

DEVELOPMENT OF INFORMATION ENTREPRENEURSHIP IN THE CONDITIONS OF THE KNOWLEDGE ECONOMY

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ABSTRACT

IT industry is one of the most highly developed and dynamic sectors of the national economy, the basis of which you should consider the availability and sufficient skill level of the workforce. Calculations of conventional indicators of effective activity of IT enterprises as information entrepreneurship, such as profitability, turnover of current assets and others, indicate a tendency to their instability during 2012-2018. Orientation of the IT sector to cooperation with the global information community determines the increased demands on the employees of this field, as well as the appropriate level of their wages. Considering information factors of functioning of economic systems from the point of view of resources, the way of using resources as system-forming elements of social production, as a result-consequence of economic transactions, we managed to substantiate the system of evaluation of economic results, as well as to synthesize the quadratic function of their evaluation and forecasting. The role of the information components of the enterprise activities in ensuring the manufacturability of their functioning, timely realization of economic competences and expediency of obtaining economic effects has been formalized.

Keywords: Information Entrepreneurship, IT Services, Balanced Scorecard, Profitability, Knowledge Economy.

JEL Classifications: M5, Q2

INTRODUCTION

The formation and development of modern economic systems is characterized by the growing role and importance of information technologies, the spread of innovative solutions in all spheres of economic activity. On the one hand, this is due to the acceleration of market transactions, and therefore the need to increase the speed of development and implementation of management decisions.

On the other hand, it should be noted that a qualitatively new stage of complication of economic processes is occurring as a result of the globalization of markets, which determines the need for processing at the enterprise level not only national statistical information, but also the continuous monitoring of world information sources of databases.

Today, managers of different levels, when developing managerial decisions, must take into account a much larger number of factors than before, work with a much larger amount of

information, use both national and international experience of concluding commercial contracts.

In such conditions, the value of information and analytical technologies is increasing exponentially, the share of the value of goods that is formed outside the branches of industrial production is growing.

The growth of the level of competition in the commodity markets and the diversification of trade relations objectively condition the spread of new technologies, the prevalence of innovative approaches to the production and sale of goods in all areas. Therefore, the basis of a modern approach to the development of companies is innovations, the latest technologies and human capital.

The role of intangible characteristics of goods increases, which is accompanied by an increase in the significance of information or intellectual components of the formation of their value. At the same time, globalization of markets, blurring of industry boundaries or market segments makes it necessary to synchronize national business practices with the world standards of doing business.

The above specificity is especially evident in markets where the information or intellectual property itself is a commodity. Enterprises operating in the field of information and communication technologies are leaders by the speed of innovation implementation and have a range of unique characteristics. In this regard, the issues of ensuring the effectiveness of their activities have both scientific and practical value.

The purpose of the paper is to summarize theoretical approaches and to develop methodological tools to ensure the effectiveness of IT enterprises under current and prospective conditions of their operation.

REVIEW OF PREVIOUS STUDIES

Today it is traditionally accepted to say about the emergence and development of the information-knowledge economy.

Most scientists distinguish between these two concepts because of their substantive differences. Not all information of humanity can be considered knowledge, but, undoubtedly, most knowledge is based on the proper information support of the processes of its emergence and development. That is why most scientists stand for the need for a systematic approach to the study of "information economy" and "knowledge economy" (Bukht & Heeks, 2017); Guerrero et al. (2020); (Hanna, 2020).

It should be noted that the information economy is the central focus of the study of the formation and development of a large range of IT industries. Under modern conditions, the development of information and communication infrastructure is a precondition and indicator for the growth of companies in different segments of the IT business (Yu et al., 2017). In spite of the above fact, quite often the problems of information economy are reduced to the study of the service subsystem of economic entities.

Accordingly, many scientists are suggesting the emergence of a business services sector for companies, not the formation of a new economic order (Eckhardt et al., 2018). In our opinion, such position is quite debatable considering the extent and nature of the impact of the IT sector on the activities of other companies.

Thus, the unification and automation of information flows in economic systems of different levels, and the area of information resources and knowledge management becomes a key in the process of value creation. It should be noted that the workforce involved in the IT sector is changing its nature from 'information users' to information flow specialists (Elsadig Musa Ahmed, 2021); (Feola, et al., 2020); (O'Donovan, 2020).

Such processes stimulate change in the competence models of specialists in all sectors of the economy of all countries. Analytical skills such as statistical processing of information arrays, game modeling, cybernetic thinking and interactive visualization come to the fore (Abbas, 2018); (Ramesh Chandra Das & Sujata Mukherjee, 2020).

