Evaluation of commercial prospects for innovative product machine building enterprises

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Abstract. Forecasting of successful implementation of innovative product is the crucial element of decision making process. The purpose of forecasting innovative product realization is to define probable commercial level according to consumer demand. This article highlights the necessity of evaluating the commercial prospects for innovative products. It reviews the most popular methods of assessment of commercial prospects of the innovative products and reveal main drawback of them. The results show, that approaches to commercial prospects assessment for innovative products enables enterprises to go beyond the solely understanding of customer needs, thus enabling them to develop new way of. The authors argue for the improving procedure to assess the commercial prospects through innovative product rating Rankings innovative ideas. It is based on the following criteria's: level of product uniqueness, level of satisfaction of the consumers' hidden needs, value of the market segment, expected life cycle, products price, quality level, products design, service, amount of marketing costs, expected rate of innovation profitability. The proposed rating method of assessment of innovative products commercial perspectives would enable engineering enterprises to determine the most successful innovative ideas and to timely reject the ideas predestined to fail. Obtained results due to ranking also help enterprises to overcome barriers, associated with innovation commercialization. At the same time this method can be a start point for marketing innovation.

Key words: innovation, commercial prospects, rating.

INTRODUCTION

In the market economy survives without innovation machine-building enterprises are virtually impossible. However, implementation of enterprise innovation activities is not a guarantee of its competitiveness in the market. The main objective is to create a product that is in demand at the consumer. The implementation is failed innovation project can not only lead to significant losses, but also to bankruptcy. Therefore the problem of evaluating the commercial prospects of an innovative product is now fairly acute to domestic machine-building enterprises. Addressing these issues will help to improve the market position of innovative engineering companies, by reducing the risk of failure of the innovation project and avoiding unnecessary time and cost.

THE ANALYSIS OF RECENT RESEARCHES AND PUBLICATIONS

The research of general issues of innovation development process and evaluation of their commercial prospects of were engaged a lot of foreign and domestic scientists in particular should allocate V.J. Kardash [2] F. Kotler [3], J.J. Lambe [5], T.N. Double [6] A. Sumets [10] R. Cooper [13]. However, despite the large number of works until today have not found a sufficient solution to the problem associated with the evaluation of the adequacy of market innovation machine building enterprises.

In practical activity the enterprises involved in innovation activities often have a situation where product innovation is not the consumer that is experiencing failure. The failure of the innovation can be of three types [4, 6, 9]:

• Absolute – when revenues from innovation are lower than the costs incurred on its creation, production and sales,

• Partial – when the revenues from innovations allow only cover the costs incurred on its creation, production and sales,

• Relative – when the company makes a profit less than planned.

Therefore, to achieve the expected level of return on innovation activities of enterprises need to enter the market with such a product-innovation that will interest consumers that will be commercially promising.

The economic literature which explores the behavior of consumers distinguishes the following methods of evaluating the commercial prospects for innovation:

• multi-level goods' model by F. Kotler,

• multi-level goods' model by V. Blagojew,

• multi-attributive goods' model by J.J. Lamben,

• matrix of preliminary assessment of the commercial chances of the new goods by the American consulting group MDA,

• block model: 4P, 4P + 1S, 5 P, 5 P + 1S, 6 P, 7 P, 10 P, 12 P, 4A, 4C, 4E, SIVA, 2P +2C +3S,

• evaluation matrix is a new product of the American consulting firm "AS Nielsen ",

• methodology of "New Prod".

All these methods have in common is that they should be used at the stage of selection of innovative ideas, and their product is based on the representation as a combination of commercial characteristics, benefits that satisfy customer needs.

Multilevel model of product Kotler [3] contains three levels:

• planned product,

• product in realization,

• product with support.

At the first level it is very important for the enterprise to find out the hidden consumer needs and form the main benefit of using the product.

The second level defines the main commercial product characteristics, such as: quality, functional properties, exterior design, packaging, and trade mark.

