World Applied Sciences Journal 27 (Economics, Management and Finance): 48-52, 2013
ISSN 1818-4952

DOI: 10.5829/idosi.wasj.2013.27.emf.10

Methods of Technology Commercialization in Projects of the agrofood System (AFS) Development

N.G. Bagautdinova, S.K Eshugova, U. Saipullaev and E.A. Karasik

Kazan Federal University, Kazan, Russia

Submitted: Oct 15, 2013; **Accepted:** Dec 11, 2013; **Published:** Dec 15, 2013

Abstract: In the article, a methodological approach to the process of selecting projects of small technological companies in its function as one of the most important spheres of taking decisions in managing technology commercialization in the agribusiness. The authors carried out normalization of the existing methodology and presented their methodological approach in conformance with the concept of managing economy as a total of developing economic systems.

Key words: Agrofood system · Managerial decisions · Project management · Technology commercialization · Selection criteria

INTRODUCTION

In the circumstances of strengthening competition between manufacturers at the sector-related markets of the agribusiness, it is necessary to speed up the process of turning new technological ideas into social utilities by way of forming interest of the process participants based on differentiation of critical decision-making stages and development of decision-making methods.

The new mechanism of technology commercialization assumes formation of methodological prerequisites, conditions and requirements produced to the strategic management. Prerequisites describe the initial original factors. These prerequisites are determined by and manifest themselves in the existence of objective national interests in developing the Russian economy and improving its competitive position, on the macrolevel, in the international market. As for the microlevel, they are determined by the mechanism of selecting prospective projects and developing the technology commercialization management strategy.

Implementation of the mentioned prerequisites requires relevant conditions. These conditions can be broken up into two groups: the institutional (the object of strategic management is present) and systemic (the system of bodies of managing the technology commercialization process and the management mechanisms and means are present) ones.

As applied to the high-tech agribusiness, the aspects determining the conditions of its commercialization are: the infrastructural decisions including formation of a new technology market; the Russian national, regional and sectoral (agribusiness) peculiarities of the critical phases of the investment stage in the commodities' lifecycle; the development of criteria for selection of potentially successful projects and the provision of strategic management of technology commercialization; the development of the model of project investments business administration.

RESULTS

Let us analyze the macroeconomical structure of interaction between the commercialization objects. Here, the subjects that interact with each other are: the government, the investor and the recipient of investments.

For fruitful interaction of consumers and manufacturers, it is necessary to form stable macrostructural area of shared interest of the commercialization objects. This is determined by the creation of infrastructure, which encourages investors, the investment recipients and the market demand to move towards each other.

Infrastructure includes the standard systems of regulatory legal and informational support, the financial and economical system, the production and technological

Corresponding Author: Bagautdinova, Kazan Federal University, Kremlevskaya, 18, Kazan, 420008, Russia.

support, the innovation certification and promotion system and the system of personnel training and retraining.

Technological management deals with three tasks and, accordingly, includes three component parts: the scientific and technological management, the business administration and the technology commercialization management. Traditionally, a product lifecycle is broken up into four stages: the market entry, the growth, the maturity and the recession. Sometimes, the fifth stage is added, precedent to the others: the development. However, the development stage is further broken up into the stages of research, development and production preparation. Thus, we have three development stages and, accordingly, four stages that require managerial decisions (supervisory and analytical functions) with respect to technology commercialization.

The peculiarity of the technology commercialization is the consideration of the first two lifecycle stages, of which the first one is broken up into three phases and the second is taken as the fourth one.

Obviously, not all developments and organizational and technological ideas have sufficient grounds for commercialization. Selection of projects of small technological companies is one of the most important sphere of decision-making in the technology commercialization management.

