Forming the Strategic Potential for Development of Machine-building Enterprises: The Balanced Scorecard in Use

ROMAN POBEREZHNYI
ASSOCIATE PROFESSOR

e-mail: pobrom@gmail.com

SUMMARY

The methodological approaches to strategy development for engineering companies using balanced scorecard are described in the article. The results are given of an analysis of strategic potential of modern Ukrainian machine-building enterprises. An indicator of the current state of the base potential and integral index of the potential of the enterprise forinnovative development is proposed that characterizes the use of the strategic potential of Ukrainian machine-building enterprises.
Keywords: strategic potential, internal and external environment
Journal of Economic Literature (JEL) code:M11, M40

INTRODUCTION

The long-term effective operation of any company, including an engineering firm, requires that its growth and development are determined by the right choice of strategic guidelines that allow the best way to realize the potential human capital and other resources of the enterprise. The strategy that the company selects must ensure sustainable economic growth and development of the company, increasing its competitiveness. Therefore, engineering firms are now faced with the task of development of effective management, including strategic management, in order to take the lead.

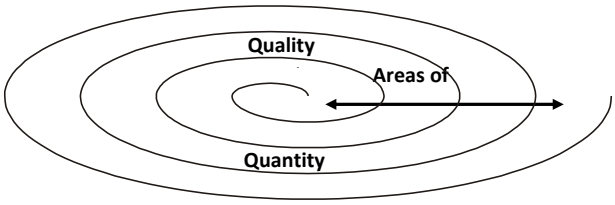
The problems of strategic management, how to evaluate and formulate strategic directions of development potential, and problems of methodological of predicting outcomes of development strategies are important for modern enterprises and are analyzed through various aspects in a number of scientific works.In particular, Kaplan and Norton studied the causal relationships between strategic objectives of enterprises and structural units and functional services based on the Balanced Scorecard. Marytnenko andIgnatieff described the basic principles of strategic management. Rampersad paid attention to the formation of the mission and strategic goals based on the concept of a universal system performance of the enterprise. Fedulova, Ivakina, and Malyarets described and studied a modern criteria balanced scorecard (BSC) for defining and shaping an effective strategy for avcompany. Shekhovtsova, Mizyuk, Shershneva, Thompson and Strickland explored the nature of management and its place in the management system,ad analyzed the content management objective laws governing the functioning and development of the organization's management system in market conditions.

The basis for practical calculations is primarily statistical and financial information of machine-building enterprises of the Kharkov region in 2007 to 2011. To achieve this goal a system of general and special methods was used.

POTENTIAL DEVELOPMENT OF MACHINE-BUILDING ENTERPRISES

It must be noted that modern enterprises for sustainable development should be considered as a condition of the internal environment, as well as constant and variable conditions of an unstable external environment. At the same time we believe that the strategic development of the company has properties as shown in Figure 1:

- cyclicity - a property that is to move from quantity to quality, new quality gives the further development, etc.;
- helicity - the property that is the change of the spiral, with different influences in the development of the object. Direction can be positive or negative for object development. There are both upward and downward spirals of development.

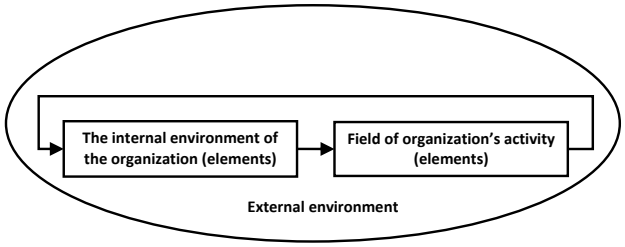


Source: own development

Figure 1. Properties of strategic development of industrial enterprises

Consider the development of the organization as a positive impact of development, so that a negative effect or a negative development will lead, ultimately, to the liquidation of the company.

The overall system organization as shown in Figure 2 represents a set of elements of the internal environment that characterize the capabilities and limitations of a company, which through the development and implementation of strategic and operational decisions form the elements of the scope of the enterprise, describing the organization's activities in the environment of operation.



Source: own development

Figure 2. General system of the organization

Internal elements of the enterprise environment affect the formation of element areas that allow for better internal environment elements. The properties of the organization reflect the cyclical and helical development.

