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## **THE ROLE OF THE STRATEGY IN THE INNOVATION ABILITY OF THE HUNGARIAN AGRICULTURAL MACHINERY MANUFACTURERS**

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**Abstract:** The current production of the Hungarian agricultural machinery manufacturing sector, which used to see better days, lags behind the production of the previous years to a great extent. The organisational structure of the Hungarian agricultural machinery production has totally been transformed, primarily regarding its ownership structure. The general problem of this sector is that they can only spend slight amounts on development an innovation relative to foreign-owned concerns. As a consequence, loss of market is not surprising as a bit more than one-quarter (26-27 percent) of the current total domestic market turnover derives from domestic manufacturers. The extent of market loss and the general situation of the national agricultural machinery manufacturers justify that the present of this sector must be dealt with by searching the ways-out of the crisis and make steps to develop.

The conclusions of our paper are based on the examination results of questionnaires and in-depth interviews that were carried out at 58 Hungarian agricultural machinery manufacturing companies. The characteristic features of the companies that were involved in the examination reflect the situation of the entire sector in Hungary properly. According to our experience and sources, the Hungarian conditions are also applicable and typical of the agricultural machinery production of the other ex-Socialist countries.

In our paper first of all the method of the empirical research is presented where the structure of the questionnaire used in the research and the process of data recording and processing are shown in details. In our present study some of our results together with

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those based on univariate descriptive statistics are published. Besides the brand-new or highly developed products and technological (procedure) innovations, furthermore, some of the indicators of the strategy of the companies are also presented.

**Key words:** innovation, agro-technical development, key-factors of innovations,

## INTRODUCTION

It is an empirical fact that besides the financial constraint, structural troubles also prevent the national technical innovations from being successfully developed.

In Hungary the total expenditure on research and development reached 299.5 billion HUF in 2009, which was 1.14 percent of GDP (GERD indicator). It means a 12.3 percent growth relative to the previous year at current prices [4].

The share of the state of the GDP-related R&D expenditure is 0.42 percent of the total sum (state-owned research institutes and those in higher education altogether) while the expenditure of the business sector amounts to 0.58 percent of GDP. This proportion has been improving relative to the previous ones or, rather, approaches the international practice. However, approximately 60 percent of the R&D expenditure of the national business sector is realised by exclusively foreign-owned enterprises or those which are mostly in foreign hand [5]. In most of the developed countries the national companies spend more of their revenues on R&D expenditure than the foreign-owned ones.

The high-level concentration of corporate R&D can also be observed: almost half of the expenditure derives from 17 big companies. The share of those employing fewer than 20 employees is only 12.6 percent.

Unfortunately, in the sector of the national small-and medium-sized enterprises not only research and development but also the number of licenses and know-how purchase is slight, so the demand (pull) side of innovation is weak under the present system of conditions [7].

- 72-74 percent of the segment is inactive regarding innovation or simply struggle to survive.
- 22-23 percent belongs to those catching-up, i.e. they show some initiatives in innovation that could prevail in the standard of their products and services by means of technological transfer, information and advisory institutions.
- Only 3-6 percent of companies make up the group of promising innovative companies [6].

According to our experience the above-mentioned facts can also hold true for agro-technical innovations more or less. Before the change of the regime only 27 agricultural machinery plants operated mostly “embedded” in the system of the national “agri-business” [2]. Due to this fact (among others), 60 percent of the requirements for agricultural machinery in the country were covered by these plants at a more advanced standard than the average of the former Comecon countries. During the past 15-20 years the organisational structure of the Hungarian agricultural machinery production has totally been transformed. Generally, the machine manufacturers operating as small-or medium-sized enterprises appear on the market with “separate” products usually not developed by themselves. Consequently, they are not price-setters, rather price takers.

The product line of the companies that are successful in the international competition primarily consists of mass-produced and highly automated products. The national agricultural machinery manufacturers-partly due to their size- are not able to mass-produce in such an extent that they could compete with the West-European, American and Asian companies of huge capital power either in productivity, price or product supply [8].

