

THE PARAMETERS OF PRODUCTION MEANS SELECTION AS A BASE FOR SUPPLIER'S MATURITY – ASSESSMENT PREPARATORY

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Abstract The subject of the study, which is a preparatory study, is the determinants of the selection of technological resources. The research was conducted from the perspective of small, medium and large enterprises producing agricultural machinery. The fundamental aim of the research is to answer the following questions: what factors – from the point of view of agricultural machinery manufacturers – are important and determine the choice of selected means of production, and which of the above may constitute the basis for assessment in the perspective of the maturity of their suppliers? Achievement of the main objective required formulation and implementation of partial objectives, which included: a) Determination of the importance of production means and their impact on the production process; b) Using the method of reconstruction and interpretation of the literature on the subject – nomination of factors taken into account in the selection of production means; c) Compilation of the list of desiderata constituting the foundation of the research tool in the form of an evaluation sheet being the resultant of literature exploration and discussion among deliberately selected experts related to the agricultural machinery sector. Specified applications have become a substrate defining the proper direction of further research (assessment of the significance of requirements), the results of which will be presented in the next part of the study.

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1. INTRODUCTION

In the input market, the main players in determining its scale and functioning are manufacturing companies. Those that produce means of production also buy them as equipment and materials necessary for their production processes (Wojciechowski 2003, p. 39). Therefore they participate in transactions on this market in two ways: as buyers and sellers. Even if they produce consumer goods, they are always buyers of the means of production needed to produce them, and thus they also operate on the means of production market, although only as buyers.

Therefore, in manufacturing enterprises, there are sequential operations aimed at producing a product or providing a service. In order to carry out their production tasks, systems must have adequate material resources, among which one can distinguish such means as: objects, machines, tools, materials, and use processes adapted to these tasks (e.g. the process of technical preparation of production, manufacturing process) (Bąbiński 1972, p. 68). Each production system combines specific means of production with objects of work and executive employees necessary for the execution of production processes.

Having a specific production task, using the necessary input resources in a given production system, they should be selected in such a way that the costs incurred are minimal. Moreover, it is necessary to strive for maximum use of all factors obtained at the output, e.g. aiming at maximum use of post-production waste by transforming it into a full-fledged product.

Delivery of resources in accordance with defined needs is expressed not only by the delivery act itself, but also requires meeting specific expectations of the producer (customer) closely related to the order (Fechner 2007, p. 35). Meeting these conditions from the point of view of the "user" is a source of his satisfaction, while from the point of view of the quality assessment of the production process it determines the level of maturity of the supplier, i.e. the ability to adapt it to the needs of the manufacturer.

In relation to the above, the subject of the study, which constitutes a preparatory study, is the determinants of the choice of technological resources. The research was conducted from the perspective of small, medium and large enterprises producing agricultural machinery. The fundamental aim of the research is to answer the following questions: what factors – from the point of view of agricultural machinery manufacturers – are important and determine the choice of means of production, and which of the above may constitute the basis for assessment in the perspective of the maturity of their suppliers? Achievement of the main objective required formulation and implementation of partial objectives, which included:

(1) Determination of the importance of production means and their impact on the production process; (2) Using the method of reconstruction and interpretation of the literature on the subject – nomination of factors taken into account in the selection of production means; (3) Compilation of the list of desiderata constituting the foundation of the research tool in the form of an evaluation sheet being the resultant of literature exploration and discussion among deliberately selected experts related to the agricultural machinery sector. Specified applications have become a substrate defining the proper direction of further research (assessment of the significance of requirements), the results of which will be presented in the next part of the study.

Supplier evaluation is an extremely important issue for the effectiveness and efficiency of any company. It is connected with constant cost competition and pressure to increase broadly understood quality. Since there is a supply logistics system in place, the improvement of supplier evaluation has become a challenge for many companies. In the area of corporate supply logistics, it takes place twice: in the phase of supplier selection (before cooperation starts) and in the phase (during) of the cooperation. In the context of the above, the paper presents the method of evaluating the maturity of the supplier in terms of the implementation of important factors and determining the choice of production means being offered.