The elements of internal environment that characterize the capabilities and limitations of this company, in our view, should include:

- Raw materials (their quality, quantity, price, etc.);
- Technology (existing in the enterprise);
- The means of labor (fixed assets, their characteristics);
- Company personnel (structure, quantity, quality characteristics, etc.);
- Financial resources (equity and debt, generating funds, investment, etc.);
- Structure of the enterprise (the division of responsibilities and work, hierarchy, degree of freedom in decision making, etc.);
- Management system (principles and tools of management, planning, organization, control, motivation, and coordination);
- System information (documents, characteristics, information security, etc.);
- The process of converting raw materials into a finished product (value chain, cost, etc.).

Development of the elements of the internal environment of the organization increases the possibilities and reduces limiting on the activity of the company, and thus contributes to the development of reasonable and timely strategic and operational decisions, which in turn creates and develops the scope of activity of the enterprise.

The scope of the enterprise, which characterizes the activities of the organization in its environment functioning includes, in our opinion, the following elements:

- Finished product (the quality, price, consumer value, etc.);
- The market and consumers (market share, new markets, old and new customers, etc.);
- Position within the industry (competitors, suppliers, distribution system and sales, etc.);
- Technology (technology applied, innovation, novelty, etc.).

Development of the elements of the business sector enables a company to more effectively set strategic and operational objectives, increase productivity and efficiency of activities of the organization, and provides opportunities for the development of its internal environment.

Strategic management is now seen as not only a set of strategic management decisions that determine the long-term development of the enterprise, but also concrete action to ensure rapid response to changes of the external environment that may require strategic maneuvering, revision of goals and choosing a new direction of development (Ivakina I., 2007).

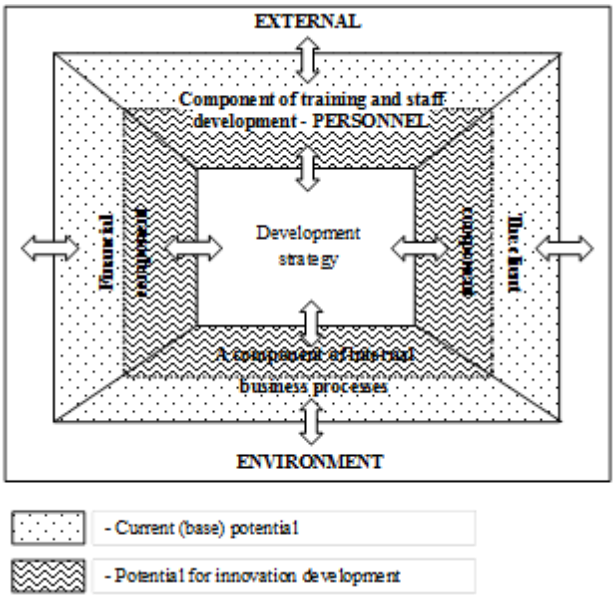
For their existing conception about the state of the implementation of selected goals for objective measurement of the results of implementation strategy, the management of many Ukrainian machine-building enterprises has used the traditional system of financial-accounting indicators. In our opinion, in today's conditions of development, which has replaced the earlier industrial competition, now it is the time of information competition, meaning that reconsideration is needed of approaches to the formation, control and efficient allocation of financial, industrial, intangible and labor assets of the company. Enterprises need an additional evaluation system, which is linked to accurate and reliable financial evaluation of such intangible assets as market promotion of new products and services, potential ability, experience, interest in employee flexibility, customer loyalty, innovation projects, investment in production and workers, and other assets.

In order to satisfy the needs of Ukrainian enterprises, we are proposing to use the method of Balanced Scorecard (BSC) (Kaplan R. and Norton D., 1992). BSC complements the financial parameters system which reflect the results of grading the development prospects system of enterprises. Objectives and indicators of the

system are formed depending on the ideology and strategy of each organization and consider its activities on four criteria: financial, customer relationship, internal business processes, as well as training and staff development (Kaplan R. and Norton D., 2003).

Figure 3 shows the relationship and subordination between the components of BSC by shaping the strategy of development of a modern engineering enterprise. This vision is based on the proposed dual structure of potential strategic development of industrial enterprises (including engineering), which combines the current state of the underlying potential and the ability of companies to develop, i.e. the effectiveness of innovative potential.