Regarding innovation, the national agricultural machinery manufacturers also significantly lag behind as they can only spend slight amounts on development relative to foreign-owned concerns. As a consequence, loss of market is not surprising as a bit more than one-quarter (26-27 percent) of the current total domestic market turnover comes from domestic manufacturers. The extent of market loss and the general situation of the national agricultural machinery manufacturers justify that the present of this sector must be dealt with by searching the ways-out of the crisis and make steps to develop.

## **MATERIAL AND METHODS**

Our examinations are mainly based on primary research. When formulating the research objectives, we relied on the theoretical conclusions drawn from the related specialist literature as well as the earlier publications of experts and empiric research results.

The basic objective of the research is to explore and analyse the innovation activity of the national agricultural machinery manufacturers, its results and influencing factors.

The more detailed questions and points of view of the examination that can be derived from the basic question of the research are the following:

- What are the main directions, assisting and hindering factors of the technical development activity of the companies?
- What are the dominant directions and bottlenecks of the agri-technical innovations?
- How can technical development be described compared to the research results of other sectors?

Finally our objective is to have a picture of the innovation activity of the organisations involved, the special features of innovations, the partners taking part in the processes and the impact of innovation on the general situation of the companies through our examinations. Besides the brand-new or significantly developed products and technological procedure innovations, organisational features, marketing activity and the environment of the innovation are also considered. The questionnaire serving as the basis of primary research embraces three years, from 2007 to 2009.

According to the estimations of experts the number of agricultural machinery manufacturing companies is between 100-120 in Hungary. A great part of the enterprises are involved in more than one activity: a lot of predominantly small enterprises are also engaged in other activities besides machinery production so that is why it is difficult to define the actual number of 'agricultural machinery manufacturers' exactly. Most of the organisations that are subject to our analysis are small enterprises whose annual revenue does not reach one billion HUF.

As there was not an available list on all the companies on the basis of which a pattern of probability could have been compiled, the companies that could be drawn into the research had to be defined in another way. To find the companies necessary for carrying out the questionnaire, the address list of MEGOSZ (National Association of Agricultural Machinery Manufacturers) served as a basis and the heads of this professional organisation were also consulted.

In the data recording phase of the research a multi-channel approach was applied whose main points are:

- 15 machine manufacturers (hopefully the most significant companies of the sector) were questioned at personal in-depth interviews.
- 25 organisations were provided with a questionnaire sent by post requiring them to send back the material filled in.
- 18 machine manufacturers were questioned at internet-interviews.

Sample-taking cannot be regarded representative. However, during the research it was not our objective to draw conclusions that can be generalised for the basic population. Our basic objective was to give a thorough examination of innovation activity and to achieve it, we tried to select the organisations regarded to be suitable on the basis of preliminary professional considerations. As such a thorough examination dealing with the innovation activity of agricultural machinery manufacturers was not carried out in the past 25 years on a national level, we consider our research is to resolve discrepancies in the professional field.

In compliance with the general methodological requirements first of all some pilot questions were asked on the basis of which the questionnaire was finalised. Data recording took place between March 2010 and August 2010.

The duration of in-depth interviews was various, typically 90-100 minutes per interview. A positive feature of them was that data providers mainly come from the senior management (chief executive officer, head of production or technical manager). In this way first-hand information on the general situation, actual projects and strategic plans of the organisation involved was gained besides the reliability of data. The atmosphere of the interviews was typically of honesty and intimacy. Before starting the interviews we assured our interviewees of the confidential nature of the research, i.e. their names and opinions were treated as highly confidential and were not made recognisable for others. Some of our interviewees have already expressed their enquiry in our results.

The questionnaires compiled on the basis of the interviews and sent out by post were also accompanied by a guide to filling in. Seven-ten days after the questionnaires had been filled in, the enterprises were also contacted by phone asking them to cooperate. A kind of evaluation of our preliminary work is that all the responding organisations gave answers that could be assessed.