2. MEANS OF PRODUCTION – THE BASE IN THE PRODUCTION PROCESS

The manufacture was an embryonic form of capitalist enterprise (Niewiadomski 2016, p. 18), an internal division of labor was used among specialized craftsmen already in the form of work organization (Czermiński 1971, p. 26). At that time, man organized work processes, developed objects and tools and methods of making a given object. The quality of manual work was the responsibility of the contractor. Over the years, tools became more and more complex and were gradually supplemented by machines. At first they were simple devices for transforming energy and performing simple works. Over the years, machines expanded the mechanical capabilities of the human body or senses, as well as regulating and organizing the processes of life (Mreła 1975, p. 1). The physical strength of the task performer was replaced by the much greater strength of the machine, in which man became the operator and user. In the context of the above, knowledge and skills related to machines, tools and new production methods became increasingly necessary. Research initiated by such engineers as: K. Adamiecki, F. W. Taylor, H. L. Gantt and H. Ford made it possible to get to know the means of production and objects of work, their better use, as well as to increase the efficiency of operations in a company (Nogalski & Niewiadomski 2014, p. 87).

The introduction of machinery has revolutionised the existing method of production. A company was created in which two systems worked together: people and machines. The efficiency of the company became dependent on the appropriate symbiosis of these systems. New tools, machines and technologies changed the way of working and became the beginning of the establishment of factories. On the basis of the law of economies of scale and specialization, thanks to the development of technical weaponry (machinery, equipment, technology) and the organisation of production (spare parts, production in production batches), the quantity and seriality of manufactured goods increased (Maczewski 1997, pp. 289-291).

The development of mass production led to the search for ways to increase its efficiency by improving the organisation of the production process and, above all, the work of individual contractors. The aim was not only to make better use of means of production, raw materials or materials, but also to use them more efficiently and use them optimally.

The apogee of the mass production organization was the years of World War II in the United States, where for the needs of warfare a lot was produced, quickly, rhythmically, in large series and cheaply (Walentynowicz 2013, p. 62). Since the 1950s, the concept of production began to change. Citizens became increasingly wealthy, focused on higher quality products, tailored to their current needs. Economic conditions were dramatically tightened. Opportunities and ways to improve the competitiveness of enterprises were sought. As the traditional concept of mass production was no longer sufficient, other solutions requiring the possession and use of various resources to be transformed into the effects of work of a given organization, i.e. goods and services, were feverishly sought (Nogalski & Niewiadomski 2013, p. 448).

Nowadays, a new paradigm of a flexible and lean company is being adapted, which assumes that technological resources, knowledge resources, relational resources and financial resources are of central importance for implementation processes, which determine the dynamics of changes in the product portfolio, and thus adaptation to changes in the turbulent environment. The whole range of input elements of the production process includes specific means of production, such as: machines, tools, equipment, instruments, buildings and structures, means of transport, by means of which the contractor can transform objects of work, i.e.: raw materials, materials, semi-finished products and energy into finished products, creates a production system. Material factors influence the course of production and its effect. The use of a worn-out (not durable) machine, the use of improper material (steel with improper parameters, e.g. hardness) or tools (damaged lathe knives) worsens or prevents the performance of the task.

The above-mentioned factors, in the opinion of the authors, determine the flexibility, and the level of these features implies the recognition of market opportunities offered by the market niche and the possibly quick reconfiguration and integration of the manufacturing process and thus the quick implementation of a new product.

Knowledge of the input factors of the manufacturing process influences the final result. The more you learn more about technological resources, the easier it is to manage them. The production system model, including input resources and output factors, is shown in Figure 1.