Economic science always relies on the analysis of processes of attraction and use of economic or natural resources in the process of production of goods and provision of services (Bayrakdaroğlu & Bayrakdaroğlu, 2017).

Certainly, the issues of value creation in the process of using limited economic resources is of greatest importance. But under the conditions of information-knowledge economy, the above aspects of economic relations are significantly transformed in the direction of integration of production and consumption processes (Setini et al., 2020); Širá, et al. (2020).

In spite of the soundness and diversity of the studies conducted in the field of ensuring the effectiveness of enterprises in general or IT companies in particular, the issues of developing approaches to assessing the results of virtual enterprise activity, analyzing the effectiveness of the initial stages of the development of IT projects, approaches to cost management are still underresearched.

Significant fragmentation of scientific studies of the above issues, contradictory practical experience of operation of various subsystems of modern IT enterprises make it necessary to generalize and further improve the key points of organizational theories, to develop methodological tools for organizational design of IT enterprises based on technical, economic and social activities. The importance of outlined scientific problems conditioned the selection of the topic of the paper, the definition of the object, subject, setting goals, objectives, and its logical-structural structure.

METHODOLOGY

The theoretical and methodological basis of the study is a system of general scientific and special approaches containing methods of comparative analysis and synthesis. On the basis of evolutionary analysis and functional apparatus of description of cause and effect relationships, the essential characteristics of information for the purposes of economic use are described, as well as the conceptual apparatus of cost management in the field of information and communication technologies, innovation management and project engineering is systematized.

The information base of the study is the regulatory and legislative acts regarding the specialty of the study, scientific works of specialists (monographs, articles, theses, collections of scientific works, results of case studies), periodicals and annuals of international organizations, public reports of enterprises, their associations, expert assessments of rating agencies, leading IT professionals, and the results of the studies of the author.

RESULTS AND DISCUSSIONS

It should be noted that the problem of combining financial and non-financial analytical indicators in the models of applied calculations is an urgent problem for the companies of all spheres of business. The area of information and communication services, where high-tech processes of processing or transferring information are closely intertwined with business processes of value creation for investors, consumers or society as a whole, is no exception.

It should be recognized that most of the applied models of analysis and management of the performance (development) efficiency of companies are intended to offer an understandable and transparent technology combining the technological and financial parameters of organizations, consumer assessments with the economic performance results of

firms. As an example, we can use a fairly popular model for building the management of a company known as the “Balanced Scorecard”, which, in its methodological basis, identifies four perspectives of analysis: financial, client, process and strategic (training and development).

As the basis for such attempts and comprehensive studies of analytical indicators of various nature, we consider the following self-explanatory and statistically proven relationships:

The growth of quality, in general, causes an increase in the level of customer satisfaction;

The increase in customer satisfaction causes an increase in the sales of the company products or services, which in turn leads to an increase in market share, all things being equal;

The increase in the sales of the company products and services determines the need to increase the volume of current assets to serve the growing needs of the business;

The increase in the level of organization of business processes reduces the need for working capital, but this relationship is not always unambivalent in different business areas;

The sales growth has a positive impact on the profitability of operations as a result of decreasing unit costs and increasing incomes of a company, all things being equal;

The increase in the profitability of sales causes an increase in the profitability of the capital of a company and an increase in the prices for a company stock;

The increase in the prices for a company stock enhances the possibilities for raising additional capital and increases the cost of equity capital.

There are many more examples of such relationships, but unfortunately, they can not always be scientifically proven and quantifiable. The problem of establishing cause and effect relationships is a subject of research for all sciences, but in the economy, it is most often solved based on the analysis of empirical data.

Despite the modern development of information and analytical technologies, in business the dependence of the level of consumer satisfaction and the growth rate of business value remains insufficiently substantiated. Such an array of direct and indirect economic effects is between these two analytical indicators that their direct mathematical comparison may be fairly conditional, although the relationship between these indicators is understandable.

An additional problem is the analysis of changes in the analytical indicators of effectiveness over time, that is the problem of combining different economic, social, financial or environmental indicators in a single model of analysis.

The importance of this applied problem is determined by two multidirectional factors, especially for the companies of the IT sphere:

Pace of social and economic processes, both domestically and globally, is steadily increasing, prompting a rapid change in the nominal value of equivalents, instantaneous spread of network economic effects, etc;

Pace of information and communication exchanges has been steadily increasing over the last decades, which suggests that this trend can be maintained in the future, and thus, the external aging of information products and software solutions is accelerated.