The second important sphere of management is the completion of projects, because timeliness of ceasing or changing financial support of the project is an equally important factor of commercialization success. Thus, project evaluation must be an important point of commercialization management, which should state suspension of works, whenever relevant additional information is received and with account of risk factors. Such revisions normally are precedent to the beginning of the next phase of commercialization, which involves additional investments. Thus, the procedure of evaluation must be applied not only for the decisions of selecting projects for financing, but also for operational management of a small technological company. Operational management includes the following elements: the identification of factors, which relate to decisions; the evaluation of proposals on these factors using either quantitative information if it is available or expert report data if it is possible to obtain precise data; the identification of spheres, which require additional information; the comparison of new and previously received information and the identification of the trends of changes; the acceptance or the rejection of decisions based on the evaluation.

The main factors that the evaluation procedure must account for are: the financial advantages expected of the project implementation; the impact of management on the project implementability; the environmental and social impact of the project; the economic impact of the project on the market trends in general.

B. Twiss, in his book *Management of Scientific and Technical Innovations*, proposed some criteria of selecting new technology projects for large corporations. The list of criteria suggested in the article is different from the list described in the book, as it accounts for the peculiar features of small technological companies, in which the impact of their management is significant and yet there are no strong corporate impacts on some indexes. Due to this reason, application of this approach alone for implementation of innovative solutions in agribusiness is hardly possible.

Project evaluation is something more than just a procedure of criteria calculation. It is an important element of management, which allows taking a timely decision on the technology commercialization progress even at the early stages of the project promotion. The compilation of a list of all criteria, which will be necessary to account for, ensures remembering every one of them even if there are some difficulties with initial evaluation.

Let us consider the criteria of selection and evaluation of projects in accordance with the determined stages of commercialization and compare them by several indexes, which represent the peculiarities of information expression in business plans, depending on the particular stage and the relationship of the commercialization objects: the investor and the recipient of investments. Tales 1 and 2 generalize these indexes by criteria.

n the columns 1-4 of Table 1, the indexes of the necessity of providing and using the criterion for selection of information in accordance with the lifecycle stage of the commercialization management, from 1st to 4th columns in a sequence: "-" means not mandatory; "+" means mandatory; "0" means advisable to use. The columns "author", "investor" of Table 3 contain indexes of the innovation authors' and investors' attitude to the selection criterion by importance: "i" means important; "u" means unimportant. In the “bis-plan” column, the index of the frequency of information inclusion is represented, which relates to the criterion of selection in the business plans of Russian small innovative enterprises: "o" means often; "s" means sometimes; "r" means rarely.

The data in the table are received by polling the innovation authors and by method of analyzing projects implemented in the Republic of Adygea and the Rostov

Table 1: Selection criteria and their evaluation by the stages of commercialization and development in the agrofood industry

		Commercialization stages			
	Criteria	1	2	3	4
1	Duration of the developer's operation and its technological achievements	0	0	+	+
2	Analysis and accounting of tendencies of the given technology development	0	+	+	0
3	Technology protection status	0	+	+	+
4	Patent clearance	0	+	+	+
5	Refreshing and prospects of the technology development	-	-	0	+
6	Research and Development oriented to development of new products	+	-	-	0
7	Existence of demand	0	+	+	+
8	Competitive position	0	0	+	+
9	Evaluation of the total market volume	0	+	+	+
10	Evaluation of the market share	0	+	+	+
11	Tapped foreign market	0	0	+	+
12	Evaluation of the technology usage period	-	-	+	+
13	Chances for commercial success	-	0	+	+
14	Estimated sales	-	0	+	+
15	Position in the competitive struggle	-	-	0	+
16	Conformance to the existing distribution channels	-	-	0	+
17	Level of education and previous experience of managers of the agricultural enterprise	+	+	+	+
18	Managers' personal focus on the aspects of risks and methods of their decrease.	0	+	+	+
19	Extensive and clear entrepreneurial idea	+	+	+	+
20	Personal contribution to the enterprise	+	+	0	0
21	Availability of a team of managers before the beginning of operation of a new enterprise	0	+	+	+
22	Determination of the role of the enterprise by its founder	-	-	+	+
23	Determination of the structure	-	0	+	+
24	Determination of the future activity	0	+	+	+
25	Development of the production infrastructure	-	-	+	+
26	Conformance with the existing facilities	-	-	+	+
27	The price of resources and their availability	-	+	+	+
28	Availability of production personnel	-	-	+	+
29	Demand in extra capacity	-	0	+	0
30	Machinery purchasing (including on leasing)	-	0	+	+
31	Balanced approach to the organizational risk	-	0	+	+
32	Sales growth	-	-	0	+
33	Moment of reaching the point of return	-	+	+	+

Region in 2005-2012 by the Russian Research Institute for Melioration This proves that the necessary point is that the interests of authors and investors need to become closer to each other, which can be achieved with the help of education in the sphere of technological management.