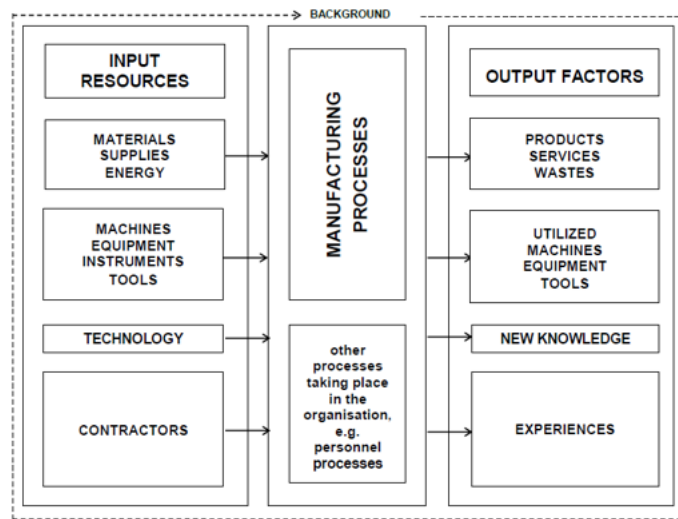


Fig. 1 Production system model; Own study based on research

The listed elements of the system are generally used repeatedly. They are not purchased for the sole purpose of producing a single product. The purchase of certain machinery for one production process would be completely uneconomic. Therefore, the choice of the means of production should be guided by one of the two following principles of farming: (1) minimising inputs with a predetermined objective; (2) maximising productivity (efficiency) of the measures concerned – maximising the achievement of the objective (Kotarbiński 2003, p. 33).

Means of production planning is a process whose input includes information on key requirements implied by the company's implementation plans and on the possibilities of lending necessary resources existing on the external market. At the exit, information is obtained about specific needs that ensure the implementation of strategic objectives.

Practitioners are increasingly convinced that competitive advantage is gained thanks to unique solutions that are considered to be a strategic resource in a given enterprise. It is the key resources possessed by the company that allow to create appropriate conditions for people, conducive to effective actions. The need for a process approach to managing the flexibility of the organization results from modern manufacturing methods. The manufactured products are derived from not one but several resources, and therefore flexibility management should be applied not only to a single resource, but also to a group of resources.

Progressive specialization, within particular phases of the manufacturing process, has contributed to separating the logistics of supply with production means. The main task of the supply logistics is to provide the company with an efficient supply of all the input resources, including the means of production, necessary for continuous and rhythmic business operations. The mission of the supply logistics is therefore to maximise the security of all the company's needs at minimum logistics costs in order to achieve market-oriented supply deliveries.

The demand on the industrial goods market is largely linked to the type of technological resources acquired, and this has a direct impact on the way suppliers are qualified and assessed for maturity. Without reliable measurement results, it is difficult to objectively assess the effectiveness of supplies. Companies that have adopted a process orientation face many difficulties here. How to design a system for managing the supply of means of production? How to construct indicators of suppliers' qualifications and maturity? How and with what frequency should it be measured? How to analyse the results obtained? These are the most common questions that entrepreneurs are looking for answers to.

When assessing the maturity of suppliers, a number of methodological problems need to be solved. From the point of view of the purpose of this study, also in the research sense, this measurement is very important. Selection of appropriate sources of purchase (suppliers) is one of the most important supply problems in a market economy.

Properly conducted evaluation, apart from compiling a set of potential suppliers of means of production, establishing criteria for their evaluation, establishing the rules of scoring for individual desiderata, should take into account the proper setting of their hierarchy. Notwithstanding the above, the basic selection criterion should be to create the basis for a smooth production process while ensuring an appropriate level of quality of the supplied resources. Of course, it is important to strive for cost minimisation.

For the purposes of this study, the maturity of the supplier has been defined by 19 criteria.

3. MATERIAL AND TEST METHOD

Using the method of reconstruction and interpretation of the literature on the subject, supported by own experience and participatory observation, a number of factors determining the choice of the means of production supplier were identified. The literature search (a1) supported by brainstorming among deliberately selected experts (a2) – at the design level – enabled the compilation of a research tool in the form of an assessment sheet. The diagram of the research implementation is shown in Figure 2.