At the third level establishes additional commercial product characteristics such as delivery, installation, guarantees after sales service, credit.

Multilevel product model B. Blagoev [1] is improved version of the multilevel model by F. Kotler. B. Blagoev identifies four levels:

• core of innovative product,

• physical characteristics of innovative product,

• advanced features of innovative product,

• characteristics related to personal features of potential customers.

The innovative product's core is the product's main merit, which is valuable for potential customers.

The physical characteristics of an innovative product B. Blagoev include: brand; quality; function; style; packaging.

Advanced features innovative product is: price; lending; installation; warranty service.

Characteristics that are related to personal characteristics of potential buyers, according to B. Blagoev are: reputation of the manufacturer; prestige; fashion; universally benefit from the use of new products.

Multi-attributive goods' model by J Jean-Jacques Lambe defines a set of product attributes (benefits to consumers), which allow the consumer to provide both nuclear service (basic functional benefit that provides any trademark for a particular product group), and a number of secondary benefits. Secondary benefits may be necessary (relating to nuclear service – efficiency, comfort, etc.) and reinforcing (unrelated to nuclear service – packing, terms of delivery, payment method, after-sales service, etc.).

When buying the goods consumer assesses all important attributes. Price is an important attribute, but not always decisive. Overall the product is based on the degree values of each, as well as consumer perceptions of the presence or absence of certain important attributes for a particular trademark.

Matrix preliminary assessment of new product commercial chances American consulting group MDA, which refers in his book Jean-Jacques Lambe [5], identifies the key factors of market prospects innovation its attractiveness and competitiveness. Each of these factors combines several components and their level is determined by the estimated scale: very high, high, low, very low.

The attractiveness of the product includes the following criteria: the needs of consumers; term life cycle of new products; direction of the market; physical and money market potentials; velocity of propagation of innovation in the market; availability of innovation in the market; need for advertising actions; related to innovative product sellers.

Competitiveness of the goods includes the following elements: the quality of goods in general and compared to similar competitive products; period of exclusivity novelties; attractiveness of the goods; price; compliance novelties direction of industrial and economic activity; professionalism of sales staff; level of competition; compatibility sellers and buyers [28].

Block model allow assessing the commercial prospects of innovation through the prism of marketing tools. The best-known types of block models today are: 4P, 4P + 1S, 5P, 5P + 1S, 6P, 7P, 10P, 12 P, 4A, 4C, 4E, SIVA.

The traditional model is 4P, which was proposed in 1960 by the American scientist G. Mac Carti [16]. This model includes product, price, place and promotion.

OBJECTIVES

The theoretical foundations and applied problems of evaluating the commercial prospects of an innovative product formulation lead to the following objectives:

• substantiate the need for evaluating the commercial prospects for innovative products;

• consider the most common methods of evaluating the commercial prospects for innovative products;

• improve the process of evaluation of commercial prospects of innovation.

THE MAIN RESULTS OF THE RESEARCH

The main objective of the company is to create a product which meets the requirements of customers. This item has been revealed through the following criteria: the trade mark; quality; range; design; packaging; warranty service.

Price is an important marketing tool because it affects the profitability of the enterprise and consumer willingness to purchase innovative products. The main components are wholesale and retail price, payment terms, discounts, markups, loans etc.

Place aimed at ensuring the delivery of innovations from the producer to the consumer in a specific place and period of specified. These include channels of distribution, logistics, and warehouse stock.

Promotion aims to stimulate demand for innovative products and includes all types of marketing communications.

All other models P and P + 1S are 4P model varieties of that are complemented by a certain number of items. Thus, the model 4P + 1S – this improved model 4R, which is supplemented by such element as service.

The model 5P has three variants. The first variant includes product; price; place; promotion; package. The second option is to use criteria such as product; price; place; promotion; publicity. The third variant of the model 5P consists of product; price; place; promotion; staff. Model 5p + 1S includes the following criteria: product; price; place, promotion; staff; service.

