accounting and cost design systems interaction model, which are often accompanied by a low level of development of business processes and project management. As a result of the conducted research, indirect confirmation of the proposed hypothesis of the study was obtained.

Keywords: innovative project, interaction model, machinery building, management accounting

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Внутрикорпоративное взаимодействие на примере системы управленческого учета в инновационном проекте

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Аннотация

В контексте реализации большого количества инновационных проектов по всему миру одной из актуальных задач современной теории управленческого учета становится гармонизация бизнес-процессов в рамках систем различной специализации (управление, учет, проектирование и производство), формирующих организационную структуру компании и находящихся на различных ее уровнях. Проблемой является несогласованность деятельности экономических и конструкторских подразделений в процессе формирования концепции инновационного продукта в связи с отсутствием модели механизма их взаимодействия на различных стадиях инновационного проекта. В статье описывается начальный этап проверки гипотезы о существовании оптимальной модели взаимодействия между системой управленческого учета и системой проектирования (конструкторского подразделения) на различных этапах инновационного проекта. В рамках исследования решен ряд задач, в частности: задача выбора наиболее эффективного метода исследования из перечня методов, используемых авторами аналогичных научных работ; задача описания механизма взаимодействия рассматриваемых внутриорганизационных систем в контексте реализации инновационного проекта; задача установления идентичности проблемных вопросов, возникающих при взаимодействии системы управленческого учета и конструкторской службы на различных предприятиях. Целью исследования является проверка гипотезы о существовании оптимальной модели взаимодействия между системой управленческого учета и системой проектирования. В рамках исследования с участием репрезентативной группы из трех предприятий получены результаты, характеризующие текущее состояние системы управленческого учета и системы проектирования. На практике рассматриваемых предприятий возникают проблемы, связанные с моделью взаимодействия системы управленческого учета и системы проектирования, которые часто сопровождаются низким уровнем развития бизнес-процессов и управления проектами. В результате проведенного исследования было получено косвенное подтверждение выдвинутой гипотезы исследования.

Ключевые слова: инновационный проект, модель взаимодействия, машиностроение, управленческий учет

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Introduction

Machinery building industry of the most economically developed countries is currently characterized by a tendency to implement large-scale international innovative projects of civil and defence machinery building. The most indicative of innovative projects in terms of understanding the reasons for exceeding planned budget is the project F-35 Joint Strike Fighter (JSF), Lockheed Martin Corporation (USA).[1] Analysis of information about the project allows us to assume that one of the reasons for exceeding planned project budget [van Helden and Alsem, 2016] is the problem of management accounting and cost design systems interaction within the company. This problem is most relevant at the stages of implementation of investment and operational phases of the project [Liu and de Bont, 2017; García-Canal et al, 2018].

In 2018, authors of this article and a team of colleagues has launched a non-commercial research project "COSTENGINEER.RU"[2], which aims to analyse current state of management accounting and cost design systems used in implementation of innovative projects of civil transport machinery building.

The results of the study allowed us to formulate the problem of research more accurately. Currently, a significant number of machinery building enterprises are actively carrying out a set of measures to reform the management accounting system [Pash, 2019] and design system. However, there is no proven methodology for analysing the interaction model of these systems, depending on the project's phase, which can be applied in practice by specialists of enterprises involved in the project today. In context of the above-mentioned problem, we hypothesize the existence of an optimal model of interaction between these two systems for each stage of innovation project. Within the framework of this hypothesis, we abstract from the practical conditions of project implementation and consider the ideal case: when the management accounting and cost design systems of an innovative project are identical to similar enterprise systems by which it is implemented. Thus, the mention of management accounting system [Gatti, 2018; Hiebl and Quinn, 2018] and enterprise design system is equivalent to the mention of these systems of innovation project. Here, the problems, arising in connection with the lack of preparation for introduction of innovations [de Souza et al, 2018], are presented as one of the consequences of imperfect training of the company's management. As part of the study on this issue the conclusions, indicating that the main effectiveness indicator of management is the possibility of effective innovation [Serrano-Bedia et al, 2018], have been obtained. In this regard, we assume that one of innovation effectiveness indicators is the efficiency of management accounting and cost design systems interaction within the company. Project research "COSTENGINEER.RU" has shown that the problem of innovation process different perception by management [Zhao et al, 2018] and specialists of design areas exists and can be formalized at their interaction modelling.