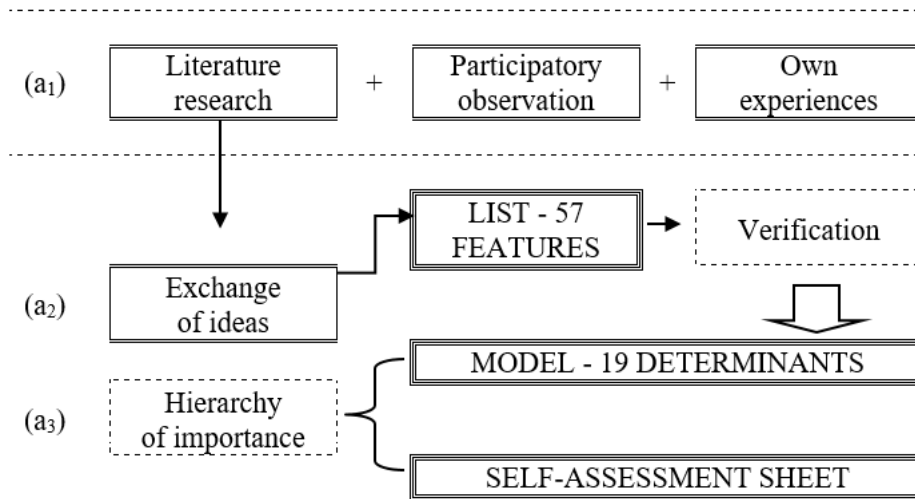


Fig. 2 Scheme for the implementation of studies; own study based on research

In the expert study (a2) two stages were distinguished: in the first stage the coordinator presented his own point of view (participatory observation, own experiences) and the catalogue of desiderata being the resultant of reconstruction and interpretation of the literature on the subject (a1). In the second one, in three five-person teams, the session of generating original ideas (a factory of ideas) took place. The session of generating ideas was conducted among 16 deliberately selected experts (professionally active persons) participating in the supply processes of enterprises (13) and institutions (3) from which they come or for which they act (Table 1).

For 5 minutes, the participants wrote down the desiderata they had selected, which constituted the choice of the means of production. Then, after 5 minutes, they handed the card over to another group (4 people), which added their observations. After another 5 minutes the card was transferred to the next group. In this way, after 3 rounds, the group generated 57 components. After the session, the evaluation of the results was summed up. The coordinators of the research wrote down all the components mentioned above, confronted them with the proposals of selected researchers, grouped similar ideas, which in perspective allowed them to establish a final list of 19 factors. Such a significant reduction in parameters was significantly influenced by the fact that the research was narrowed down to criteria related only to the directly offered means of production; competences related to the supplier itself, such as the ability to create relations, market share or direct opinions, were not taken into account.

Table 1 Characteristics of experts (a₂); own study based on research

Group	Amount	Specialisation/Station	(%)
Owners of production enterprises in the agricultural machinery sector	7	Organization and Management; Ownership supervision	43.75
Managers of manufacturing companies	2	Strategic management, controlling purchases	
Vice President of the Management Board (Ltd., L.P.)	1	Supply strategies, imports (China, India)	25.0
Member of the Management Board responsible for logistics	1	Supply logistics	
Supply Specialist	1	Movement of goods to ensure liquidity of sales	6.25
Supply logistics specialist	1	Supply chain management	6.25
Research Network Łukasiewicz Industrial Institute of Agricultural Machinery - Manager	1	Assessment of the relevance of agricultural machinery requirements	
Ph.D., D.Sc. Assoc. Prof.	1	Cost management in supply logistics	18.75
Polish Logistics Association - member	1	Supply of materials	
			100%

Qualitative research was aimed at identifying these determinants. Their aim was to understand their perception, in particular the proper interpretation and definition. The information collected in this way was presented in a descriptive way. Qualitative research made it possible to identify opinions, feelings and associations that were caused in the analyzed case by a number of factors relating to the problem. On the basis of the results of qualitative research, guidelines for quantitative research were established. The conducted research helped to establish a tool for the next study, including the formulation of problems and key issues. They provided interesting information on the language in which the phenomena of interest to researchers are described by "industry experts". In the opinion of the authors, this allowed to avoid mistakes at the level of question construction and to adapt the language to potential respondents.

At this stage, the main aim of the research was to identify the catalogue of determinants of the choice of production means by a Polish manufacturer of agricultural machinery. Therefore, the selected determinants were not differentiated in terms of their importance, assuming that each of them is very important and each of them should be demonstrated in practical actions by the supplier of production means.