Model 6P was created by Kotler [4] in 1986 and developed 4P model by new elements: public opinion formation (formation of public opinion) and political power (political influence).

In 1981 B.Bums and Dzh. Bytner [11] proposed 7 P model that improves the 4P by adding the following criteria: people; buying process; physical attribute.

The criteria "people" includes main personnel, staff, of other organizations and individuals (experts of the market), consumers and those that affect them.

The criteria "process" includes level of standardization and quality innovations; level modifications innovative product; availability of after-sale service.

The criteria "physical attribute" includes tangible and intangible assets, the environment of enterprise and different presents and gifts (badges, certificates, medals, etc.) and certificate (quality mark) of an enterprise.

Model 10P consists of the following elements: product; price; place, promotion; people; personnel; packaging; purchase; probe, public relations.

Model 12P includes the following criteria: product; price; place; promotion; people; personnel; packaging; purchase; public relations; process; physical premises and profit.

Analysis of the constituent elements of the model "P" suggests that the most grounded model is Jerome McCarthy 4P model. Because it is include all the elements which used in models 5P, 6P, 7P, 10P, 12P, while some other elements could not be marketing tools are not included in it. Particular, "packaging" and "approbation" are parts of the criterion "product". "Public relations", "physical premises" and "profit" are included in the "promotion" criterion. "Personnel" is included in all four most important criteria (product, price, place, promotion). "Purchase", "process", "people", "consumers" are the elements of the environment and the enterprise has no direct influence on them, it can affect them only indirectly with the help of marketing tools.

The conducted analysis models "P" revealed that all of them are supply-oriented. Since the main objective of which is in the creation of innovation is to develop a product that meets the expectations and needs of consumers, scientists and economists have proposed models that aim to acquirer, 4A, 4C.

Model 4A offered Yahdysh Shet [14] in order to upgrade the model "4R". The component models "4A" are: acceptability – the admissibility of the goods to the consumer; affordability – the opportunity to purchase; availability – goods presence on the market; awareness – information about product.

Bob Loteborn [15] proposed a model of "4C" in 1990. He created it because the model "4R" does not correspond of new economic conditions. The main elements of the model "4C" are: customer needs and desires; cost to the customer; convenience; communication.

In 2005 Chekitan S. Dev and Don E. Schultz [12] proposed a model "SIVA", the components of which are: solution, information, value and access. This model is an alternative model to the "4P" and reflects consumer perception of such elements as products (SIVA – this solution); price (in SIVA – this value); place (in SIVA – this information); promotion (in SIVA – access it).

Our research showed that models 4A, 4C, SIVA are more theoretical than practical. Whereas when assessing commercial prospects of innovative products is difficult to predict reaction of consumers to novelty and the more effectively manage them.

According to T. Mahrova [7] developing innovation expedient with consider moral aspects. Therefore, it was proposed humanistic model of "4E", which is in addition to the traditional model of "4P" and includes the following elements: marketing ethics, esthetics, consumer emotions and eternity.

Certainly the elements determined by Terry T. [2] should use when enterprise creating and promoting innovation product. However, this model cannot be used separately.

Estimative matrix of a new product created the American consulting firm "A.S. Nielsen" for corporation Dun and Brandstreet based on the following studies:

• innovation market, its present and possible conditions;

• the level of competitiveness of innovation in the market;

• probable volume of sales innovation in the market;

• opportunities of enterprise to carry out uninterrupted production of innovative products according to the needs of the market.

These directions of analysis are measured at market (the need for innovation, the likely possibility of the market, competitors, fluctuations in market conjuncture), trademarks (technical innovation features, pricing method, unique packaging), sales (connectivity innovations with items that are made the company; distribution channels of innovative products, advertising) and production criteria (production capacity and the need for additional staff, materials, level engineering qualifications and experience of staff).