The statistical processing of data recorded by the questionnaires was carried out by using SPSS 13.0 programme.

## **RESULTS AND DISCUSSION**

The breakdown of the concerned enterprises by size is presented by Figure 1. The types of enterprises based on the number of their employees were considered in

accordance with Act XXXIV of 2004 [9]. The breakdown reflects that the SMEs, typical of the sector, are overrepresented. Of the responding enterprises, micro enterprises represent significantly less weight in comparison with the data of the sector. The reason for it is that it was not the objective of our research to analyse them in more details.

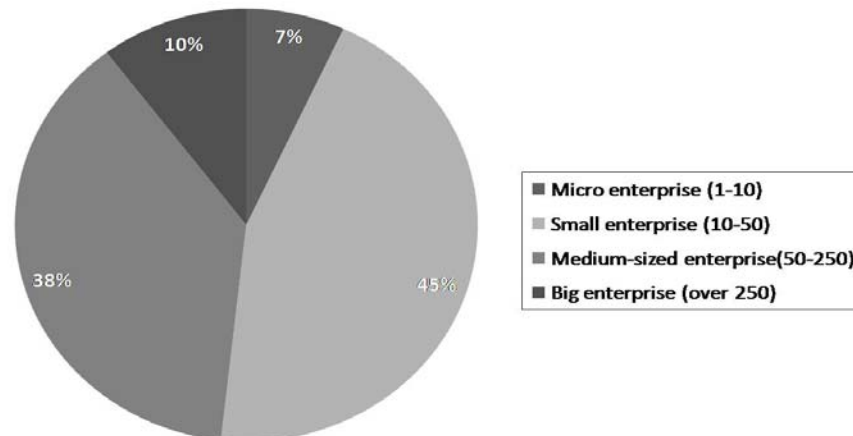


Figure 1. The breakdown of the enterprises concerned by size

In our questionnaires we separately dealt with the analysis of the role of foreign-owned innovation. Twenty-one percent of the companies involved indicated that they had foreign owners or part of its shares in foreign hands. The responses reflected that at companies owned by foreigners in 100 percent the desire for innovation is rather pushed in the background and the tasks of the national subsidiaries are limited to the launch of the products developed by the parent company in their plans and to ensure the maximum cost efficiency in production.

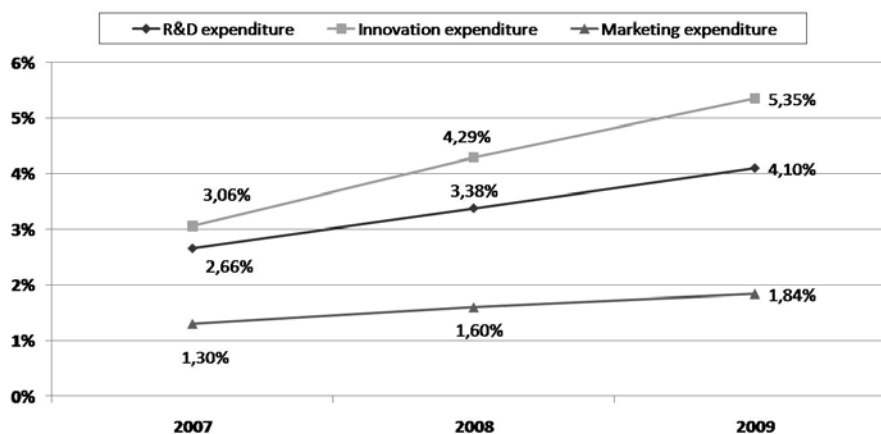


Figure 2: Expenditure on innovation, R&D and marketing

We examined how much of their revenues the enterprises spend on innovation, research-development and marketing (Fig. 2). In our experience the examined enterprises have realised the necessity of innovation in the marked areas. In this respect revenues show an increasing tendency despite the fact that the global economic crisis had several drawbacks in the growth of most companies. The companies spend hardly more than one percent of their revenue on marketing. This can also be explained by the fact that this sector is a typically neglected one as marketing-and advertising costs are the part of expenditures that enterprises can save most of in time of crisis.