The fundamental task, however, was to define the areas of particular importance (key) from the point of view of quality and effectiveness and self-assessment of the level of their fulfilment by the suppliers of means of production. The introduction of a large number of variables significantly complicated and made it impossible to carry out a reliable assessment, hence the decision was made at the next stage of the research (a3), in which the appropriateness of the selection of particular planes oriented towards the criterion of matching the means of production was verified. This research was aimed at developing a research form in the form of a list of fundamental features; it conditioned the basic research (assessment of the significance of the requirements and the level of their fulfilment).

In the context of the above, the originally developed set of features was verified among 47 industry experts coming from micro (10.64%), small (27.66%), medium (59.57%) and large enterprises (2.13%), including 40.43% of respondents aged up to 40, 31.91% aged 41-50, 19.15% aged 51-60, while 8.51% of respondents were over 60 (Table 2).

Table 2 Characteristics of respondents by age; own study based on research

Age of respondents	Total 100%	
	Number of participants	(%)
up to 30 years old	N=1	2.13
31 to 40 years old	N=18	38.30
41 to 50 years old	N=15	31.91
51 to 60 years old	N=9	19.15
more than 60 years old	N=4	8.51
Total:	N=47	100.00

Taking into account the group of owners, 52.63% were over 50 years old, 21.05% were between 41-50 years old, while 26.32% were under 40 years old (Table 3).

Table 3 Characteristics of owners by age; own study based on research

Age of owners	Total 100%	
	Number of participants	(%)
up to 30 years old	N=0	0.00
31 to 40 years old	N=5	26.32
41 to 50 years old	N=4	21.05
51 to 60 years old	N=7	36.84
more than 60 years old	N=3	15.79
Total:	N=19	100.00

In the case of managers, 10.71% of respondents were over 50, 39.29% were between 41 and 50, 46.43% of managers were between 31 and 40, while 3.57% were under 30. Detailed characteristics are presented in Table 4.

Table 4 Characteristics of owners by age; own study based on research

Age of owners	Total 100%	
	Number of participants	(%)
up to 30 years old	N=1	3.57
31 to 40 years old	N=13	46.43
41 to 50 years old	N=11	39.29
51 to 60 years old	N=2	7.14
more than 60 years old	N=1	3.57
Total:	N=1	3.57

The majority of the respondents had secondary or higher education, of which 57.89% had higher education, 26.32% had secondary education, 15.79% had vocational education. In the case of managers, 67.86% had higher education, 25% had secondary education, 7.14% had vocational education. Detailed characteristics are presented in Table 5.

Table 5 Characteristics of the studied population by education; own study based on research

Education	Owners		Managers		Total	
	40.43%		59.57%		100%	
	Number of participants	%	Number of participants	%	Number of participants	%
Professional	N=3	15.79	N=2	7.14	N=5	10.64
Medium	N=5	26.32	N=7	25.00	N=12	25.53
High	N=11	57.89	N=19	67.86	N=30	63.83
Total:	N=19	100.00	N=28	100.00	N=47	100.00

When making a decision on the selection of respondents, an important criterion was their direct acquaintance with the researchers. It enabled to determine whether the opinionant is independent in the presented views and whether he or she has sufficient knowledge and experience in the field of the subject under discussion. Moreover, taking into account communication barriers, people with whom the authors have direct professional relations were invited to participate in the research.

The consecutive stage of research proceedings is the description of the research results obtained and their interpretation. Therefore, in the further part of the work

an attempt was made to interpret the results and a deeper analysis based on the declarations of respondents.

3. CRITERION OF PRODUCTION MEANS SELECTION – THE FOUNDATION OF ASSESSMENT IN THE PERSPECTIVE OF SUPPLIERS' MATURITY

The proposed evaluation concept included 19 criteria. According to the expert assessment, the indicated planes were considered to be important and decisive for the choice of specific means of production. They were therefore considered fundamental within the framework of a comprehensive assessment of the maturity of their suppliers. Assessment of the maturity of suppliers from the perspective of the criterion of the significance of requirements is quite difficult, however, in the study an attempt at its implementation was made. The results of the research are presented in Table 6.