Each of the criteria given rating: higher than average degree, average degree and degree below average.

"New Prod" methodology was developed by R. Kuper in the 1979 [13]. According to him, factors of the innovations' success on the market are:

• novelties' uniqueness;

• compliance with the requirements of the market;

• export orientation;

• the necessity of extensive preparatory work before the development of innovative products;

• early development of marketing concepts innovative products;

• reasonable planned market entry;

• microclimate in the enterprise;

• availability of the necessary resources.

Analyzing different approaches to the evaluation of the prospects for commercial innovations proved that none of them is comprehensive and versatile. Their use will not allow machine-building enterprises protect themselves from the possibility to choose for implement an innovative idea, embodied in innovative product does not meet the needs of customers, and thus resulting in poor financial condition.

Foreign innovative firms argue that the creation of commercially successful innovations preceding review by at least 60 ideas [8]. Therefore, we propose to carry out the evaluation of commercial prospects of innovative ideas by rating. The use of the rating method will allow the company-innovators to have quantitative assessment of the commercial prospects of novelty goods at the stage of design.

Taking into account the experience of different authors and using our own research in this direction we select 10 major elements and their importance that most closely reflect possible future buyer's attitude to innovation (Table. 1).

We propose to assess the rate of the commercial effectiveness of the innovation by using this formula:

$$R_{i,j} = \frac{\sum\limits_{n=1}^{l} C_{i,n}}{\sum\limits_{n=1}^{l} C_n^{\max}} \cdot v_n, \qquad (1)$$

where: l – number of elements, which characterize commercial perspectives of the innovation; $C_{i,n}$ – sense of n-element for i-innovation, $C_n^{\max}$ - is max n-element between all estimated innovations; v_n – weight of n-element.

$$\sum\limits_{n=1}^{l} v_n = 1. \qquad (2)$$

The higher R_{ij} illustrate the better commercial perspectives of the innovations.

CONCLUSIONS

The results of analysing a number of approaches to the evaluation of commercial prospects innovation shoved their limitations and argued that they cannot be used separately. Therefore, we proposed a rating method of evaluation innovation commercial prospects which will enable the company to rank innovative ideas by the level of commercial appeal. The proposed method is based on the ranking of innovation on ten key criteria, validity of which was determined by experts. The list ranking evaluation criteria commercial prospects of innovation can be extend in each individual case according to the specificity of any given innovative product.

Table 1. Criteria for rating assessment of the commercial perspectives of innovations

№	Criterion	Criterion's validity
1	2	3
1	Level of product uniqueness	0,25
2	Level of satisfaction of the consumers' hidden needs	0,25
3	Value of the market segment	0,08
4	Expected life cycle	0,05
5	Products price	0,07
6	Quality level	0,06
7	Products design	0,08
8	Service	0,08
9	Quantity of necessary marketing revenues	0,04
10	The expected rate of innovation profitability	0,04
	TOTAL	1,00

The proposed method for ranking evaluation of commercial prospects of innovative product will allow machine-building enterprises identify the most successful innovative ideas and timely to abandon those ideas whose implementation would be a failure. The success of innovation is extremely important detail to think and to properly implement market entry. This cannot be done without a proper marketing plan. Therefore, the prospects for future research will be to develop a sequence of marketing innovation.

REFERENCES

1. **Blagoev V. 1993.** Marketing in determination and examples: translated fromBulgarian / V. Blagoev– StP.:Two-Three – 400 . (in Ukrainian).

2. **Kardash W. Ya. 1999.** Goods innovative ideas: tutorial / W. Ya. Kardash–K.: KNEY – 124. (in Ukrainian).

3. **Kotler F. 2008.** Marketing management: textbook / F. Kotler,K. L. Keller,A. F. Pavlenkoand others. – K. :Edition "Himgest" – 720.

4. **Kotler F. 2000.** Marketing in the third millennium: How create, winand take the market / F. Kotler – M.: OOO "Edition ACT" – 272.