We also examined which markets the enterprises realise their revenue (Fig. 3). It was an outstanding fact that the enterprises concerned sold their products on the Hungarian market in 72 percent and during the past three years there has not been a considerable shift in this area. The exact numbers were completed by the in-depth interviews with the fact that one of the main intentions of the enterprises is to break successfully in foreign markets. However, most of them reported failures they faced. The reason for it derives from a lot of factors altogether: although their improved products have excellent value for money, they cannot compete with the local competitors mainly due to lack of a proper channel of distribution. Another problem is the resistance of the West-European farmers to less-known brands. The resources of the enterprises are depleted by demanding developments so they can hardly spend on marketing and PR activities, which would be essential in this sector.



*Figure 3. The breakdown of revenue by markets*

On the examined timeline 34 percent of the enterprises had a separate R&D department. The picture is made even more complicated by the fact that at the departments of such small-and medium-sized enterprises there are only one or two full-time employees to deal with the questions of innovation on the average compared to the big companies that can afford to operate R&D department with much bigger staff.

In case of the marketing departments, the result was the same as 30 percent of the examined organisations had such a section. In this department typically one person in full time, or rather, part-time is employed to deal with marketing issues.

An interesting finding is that 48 percent of the enterprises operate in a linear while 38 percent of them in a simple organisational form, i.e. they do not have functionally separate organisational units.

Strategy in the competitive market is such a guideline of corporate function that defines the long-term goals and the system of means and methods that are necessary to reach them. Strategic planning plays an important role at all types of companies especially in the case of the innovative ones as it is they who dare to enter an uncertain area in its technical and economic sense due to their special activities [1]. A thoroughly planned conscious strategy is the basis for creating innovations and operating an innovative organisation. Innovation strategy has to derive from and serve corporate strategy. The main point of innovation strategy is how the company can reach the market starting from research and development via product/service/technology production in the easiest way [3]. An effective innovation strategy is implemented in a simple, concentrated way to a small extent so at the beginning scarce resources (funds, labour) are used and, simultaneously, the way out is also considered.

At the time of the research almost 44.8 percent of the responding companies had a written corporate strategy and only 33 percent could present innovation strategy.

Figure 4 illustrates the reason why the respondents decide on investing in innovation. Typically external forces (31 percent) explain why some of them lack a concrete conception on corporate running. Ten percent of them make a decision relying on other's opinion. The interviews revealed that mostly it is the business partner's recommendation and opinion that is reflected in the figures and nearly 14 percent make decisions based on anticipation.

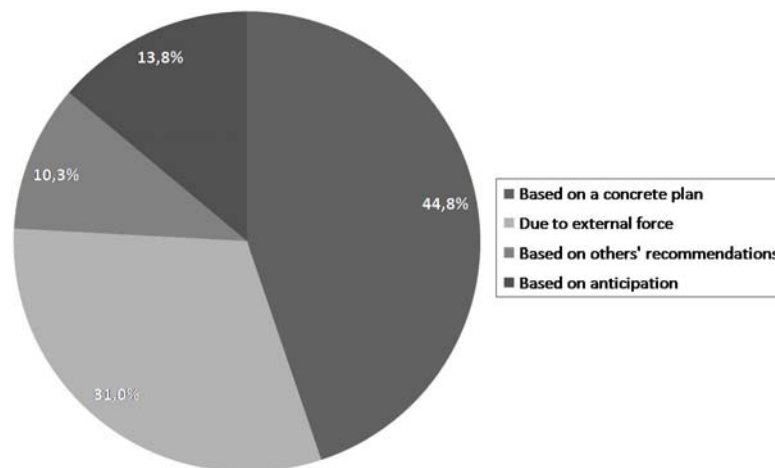


Figure 4. The main motives of innovation investment

Basically, innovation strategies can be of setting or following nature. The setting companies strive to have a leading role based on their technological advantages. At the same time, the application of this strategy incurs higher market and technological risks. It turns out from the examinations conducted so far that only a few national agricultural machinery producers are able to carry out setting innovation strategy. The relevant part