It should be noted that we did not use all the data from the initial array of information. Due to the fact that the information in our study is of a real nature and is based on the reporting of real companies and not selected according to certain sampling rules, it is very heterogeneous.

In other words, a sample of enterprises needs some unification. In economic research that focus on the study of socio-economic processes, some of the observations are always deviant. There can be many reasons for this, as for instance, the misbehavior of market agents

in the market will result in illogical proportions between their capital invested in the business and the number of users of their services.

One way or the other, we separated from 15,541 observations over the activities of IT companies in 2012-2018, only two-thirds of enterprises that provided technically correct information in the financial and statistical reporting. This is not about assessing the reliability of the information provided by companies, and the point is that they often do not specify separate lines of their reporting at all, although according to the law, further calculations are provided based on missing data.

The general structure of the relationships between the primary indicators in our database is given in the table of partial correlation coefficients (Table 1).

	Assets	Current	EqCap	CurLb	Turn	Costs	Netprof	TotExpenc
Asset	1							
Current	0.8903	1						
EqCap	0.6073	0.3308	1					
CurLb	0.8641	0.9042	0.1799	1				
Turn	0.2085	0.2193	0.1818	0.2155	1			
Costs	0.2076	0.1175	0.1808	0.2160	0.8999	1		
Netprof	0.1846	0.1050	0.3200	0.0538	0.1677	0.0944	1	
TotExpenc	0.2076	0.1775	0.1809	0.2160	0.8999	1.000	0.0944	1

Notes: Assets – total capital; Current – current assets; EqCap - equity capital; CurLb - current liabilities; Turn - revenue from the implementation of works (services); Costs - cost of the implementation of works (services); Netprof - net profit; TotExpenc - gross costs.

The table below is prepared in the package of statistical information processing Stata MP/13.0 for Windows, which will be further used in our study. It should be noted that the information from our database can be divided into two blocks: primary indicators and analytical indicators. In fact, based on these primary indicators, analytical indicators of our study were calculated.

Below, we will use the relationships and their strength in developing the general model. But at this stage of the study we consider it necessary to draw a conclusion on the use of borrowed financial resources in the activities of IT companies, since the sum of aggregate assets almost depends on the amount of both the equity capital of the companies and the amount of 155 short-term credit resources.

It should be noted that actually financing of IT projects is carried out on the basis of different ways of partnership of investors and developers, and not implementation of project mechanisms of development management. That is, it is easier for an investor to become an owner of the company than to create a project team for the development of a certain start-up.

It should be noted that the level of significance of net profit for the formation of capital of IT companies is rather low, as evidenced by the corresponding pair correlation coefficient. On the one hand, this confirms our position regarding the need to improve analytical systems for monitoring the activity and assessing the development of IT companies. On the other hand, it is possible to recall the specifics of the work of enterprises under foreign contracts, as well as the use of different mechanisms of optimization of tax payments.

As a result, we have made corrections in our net profit calculations based on the gross profit of the companies. Such approach made it possible to exclude from the analysis those cost items of companies that are used to adjust the amount of profit before tax and to lock on more operational performance characteristics in our analysis.

Certainly, we do not consider it legitimate to carry out such applied calculations for separate companies, but as regards the array of 10,541 companies, there is an opportunity to use average percentage of overheads in the cost of services, estimate the average level of payment of taxes, etc.

In accordance with the model of analysis of efficiency of IT companies presented above, the following evaluation logic was developed (Figure. 1).

To the previous financial and economic indicators, we have added two operating indicators, which were discussed above and which are part of the model of our analysis. On this basis, we can calculate the economic value added that companies generate per unit of time tEVA (in our study in one business day). Given the high dynamics of this business sector, this indicator should be considered as the most indicative for the analysis of economic processes in the IT sphere. The technology of EVA calculation is traditional, but in our study we also should emphasize the need to bring different economic indicators to a single time period.