5. **Lamben J.J. 1996.** Strategy marketing. European perspective. Tr. from French/ J. J.Lamben – StP.: Science– 589. (in Ukrainian).

6. **Losavikova L.D. 2001.** Generarionthe idea of new goods / L.D. Lozavikova// Marketing in Ukraine. № 7, 34. (in Ukrainian).

7. **Machrova T. N. 2003.** Humanistic model of the marketing/ T.N.Machrova – Vladymyr : Russ. association of marketing,– 216. (in Russian).

8. **Pavlenko A.F. 2003.** Marketing: textbook / A.F. Pavlenko and A.V.Vojchack. – K.: KNEY. – 246. (in Ukrainian).

9. **Starostina A. O. 2009.** Marketing: textbook /[on the red. A. O. Starostina]. –K.:Knowledge – 1070 . (in Ukrainian).

10. **Sumec' O. M. 2010.** Goods innovative policy: tutorial / O. M. Sumec'. – K.:Hi-tech Press – 368 . (in Ukrainian).

11. **Booms B.H. and Bitner M. J. 1981** Marketing strategies and organization structures for service firms. Donnelly, J. H. And George, W. R. (Eds), Marketing of Services, American Marketing Association, Chicago, IL, 47–51.

12. **Chekitan D. and Schultz D. 2005.** In the Mix: A Customer-Focused Approach Can Bringthe Current Marketing Mix in to the 21st Century // Marketing Management. – Vol. 14. № 1. 15–21.

13. **Cooper R. G. 1982.** New product successin industrial firms // Industrial Marketing Management. – Vol. 11. – 215–223.

14. **Jagdish N. Sheth 1973.** A Model of Industrial Buyer Behavior// Journal of Marketing, 37, 4, 50-56.

15. **Lauterborn, B. 1990.** New marketing litany: four P'sPasse: C-Words take over',. Advertising Age, Vol. 61, № 41, 26.

16. **McCarthy E.J. 1960.** Basic Marketing: A Managerial Approach. –Homewood, IL: RichardD. Irwin – 770.

17. **Neil H. Borden. 1964.** The Concept of the Marketing Mix, Journal of Advertising Research, June, 4.

18. McKinsey Global Survey 2010. Innovation and Commercialization.

19. **Belz C., Schögel M. and Tomczak T. 2007**. Innovation Driven Marketing: Vom Trend zur innovativen Marketinglösung, Gabler, Wiesbaden. (in German).

20. **Aron C. and Liem V. N. 2011.** Winning through innovation and marketing: Lessons from Australia and Vietnam, Industrial Marketing Management, Vol. 40, Issue 8, 1319–1329.

21. **David W., Cravens Nigel F. and Piercy 2009.** Strategic marketing, McGraw-Hill, Boston.

22. **Miles N., Wilkinson C., Edler J., Bleada M., Simmonds P. and Clark J. 2009.** The wider conditions for innovation in the UK, NESTA.

23. Eurostat 2013.Science, technology and innovation in Europe.

24. **Liem V.N. and Aron O. 2012.** Performance implications of market orientation, marketing resources and marketing capabilities, Journal of Marketing Management, Vol. 28, Nos. 1–2, 173–187.

25. **Narver J. and Slater S. 1990.** The effect of a market orientation on business profitability. Journal Of Marketing, 54(4), 20–35.

26. **Gatignon H. and Xuereb J. 1997.** Strategic orientation of the firm and new product performance, Journal of marketing research, Vol. 34, 77–90.

27. The work foundation working paper, 2010. Demand and innovation, NESTA.

28. **Kharchuk V., Kendzor I. and Petryshyn N. 2014.** The role of marketing strategies for innovations. Econtech-mod: an international quarterly journal on economics in technology, new technologies and modelling processes. – Lublin–Rzeszow, Vol. 3, No. 1., 49–54.