Developing production systems enables not only to increase production capacity, but also to create products of higher complexity, so that production processes have started to become more and more complex. It is therefore necessary to identify in detail the degree of machine utilization in production plants and the ways of organizing production processes. In order to calculate it, hypothetical data should be collected on the times of individual activities at the workstation and on the production volume. In this case, this indicator is the product of two components, i.e. productivity and quality. Expressed by the ratio of the actual production to the target production, calculated on the basis of parameters given by the machine manufacturer – productivity – the average score of 4.70; 70.2% of the indications for the score of 5 points). In view of the existing diversity, companies may specialize in the supply of means of production well adapted to the specific expectations of different categories of manufacturers, and in particular offer them a more or less technologically advanced product. In such a case, according to economists, we are dealing with a qualitative differentiation constituting the quotient of "good" production (i.e. the number of products manufactured without any need for improvement) to real production (Francis & Mathot 2002; Wirkus & Kufel 2014; Kosieradzka 2004). Taking into account the above, the authors of this paper broaden the concept of quality differentiation, understanding it as a supply of such a means of production which, belonging to a given field of activity, distinguishes itself from a standard product in this field of quality, and the difference is clearly perceived by manufacturers (or a significant part of them). From the point of view of manufacturers of agricultural machinery, the quality of means of production is an important criterion and determines to a high degree the maturity of suppliers (mean score of 4.55; 57.4% of the indications for the score of 5 points).

Table 6 Own research results; own study based on research

No.	Evaluation Descripts	Level of implementation (% of indications)					\bar{X}
		The value of the feature					
		1	2	3	4	5	
1.	Quality of the means of production	-	-	1.0	19.0	27.0	4.55
		-	-	2.1	40.4	57.4	
2.	Technological efficiency	-	-	-	14.0	33.0	4.70
		-	-	-	29.8	70.2	
3.	Brand	1.0	3.0	11.0	17.0	15.0	3.89
		2.1	6.4	23.4	36.2	31.9	
4.	Price	-	-	5.0	16.0	26.0	4.45
		-	-	10.6	34.0	55.3	
5.	Flexibility	-	-	3.0	14.0	30.0	4.57
		-	-	6.4	29.8	63.8	
6.	Compatibility	-	-	3.0	19.0	25.0	4.47
		-	-	6.4	40.4	53.2	
7.	Operating costs, including service and spare parts supply	-	-	2.0	16.0	29.0	4.57
		-	-	4.3	34.0	61.7	
8.	Length of the guarantee period	2.0	2.0	4.0	22.0	17.0	4.06
		4.3	4.3	8.5	46.8	36.2	
9.	Delivery/performance deadline	2.0	2.0	13.0	17.0	13.0	3.79
		4.3	4.3	27.7	36.2	27.7	
10.	Scope of additional services	2.0	2.0	5.0	21.0	17.0	4.04
		4.3	4.3	10.6	44.7	36.2	
11.	Purchase conditions	1.0	3.0	5.0	21.0	17.0	4.06
		2.1	6.4	10.6	44.7	36.2	
12.	Multifunctionality/multifunctionality	-	-	2.0	17.0	28.0	4.55
		-	-	4.3	36.2	59.6	
13.	Intelligent functionality	-	2.0	4.0	19.0	22.0	4.30
		-	4.3	8.5	40.4	46.8	
14.	Competence of the machine supplier	-	-	3.0	20.0	24.0	4.45
		-	-	6.4	42.6	51.1	
15.	References of other users	1.0	3.0	7.0	21.0	15.0	3.98
		2.1	6.4	14.9	44.7	31.9	
16.	Ergonomic design	2.0	2.0	4.0	22.0	17.0	4.06
		4.3	4.3	8.5	46.8	36.2	
17.	Possibility of EU funding	1.0	1.0	3.0	24.0	18.0	4.21
		2.1	2.1	6.4	51.1	38.3	
18.	Distance from point of sale	6.0	8.0	21.0	9.0	3.0	2.89
		12.8	17.0	44.7	19.1	6.4	
19.	Safety in use	-	-	-	18.0	29.0	4.62
		-	-	-	38.3	61.7	