The next step is the development of the score system for the project quality, at which system some items are given certain score points according to their importance and the ranking parameters also are given quantitative evaluation (Table 3). The total score is calculated by summing the score points and it is considered as the index of the project value. At that, the question of applicability of such an indicator for evaluation of the real value of a project in certain agribusiness occurs.

Using the Russian and foreign experience of innovative business and the results of researches related to small technological businesses, as well as the methods offered above, we can identify the sequence of a commercialization technology manager's actions oriented to improving the agribusiness and also study the tree of managerial decisions. The methods of analysis and evaluation of the market, the competitors, the internal opportunities, the external conditions, etc. are described in literature on management. They include the SWOT matrix and others. Let us consider the missing element of the technology commercialization management for small agricultural businesses – the selection of decision options.

During the research, we found out that the processes described below take place in the market economical environment when they are impacted by the total of external conditions and internal factors. On the one hand, the need in the activity types (services, products, items), which means there is the demand and on the other hand,

Table 2: Criteria of selection and their importance

		Indexes		
	Criteria	author	investor	bis-plan
1	Duration of the developer's operation and its technological achievements	u	i	r
2	Analysis and accounting of tendencies of the given technology development	i	i	s
3	Technology protection status	u	i	s
4	Patent clearance	u	i	r
5	Refreshing and prospects of the technology development	u	i	r
6	Research and Development oriented to development of new products	i	u	r
7	Existence of demand	u	i	o
8	Competitive position	u	i	o
9	Evaluation of the total market volume	l	h	r
10	Evaluation of the market share	i	i	s
11	Tapped foreign market	u	i	s
12	Evaluation of the technology usage period	u	i	r
13	Chances for commercial success	u	i	s
14	Estimated sales	i	i	s
15	Position in the competitive struggle	u	i	r
16	Conformance to the existing distribution channels	u	i	r
17	Level of education and previous experience of the managers of the agricultural enterprise	u	i	s
18	Managers' personal focus on the aspects of risks and methods of their decrease.	u	u	r
19	Extensive and clear entrepreneurial idea	i	i	s
20	Personal contribution to the enterprise	u	i	s
21	Availability of managers team before the new enterprise starts working	u	i	r
22	Determination of ther role of the enterprise by its founder	u	i	r
23	Determination of the structure	i	u	r
24	Determination of the future activity	i	i	r
25	Development of the production infrastructure	u	i	s
26	Conformance with the existing facilities	u	u	r
27	The price of resources and their availability	u	i	s
28	Availability of produciton personnel	u	i	r
29	Demand in extra capacity	u	i	r
30	Machinery purchasing (including on leasing)	i	u	r
31	Balanced approach to the organizational risk	u	u	r
32	Sales growth	u	i	s
33	Moment of reaching the point of return	u	i	s

Table 3: Quantitative evaluation of criteria

Criteria	Criterion's importance	Very good (5)	Good (4)	Satisfactory (3)	Bad (2)	Very bad (1)	Evaluation of the criterion's contribution
Environmental and political criteria							
1	10	5					650
2	8		4				32
3	8				2		16
4	9		4				36
Organizational and production criteria							
1	10						30
2	6			3		1	6
Total	627						

opportunities and restrictions related to the specific activity (taxes, raw materials, resources, basis, personnel) encourage the situation, when enterprises in the same sphere and under specific conditions are in demand and are accessible by everyone and, therefore, they develop and their number increases, where enterprises of other activity types are not in demand and, thus, they cannot exist and their number gently decreases.