Thus, in our view, the modern industrial enterprise faces two major tasks: first, creation of a system of indicators, and second, its use as an integrated system of strategic control for their development.



Source: own development

Figure 3. Subordination and the relationship between components of BSC in the formation of development strategy

One of the main methods of management for the development potential of industrial enterprises is to develop a system of evaluation and development of methods of assessment on development potential and its prediction to identify the priority capacity of a development enterprise environment.

As a result, there is a need for quantitative and qualitative assessment of the current (base) potential and capacity for innovation development to guide the process of formation of competitive advantage and provide evaluation and formulation of strategic directions of engineering enterprises.

ANALYSIS OF DEVELOPMENT POTENTIAL

For solving the problems that relate to the company's further development and creating the most effective strategy, tabulated lists of indicators that are part of the BSC are given for assessing the current potential (Table 1) and the potential for innovative development (Table 2). Application of the proposed system performance will, in our view, take into account their integrated impact on the competitive advantages of machine-building enterprises.

Table 1
Indicators for evaluation of the current (base) potential of machine-building enterprises

Indicator	Symbol
1.1 The financial component	
1.1.1 Ratio of general (current) liquidity	$X_{1.1.1.}$
1.1.2 Return on equity	$X_{1.1.2.}$
1.1.3 Net return on sales	$X_{1.1.3.}$
1.1.4 Share of labor costs in operating expenses	$X_{1.1.4.}$
1.1.5 Share of social transfers in operating costs	$X_{1.1.5.}$
1.2 Staff	
1.2.1 Rate of utilization of time	$X_{1.2.1.}$
1.2.2 Share of workers aged 18 to 55 years	$X_{1.2.2.}$
1.2.3 Proportion of employees with university degrees	$X_{1.2.3.}$
1.2.4 Proportion of additional salary	$X_{1.2.4.}$
1.2.5 Share of administrative costs in the cost of goods sold	$X_{1.2.5.}$
1.3 The client component	
1.3.1 Net profitability on sales	$X_{1.3.1.}$
1.3.2 Rate of turnover of receivables	$X_{1.3.2.}$
1.3.3 Rate of credit turnover payable	$X_{1.3.3.}$
1.3.4 Share of cost of marketing in the cost of goods sold	$X_{1.3.4.}$
1.4 Business processes	
1.4.1 Coefficient of autonomy	$X_{1.4.1.}$
1.4.2 Coefficient of financial stability	$X_{1.4.2.}$
1.4.3 Coefficient life of fixed assets	$X_{1.4.3.}$
1.4.4 Reduction factor for fixed assets	$X_{1.4.4.}$
1.4.5 Share of production costs in the cost of goods sold	$X_{1.4.5.}$
1.4.6 Average annual outputper worker, thousandUAH/person	$X_{1.4.6.}$
1.4.7 The share of investment in fixed assets of own capital	$X_{1.4.7.}$

Source: author

A development strategy for machine-building enterprises involves finding out the current strategy and analysis of the current (base) potential and efficiency in using the company's potential for innovation development.

Table 2
Indicators for evaluation of the potential for innovative development of engineering enterprises