Methodology

Proposed method of analysis of interaction between management accounting system and design system is based on of such disciplines as: theory of organisation; theory of accounting (management, financial) accounting; theory of decision making; theory of systems; design theory and project management theory, and includes its elements. Therefore, when choosing research methods, the possibility of using research methods specific to these disciplines has considered in the first place. Application of the method proposed by the authors involves three stages of the research. Table 1 lists the stages of the research and the methods used in each of them.

[1] *Congressional Research Service* (2022), F-35 Joint Strike Fighter (JSF) Program, available at: https://fas.org/sgp/crs/weapons/RL30563.pdf (accessed 05.02.2022).

[2] Available at: https://costengineer.ru (accessed 05.02.2022).

Table 1

Stages of the management accounting and cost design systems interaction model creating

Stage	Purpose and description of the stage	Methods	Input data	Output data
I	*Objectives*: identifying main problems of the project in management accounting and design; control parameters set formation and formalisation of data on management accounting and cost design systems; intermediate conclusions formation *Description*: establishing contact with company under study; analysis of general information about the company and documents provided; meeting with management and employees in form of a lecture-dialogue; testing; results processing	*Theoretical*: formalisation; hypothetical-deductive method; abstraction and idealisation *General logic*: analysis; synthesis; system approach Interdisciplinary: expert survey; documents analysis; dialogue	General information about the company; information about management accounting systems and the list of methods used; information about organisational structure and cost accounting system	Set of control parameters for existing management accounting and cost design systems; test results for this set; conclusions on the preliminary stage of analysis

End of Table 1

Stage	Purpose and description of the stage	Methods	Input data	Output data
II	*Objectives*: assessment of the project team's actual capabilities in the field of management accounting system and design system interaction by implementation of a conceptual mini-project; interaction current model construction *Description*: implementation of the preliminary mini-project on basis of the company with specialists and management participation; results processing	*Empirical*: observation; comparison General logic: analysis; synthesis; generalisation; induction; analogy; modelling; system approach Interdisciplinary: ideographic method	Output of stage I, information about previously implemented projects	Formalised data of mini-project execution; current model of interaction between management accounting system and design system
III	*Objectives*: assessment of costs and risks in case of changes in model of interaction of management accounting system and design system, in the case of preservation of current model; management decision to change or save of interaction model *Description*: report's on performed work formation; presentation of report to company's management; support formation of a new model of interaction between management accounting system and design system	*General logic*: analysis, synthesis, generalization, induction, analogy, modelling, system approach	Output of stage II	Report in form of a presentation; a new model of management accounting and design systems interaction; reorganisation plan; report on reorganisation

Compiled by the authors based on the research materials

It should be noted that the technique proposed by the authors, on its principle, is a common case of modelling, where the preliminary analysis is nothing more, than a formalisation stage; in-depth analysis (implementation of preliminary mini-projects) is the direct modelling stage; recommendations formation is the interpretation of simulation results stage. Thus, the central study method used is modelling.

In this article, we consider the first of the three stages of the research and the methods used at this stage. Further, during the dialogue with representatives of companies and analysis of company working documents, a range of the most common problems in practice has been identified. Based on this, a common list for three companies has been compiled by synthesis method.

Results

A list of issues arising in practice of innovative projects has been formed as a result of preliminary interaction with specialists of enterprises, who later took part in testing. According to the results of analysis, it was divided into four groups. The first group of questions is the most general and characterises: enterprise development degree, and in case of management accounting system, degree of interaction of this system with technical specialists; level of understanding by enterprise specialists of the costing issues relevance; accounting and cost planning at various stages of innovation project. The second group of questions characterises the problems, related to lack of the company's proven set of business processes and approaches to project management. The third group presents issues related to the current organisational structure and management strategy applied at different stages of the project. The fourth group presents issues, related to methods of cost design and management in design departments.