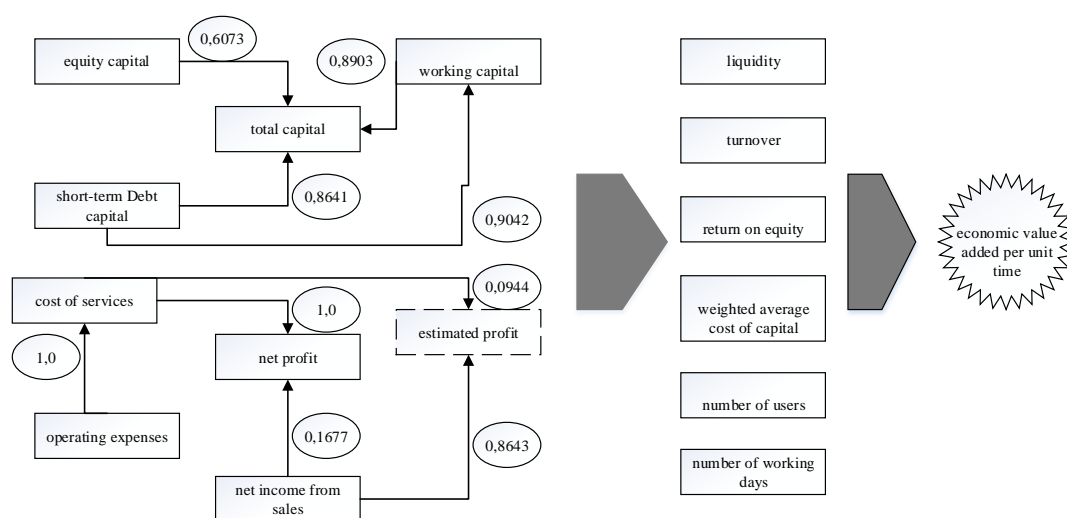


FIGURE 1
LOGIC OF EVALUATING THE PERFORMANCE EFFICIENCY OF IT COMPANIES BASED ON THE COMPARISON OF ECONOMIC VALUE ADDED (CONSTRUCTED BY THE AUTHOR)

Therefore, it is advisable to make several generalizations from the above analysis, first of all it concerns the identification of key factors influencing the value added and time unit: company equity; total invested capital; company working capital; short-term credit resources (current liabilities).

Therefore, all the factors presented are resource-based and duplicate each other. For example, the amount of invested capital depends on both the amount of company equity and the amount of short-term credits. In general, we can draw a conclusion that resource components are crucial for the development of national IT companies. Actually, this necessitates the constant search for financial resources by the developers of information solutions.

You should consider it to be sufficiently indicative that the strength of relationship between the changes in the amount of the value added of a company per unit of time and the number of days worked or the number of clients (users) served is low. Such situation is explained by the unregulated nature of the provision of IT services to users, as well as the lack of complete standardization of these services. Therefore, it can be assumed that IT companies have a limited and stable portfolio of clients who occasionally turn to them for various services.

RECOMMENDATIONS

It should be noted that the problem of time factor accounting becomes even more complex, given the possibility of separating calendar, financial or virtual time periods when analyzing the performance efficiency of IT companies. Traditionally, the factor of time is taken into account in economic calculations by converting all indicators to one period of time. In our opinion, this approach somewhat depletes economic analysis, since it involves artificial summation based on a number of assumptions about changes in value over time (value of currency units).

With such static approach (conversion to one date), the speed or dynamism of economic processes are ignored. It is worth reminding that the speed of the spread of information solutions and the speed of their aging (external depreciation) are perhaps the main factors of value creation in this area.

On this basis, we draw a conclusion on the need to make calculations in dynamics or perspective, comparing in the time interval not absolute economic indicators, but their analytical ratios – indicators of efficiency per unit of time. With such approach, it is important for us to constantly adhere to one time dimension: calendar, marketing, financial, or virtual (informational).

It is worth noting that from the point of view of economic analysis of the processes of information entrepreneurship, it is advisable to systematically separate transaction costs of doing IT business, namely to investigate the costs of organizing activities, coordination costs, costs of maintaining feedback, costs of information retrieval and more.

CONCLUSIONS

The need to take into account information factors in economic studies as a key factor in the goods value creation under the conditions of information and knowledge economy, the growth of market environment dynamism, and the integration of economic systems at different levels, led to a generalization of the available approaches to the study of the essence of information and scientific works on type-specific information economic processes.

The management of performance and development efficiency of IT companies should be based on a systematic approach and use a universal system of requirements, which usually serve as the basic management principles: validity; systematicity; resource-time orientation; regularity; balance.

Developed and calculated econometric model of business performance of over 15,000 IT companies in 2012-2018 has made it possible to determine that it is advisable to build improvement of efficiency of management of activity and development of IT companies on the basis of management of profitability of invested capital.

Increase in return on invested capital by 7.3% causes an increase in economic value at an average of 1%. As a characteristic of profitability of the use of invested capital, we have substantiated and used the criterion of economic value added.

The theoretical functional model of the ratio of economic value added per unit of time can be structurally represented on the basis of the multiplicative ratio of economic profitability, turnover of operating costs, cost-effectiveness and speed of customer service of companies. Each of the listed elements of our model was presented as a system of analytical relationships of the second level of detail.

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