Looking for a particular means of production on the market, the producer draws attention to a set of benefits (values) he can provide. These benefits consist of specific functions and features, both tangible and intangible, of the product. To a lesser

extent, the manufacturer pays attention to time (mean score of 3.79; 27.7% of indications for the score of 5 points), place (mean score of 2.89; 6.4% of indications for the score of 5 points), purchase conditions (mean score of 4.06; 36.2% of indications for the score of 5 points) and the scope of additional services proposed by the supplier (mean score of 4.04; 36.2% of indications for the score of 5 points). Among the many benefits having a certain value for the buyer, the brand that occupies a relatively distant position in the ranking of criteria for assessing the maturity of the supplier is poorly ranked (mean score of 3.89; 31.9% of indications for a score of 5 points).

One of the concepts of sources of competitive advantage of enterprises is the marketing concept of competition. This trend includes the marketing concept of enterprise management, which postulates not only passive adaptation to market needs, but also, where possible, active impact on the market, in order to increase sales and build long-term relationships with customers. In turn, pricing policy is important here. When starting to shape price policy, it should be taken into account that price is the element of marketing mix that directly affects the company's revenues and profitability (Doyle 2003, p. 298). Price is a very important strategic factor that needs to be skillfully profiled. In order to conduct a conscious pricing policy, it is necessary to understand what price is for the customer and what elements influence its level and perception. Price influences the perception of the product and its quality. Lowering the price is usually associated with low quality or increased maintenance costs associated with the subject matter of the contract. In such a case, the saving associated with choosing the lowest price offer is apparent. Therefore, from an efficiency point of view, in many cases, the contracting authority's action should be directed towards the choice of the offer presenting the best value for money. Therefore, among the surveyed companies there is a move away from the use of price as a key parameter in assessing the maturity of a supplier of inputs. Attention is drawn to the greater significance of the cost criterion (mean score of 4.57; 61.7% of indications for a score of 5 points) in relation to the price criterion (mean score of 4.45; 55.3% of indications for a score of 5 points). The cost criterion takes into account necessary expenses related to maintenance, use, decommissioning or training of users of the means of production which is the subject of the contract. The application of the operating cost criterion favours measures that may be more expensive to purchase but cheaper to maintain. In the case of machinery, the calculation of the running costs shall take account of the manufacturer's declaration of the level of power consumption.

The development needs of the global industry mean that the global demand for multi-purpose machinery is on the rise. The situation is similar in the case of the surveyed enterprises, where multitasking is indicated as an important criterion in the process of assessing the maturity of a supplier of means of production in order to reduce production costs (average score of 4.55; 59.6% of indications for the score of 5 points). It is noted that the manufacturer should strive to optimise the machining of the manufactured part, which has so far been performed in several

operations on different machines, e.g. lathes or milling machines. The authors' research so far clearly indicates that the use of a multifunctional turning and milling centre results in a 4-fold reduction in the production time of the workpiece in relation to the previous machining performed on many workstations.

The need to improve the flexibility of production lines for some companies is an important reason why it is worth evaluating the supplier based on the criterion of the ability to configure the means of production according to their own needs and preferences (average score of 4.57; 63.8% of the indications for the score of 5 points). The use of flexible machines and equipment allows for a great deal of freedom in adjusting the products to the needs of customers. Manufacturers who carry out orders for several companies can freely change the parameters of their products by reprogramming the machines, without the need to rebuild the entire production line. The increased flexibility of production allows the company to react quickly to changes in market trends. When selecting machines for workshops, it is important to optimize the entire technology park. Optimal machines are those that have parameters tailored to existing machines. Proper adjustment of parameters is an opportunity to reduce the total costs of use and at the same time the costs of obtaining them. Therefore, there is no doubt, as evidenced by research results, that compatibility implied by the width of a supplier's product portfolio should be an important criterion determining its maturity (mean score of 4.47; 53.2% of indications for the score of 5 points).

In the case of some manufacturers, the key to success is the competence of the persons performing the order (14 mean score of 4.45; 51.1% of indications for 5 points). Competences may include: knowledge, experience, attitudes or behaviours. Depending on the circumstances, all these dimensions may determine the maturity of the supplier of the means of production and constitute selection and evaluation criteria for the offers presented.