The process of structure changing takes place according to the above-mentioned sequence. Hence, the role of government control in the market environment is

focused on strengthening, normalization and finally, synchronization of the structural and topological dynamics of the processes that are heading toward each other.

To our opinion, the initial pulse for the establishment of a progressive regional structure of the agribusiness must be the total implementation of efficient systems of managing local economic environment (SMLEE), which must be identified as the system of management of the market environment in a certain standalone administrative-territorial entity, which includes goals, tooling, objects, bodies and control environment. The main goals here can be identified as the creation of an efficient regional market environment, solution of social issues, the increase of budget receipts and provision of economic growth and improvement of population's life based on it.

CONCLUSIONS

The tasks of forming the methodology of innovative management of agricultural business cannot be solved in full only by using the economic tools available presently for economists and managers of agricultural businesses and business groups in Russia. It is necessary to systematize the existing methodology and refine upon the prospective ones using the unified conceptual basis, which can be represented by the concept of managing economy as a total of developing economic systems.

Management of innovative development of the agribusiness must be carried out in the course of turning the knowledge of sector-related markets of agribusiness and agricultural systems into a single production resource and in one of the most important results of production activities. At that, producing new knowledge on agricultural systems must be treated as the conversion of certain primary resources into the finished product, using the concepts of capital, labor, production function and other conventional economic categories, which are very familiar to agricultural economists. The specificity of knowledge production in its function as a special economic resource, which requires special resources and conditions for its creation and which specifically participates in the business processes and the processes of development of economic and social systems of the agribusiness.

REFERENCES

1. Frame Davidson, J, 1994. The New Project Management. San Francisco: Jossey-Bass Publishers, pp: 153-176.
2. Glebova, I., D. Rodnyansky, R. Sadyrtdinov, R. Khabibrakhmanova and Y. Yasnitskaya, 2013. Evaluation of Corporate Social Responsibility of Russian Companies Based on Nonfinancial Reporting. Middle-East Journal of Scientific Research, 13: 143-148.
3. Dinda, S., 2004. Environmental Kuznets Curve hypothesis: A survey. Ecological Economics, 49(4): 431-455.
4. Wilson, G.A., 2001. From Productivism to Post-Productivism... and Back Again? Exploring the (un)Changed Natural and Mental Landscape of European Agriculture. Transactions of the Institute of British Geographers, 26(1): 77-102.
5. Larionova, N.I. and Y.A. Varlamova, 2013. The Trends of Household Economic Behavior in International Comparison. Procedia Economics and Finance, 5: 737-746.
6. Safiullin, L.N., N.G. Bagautdinova, N.Z. Safiullin and I.R. Gafurov, 2012. Influence of Quality of the Goods on Satisfactions of Consumers. International GSTF Business Review (GBR), 2(2): 225-232.
7. Coate, S. and M. Ravallion, 1993. Reciprocity Without Commitment. Characterization and Performance of Informal Insurance Arrangements. Journal of Development Economics, 40(1): 1-24.
8. Bernstein, H. and T.J. Byres, 2001. From Peasant Studies to Agrarian Change. Journal of Agrarian Change, 1(1): 1-56.
9. Safiullin, M.R., L.A. Elstin and A.I. Shakirova, 2012. Evaluation of Business and Economic Activity as a Short-Term Forecasting Tool. Herald of the Russian Academy of Sciences, (4): 290-294.
10. Panasyuk, M.V., E.M. Pudovik and M.E. Sabirova, 2013. Optimization of Regional Passenger Bus Traffic Network. Procedia Economics and Finance, 5: 589-596.
11. Safiullin, L.N., G.N. Ismagilova, D.Kh. Gallyamova and N.Z. Safiullin, 2013. Consumer Benefit in the Competitive Market. Procedia Economics and Finance, 5: 667-676.
12. Bernstein, H., 1997. Agrarian Questions Then And Now. Journal of Peasant Studies, 24(1-2): 22-59.
13. Marsden, T., 1998. Agriculture Beyond The Treadmill? Issues For Policy, Theory And Research Practice. Progress in Human Geography, 22(2): 265-275.