of the questionnaire also justifies the statement and 22 percent strive to carry out setting innovation strategy. The follower strategy is more widely used (88%). The results so far also reflect that the national agricultural machinery manufacturers aim at the user oriented further development of once introduced innovation and technological solutions. As they carry on with their former innovation results, the technical (technological) risk cannot be regarded really significant.

## CONCLUSIONS

The characteristics of the Hungarian agricultural machinery manufacturers drawn in the examination illustrate the situation of the sector in the country. A decisive part of the organisations (83%) are small-and medium-sized enterprises. All in all, only about 26-27% of the national need for machinery derives from national manufacturers. Their attitude in development is reflected by the fact that more than 70 percent of their products are sold on the domestic market. As a result of their intention to increase export, one-quarter of their products are launched on foreign markets. Regarding the factors that influence their sales results we concluded that almost one-third of the examined organisations had a separate R&D department and the proportion of organisations that have a separate marketing department is similar.

Among the examined indicators of innovation performance the following ones must be highlighted:

Organisations were spending more and more on R&D in the examined years, in 2009 it comprised 4.1 % of their average revenue. This value means a nominal increase of 154% relative to the one in 2007.

Regarding the main directions of R&D activities it can be stated that most attention is paid to the development of the existing products (71%) and technologies (59%). Fewer companies are willing to deal with novelties, 66% are striving to develop new products and 52% to develop new technologies.

At the time of the research almost 44.8 percent of the responding companies had a written corporate strategy and only 33 percent could present innovation strategy.

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## ULOGA STRATEGIJE U INOVACIONIM SPOSOBNOSTIMA MAĐARSKIH PROIZVOĐAČA POLJOPRIVREDNE MEHANIZACIJE

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**Sažetak:** Trenutna proizvodnja poljoprivrednih mašina u Mađarskoj u velikoj meri zaostaje za proizvodnjom prethodnih godina. Organizaciona struktura mađarske proizvodnje poljoprivrednih mašina je potpuno transformisana, pre svega u pogledu vlasničke strukture. Generalni problem ovog sektora su male investicije u razvoj inovacija u odnosu na strane proizvođače. Posledica toga je gubitak tržišta, tako da ne čudi što malo više od jedne četvrtine (26 -27%) sadašnjeg ukupnog domaćeg prometa potiče od domaćih proizvođača. Stepen gubitka tržišta i opšte stanje nacionalnih proizvođača poljoprivrednih mašina pokazuju da ovaj sektor mora da se bavi traženjem puteva za izlaz iz krize i daljim razvojem.

Zaključci našeg rada su zasnovani na rezultatima ispitivanja preko upitnika i ličnih razgovora sa ispitanicima iz 58 mađarskih preduzeća za proizvodnju poljoprivrednih mašina. Karakteristične odlike kompanija koje su učestvovala u ispitivanju pravilno odražavaju situaciju celokupnog sektora u Mađarskoj. Prema našem iskustvu i izvorima, mađarski uslovi su takođe primenljivi i tipični i za proizvodnju poljoprivrednih mašina u ostalim bivšim socijalističkim zemljama.

U našem radu, pre svega je predstavljen metod empirijskog istraživanja tako što su detaljno prikazani struktura korišćenih upitnika i postupci sakupljanja i obrade podataka. U našem sadašnjem istraživanju prikazani su neki od naših rezultata zajedno sa

rezultatima deskriptivne statističke analize. Pored potpuno novih ili visoko razvijenih proizvoda i inovacija tehnoloških postupaka, takođe su predstavljeni i neki od indikatora strategije preduzeća.

***Ključne reči:*** *inovacije, agrotehnički razvoj, ključni faktori inovacija, strategija*

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