Indicator	Symbol
2.1 The financial component	
2.1.1 Share of investments in intangible assets in total assets	$X_{2.1.1.}$
2.1.2 Share of investment in informatization of the total investment in intangible assets	$X_{2.1.2.}$
2.1.3 Share of domestic investors investment in total spending on innovation	$X_{2.1.3.}$
2.1.4 Share of investments of foreign investors in the total expenditure on innovation	$X_{2.1.4.}$
2.2 Component of training and staff development	
2.2.1 Share of workers with knowledge of new professions	$X_{2.2.1.}$
2.2.2 Share of workers who raised their qualification within the last year	$X_{2.2.2.}$
2.2.3 Share of workers who are inventors and innovators	$X_{2.2.3.}$
2.3 The client component	
2.3.1 Image resource	$X_{2.3.1}$
2.3.2 S of expenditure on participation in trade shows and other image events in total costs of product sales	$X_{2.3.2.}$
2.3.3 Share of spending on marketing and advertising	$X_{2.3.3.}$
2.3.4 Share of shipped innovative products in total sales of products	$X_{2.3.4.}$
2.3.5 Share of new products set for export in total new products	$X_{2.3.5.}$
2.3.6 Proportion of new technologies transferred abroad in the total transferred technology	$X_{2.3.6.}$
2.4 Business - Processes	
2.4.1 Share of investment in innovation in total capital	$X_{2.4.1.}$
2.4.2 Share of investment in innovation in equity	$X_{2.4.2.}$
2.4.3 Share of expenditure on research and development (excluding depreciation) of the total expenditure on innovation	$X_{2.4.3.}$
2.4.4 Share of expenditure on machinery, equipment and software associated with the introduction of innovations in the total expenditure on innovation	$X_{2.4.4.}$
2.4.5 Share of own investments in technological innovation in the total cost of innovation	$X_{2.4.5.}$
2.4.6 Proportionof products shipped that underwentsubstantialtechnological changein the totalshippedproducts	$X_{2.4.6.}$
2.4.7 Proportion of products shipped produced using an improved process of manufacture in total products shipped	$X_{2.4.7.}$
2.4.8 Proportion of transfer of new technologies in Ukraine in total transferred technology	$X_{2.4.8.}$

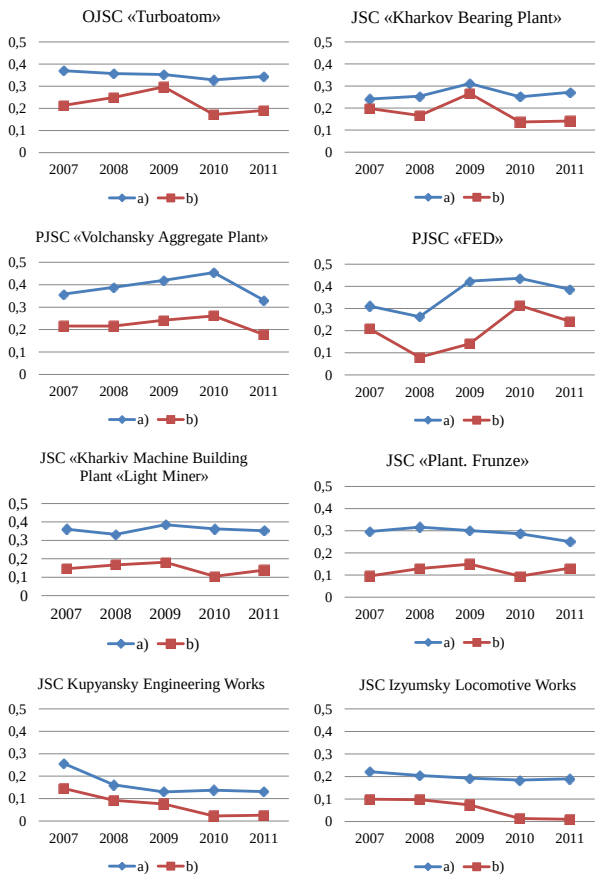
Source: author

Implementation strategy associated with conducting strategic changes should lead to three challenges: 1) the prioritization of administrative tasks in accordance with the strategy adopted, 2) to establish whether the chosen strategy and development processes of resources are a potential component of selected components of BSC, 3) reduction in accordance with the chosen strategy management capabilities of the enterprise.

For the study we selected 19 leading, famous engineering companies in Ukraine, Kharkov. Among them the most competitive companies are: Open Joint Stock Company(OJSC) ”Turboatom” which is manufacturer of enginesand turbinesfor nuclearand electricpower plants, Joint Stock Company(JSC) “Kaharkov Bearing Plant” which is manufacturer ofball androller bearingsand theirparts, Public Joint Stock Company (PJSC) “FED” which is manufacturer of aircraft and spacecraft, PJSC “Volchansky Aggregate Plant” which is of aircraft and spacecraft, cars, it is a researcher inthe field of engineering, JSC “Kharkiv Machine Building Plant “Light Miner” which is manufacturerof machinesand equipment formining and construction industries, research in technical sciences, JSC “Plant. Frunze” which is manufacturerof pumpsand compressors, JSC “Kupyansky Engineering Works” which is manufacturerof machines and equipmentfor processingagricultural products, JSC “Izymsky Locomotive Works” which is manufacturerof railway rolling stock.