Analysis of test results showed a similar picture for all survey participants. In particular, for the first group of test questions, the result, indicating the presence of a management accounting system at each enterprise participating in the survey and awareness of enterprise specialists of the problem of accounting and cost planning, has been obtained. For the other three groups of questions, the results that allow us to form control parameters set required for implementation of second and third stages of the research have been also obtained.

In addition, the study found that management accounting and cost design systems at most enterprises were developing organically, forming in parallel with enterprise developing and projects implementation without a special programme and appropriate consultants' involvement. Thus, we assume that the existing management accounting and design systems interaction model, at least, is not optimal, and, therefore, has potential for optimisation.

Currently, three companies participating in the study have received official written feedback on the possibility of participation in the subsequent stages of the study.

Discussion

As already noted, the proposed method of management accounting and cost design systems interaction analysis is similar to the general modelling case and repeats its stages. However, the analysis stages, separately, contain elements of scientific novelty.

Taking into account that the study positions as a source of information on implementation of innovative projects in Russia, the analysis of relevant publications is required. In particular, Nikitin [2016], Jin [2016], van der Poll

and Mthiyane [2018] discuss innovative projects management features when customer is the state structure, in particular, the Ministry of Industry and Trade of Russia. In this case, the number of users of the information provided by the management accounting service to the management includes managers at the Ministry level; therefore, the requirements for the information to be provided are tightened. This means increasing the role of quality interaction between management accounting system and the design service.

Rogulenko and Smolyakov [2017] also consider the issue of interaction between management accounting system and design service. Here, the authors conclude that it is necessary to form a higher-level system at the enterprise aimed at ensuring management decision-making and includes management accounting and cost design systems as one of the most important elements. Buchanan [2019] considers questions related to aspects of design and engineering decision-making [Roos, 2016], including economic.

As mentioned above, modelling based on proposed methodology of study is the main method in our research. Our methodology difference from "classic" is in modelling not to a specific activity area, but towards the interaction of activity areas, namely, management accounting and design systems.

At the 1st stage of study was considered the question of resistance to change from the side of management accounting system [Alsharari, 2019] and design system. Further (2nd and 3rd stages), the study hypotheses is considered taking into account such feature of innovation projects as hard timing, and consider conclusions and compare them with the final results.

Sitnikova [2017] concludes about the expediency of a broader understanding of "management accounting" concept, which indirectly confirms our hypothesis. The existence of an optimal model of management accounting and design systems interaction for each stage of innovative project implies broadening the scope of consideration of both systems, depending on the cost structure's detail degree and the project technical side. Taking into account above arguments, the hypothesis proof degree is considered as sufficient for the transition to second stage of the study (in-depth analysis), provided by the proposed method.

Conclusion

Innovative projects implementing in Russia in current conditions is characterised the presence of problems in terms of intra-organizational interaction between organisational structure elements. In particular, we considered the units of management accounting and design systems. The reasons for this problem are hidden not only in absence of an interaction model between two systems, but in insufficient degree maturity of of project management system and imperfection of existing business processes, which were also partially considered during the testing conducted during the study. Under the imperfection of project management and business process, in this case should be understood not only their non-compliance with requirements of stage of implementation of innovation project, but also partial non-compliance with modern international standards.

The study founds, on example of units of management accounting and design systems, that not all surveyed enterprises have a clear method of changing the structural units' interaction model for the stages of innovation project implementation. Thus, the study indirectly proves the research topic and hypothesis relevance. The presence of changes in internal model of individual units included in management accounting system and design system indicates to a high professionalism at the unit level. However, inconsistency of work at the level of systems, including these units, minimises the positive effect. The management accounting and design systems are developing in enterprises by organic way. Therefore, the transition to a new stage of project has usually accompanied by a local crisis. It ultimately becomes an incentive to change the model of interaction. With such an approach, local time losses are inevitable, leading to additional costs and risk of shifting timing of the project.

The proposed formation method allows us to form the output data of the initial stage of formation of management accounting and cost design systems interaction model. On this basis, we concluded about the efficiency of methodology, and possibility of implementing the second and third stages of study for finally verifying the proposed hypothesis.

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