Financial and statistical reports of enterprises for 2007 - 2011 years were obtained for the analysis. Requiredand mostinfluentialparameterswere obtainedbymultivariatefactor analysisusing the package STATISTICA 6.0.The integral parameters of the current (base) potential and efficiency potential of innovative development of engineering enterprises were calculated based on the performanceevaluationsystem(Table1 and2) andthe relevant data.

Analysis of the use of strategic development potential was carried out for 2007 to 2011. The overall results of the analysis are shown in Figures 4.



Source: own development

Figure 4. Dynamics of integral parameters of (a) the current (base) potential and (b) efficiency potential of innovative development of four engineering enterprises

The effectiveness of strategic development potential should be basedon an analysis ofthe calculated integral index ofthe current state of basic capabilities and the integrated parameterpotential of the enterprise for development andinnovation.

Graphically presented information shows insufficient effectiveness use of basic capabilities and potential of innovative development for 2007 - 2011 years of selected companies. The largest integral parameter of the current (base) potential reaches 0.36 in 2007 and 0.35 in 2011 in the JSC "Kharkiv Machine Building Plant "Light miner". The smallest integral parameter of the current (base) potential reaches 0.13 in the JSC "Kupyansky Engineering Works". The calculated indicators do not reach1 or 100%. Currentpotential of thesecompaniesis used only13%-40%. This indicates theexistence of problemsin the managementof enterprises,the lack ofstrategicplanning,the shortcomingsin personnelpolicies andweakmarketing.

Presented graphically dynamic potential of innovative development is evidence of itssmallsize andtendency tosmall changes. The largest integral parameter of potential of innovative development reaches 0.21 in 2007 and 0.19 in 2011 in the OJSC "Turboatom". The smallest integral parameter of potential of innovative development reaches 0.09 in 2007 and 0.13 in 2011 in the PJSC "FED". The calculated indicators do not reach1 or 100%. Potential of innovative development is used only13%-40%. This suggests the need for additional investment in these enterprises for development of innovative activity. Also it required staff training, updating of material and production base, the introduction of new technologies, the usage of progressive forms and methods of management.

CONCLUSIONS

The analysis of the dynamics of integrated indicators characterizing the use of strategic capacity development for local engineering industry indicates the following:

- the existence of negative trends, which is evident in the decline of manufacturing engineering products that are competitive on the domestic and foreign markets;
- formation of negative trends associated with the influence of a rapidly changing external environment and the lack of a clear strategic program for long-term business development in machine-building enterprises and of strategic management of its potential;
- strategic development potential is the most important factor for the economic and strategic security of an engineering enterprise and defines the base for creating a long-term competitive advantage.
- the balanced scorecard approach can provide accurate and timely information about the current (base) potential and the potential for innovative development of engineering enterprises. We believe that this information will allow for more efficient shaping of competitive advantages and improve strategic decision making at engineering companies.

REFERENCES

FEDULOVA, L. (2007): Current concepts of management. Kyiv: Center educational literature.

RAMPERSAD,H.(2004):A universal systemperformance: How to achieve results, while maintaining the integrity of the(translated from English.). Moscow:Harvard Business Review.

IVAKINA, I. (2007): The Balanced Scorecard. Kharkov: Factor.

KAPLAN, R., NORTON, D. (2003):The Balanced Scorecard(Translatedfrom English.). Moscow:Olympus -Businesss

MALYARETS, L. (2008): The Balanced Scorecard in the evaluation of the enterprise. Kharkiv: Abstract.

MARTYNENKO, M., IGNATIEV, I. (2006): Strategic Management. Kyiv: Caravel.

MIZYUK, B. (2006): Essentials of Strategic Management. Lviv: Magnolia.

SHEKHOVTSEVA, L. (2006):Strategic Management.Kaliningrad:IzdRSUthem.Kant.

SHERSHNEVA, S. (2004) Strategic Management. Kyiv: MBK.

THOMPSON, A., STRICKLAND, A. (1998): Strategic Management. Art of strategy development and implementation (translated from English.). Moscow: Unity.