A quality guarantee is the buyer's right to require the guarantor to remove a defect in the item sold or to replace it if the defect becomes apparent during the warranty period. The issue of guarantees is framed by provisions that contain certain general rules on how to deal with defects. However, the key issue is that, unlike the warranty for defects, the quality guarantee does not apply under the Act, but only if the buyer receives a warranty document. If a guarantee is given, the parties to the contract may also agree among themselves on both the duration of the guarantee and the detailed manner in which the buyer will assert his rights and the seller's conduct in the event of a defect being reported to him, in a manner different from that provided for in the law. And since it is a tool to ensure that the quality of the subject matter of the contract is maintained for a specified period of time after the conclusion of the transaction, manufacturers ordering certain means of production are also willing to use it. The willingness to maintain the functionality of the subject matter of the contract for a specified period of time makes the warranty period a quite important criterion of maturity and to a high degree determines the choice

of the supplier of means of production (average score of 4.06; 36.2% of indications for the score of 5 points).

Among the surveyed companies, a concept is observed which is another requirement in industrial design, i.e. functionality. Machines work faster and faster, and thus people become a factor slowing down the production process. Graphical user interfaces and software must enable faster operations. This leads to a choice of more intuitive technologies and a smart GUI implies rapid adaptation to cope with change. The result of this process, the so-called intelligent functionality, reduces time to a minimum, hence, in the opinion of the surveyed entities, this factor should be taken into account when assessing the maturity of the supplier (average score of 4.30; 46.8% of indications for a score of 5 points).

In order to maintain a high standard of production, operators need to feel at ease in the workplace. Ergonomic design and ease of movement in the man-machine system are the key factors influencing the machine's ease of operation and thus determining the maturity of its supplier (mean score of 4.06; 36.2% of indications for a score of 5 points).

The criterion proving the maturity of a supplier in performing similar orders – In the opinion of the surveyed companies may be references of other users (mean score of 3.98; 31.9% of indications for the score of 5 points). According to the above, contracting authorities may in particular require that suppliers of means of production have a sufficient level of experience demonstrated by appropriate references to previously performed orders.

The exact process that leads to safe and efficient operation of industrial equipment is an extremely detailed and complex practice. The safety assessment of machinery needs to be tailored to current standards, while at the same time being individualised to meet the needs of a particular company. Therefore, a thorough understanding of the process of risk identification and reduction, as well as a practical approach to implementing real-world solutions for the benefit of both employees and the company as a whole, is an important rationale for a mature input supplier (mean score of 4.62; 61.7% for a 5-point rating).

5. CONCLUSION

Introduction of a new machine, device, tool or technology to the enterprise should contribute to the improvement of production organization, timely completion of orders, quality of work, as well as to the improvement of working conditions and safety of the contractor, as well as to the reduction of the adverse impact of production technology on the environment. The sum of the above measurable and directly unquantifiable effects of modern production technology should prevail over the costs of its application. It can then be concluded that the purchase of means of production is rational. This rationality should be understood as the effec-

tive use of technical means of work generating certain benefits for the company. The above assumptions were the basis for the development of a method for assessing the maturity of a supplier of means of production in the agricultural machinery industry. This publication presents guidelines for equipping enterprises with machinery, including criteria for assessing the rationality of selection and use of selected machinery and production equipment (machinery, equipment, tools, production equipment). In the publication, indicators of selection of means of production for enterprises were taken into account, without differentiating them depending on the scale of production.

As shown by numerous studies, equipping enterprises with means of production, including the number, types, value, efficiency and power of machines used, can be differentiated between individual enterprises, even with a similar production profile. The factor that most differentiates manufacturers in terms of equipment with means of production is undoubtedly the size of the company; it is the main distinguishing factor of the scale of production. The difference in technical equipment observed within individual groups of enterprises is a derivative of the production structure, including the share of labour-intensive machining operations and its specialisation. Differences in the level of equipment with means of production are also, or perhaps above all, a result of disproportions in the development and economic strength of individual companies. Enterprises with a well-established position on the market, profitable, which reached the stage of advanced production relatively early, are distinguished today by a rich set of technological resources. This group of decidedly larger and developed enterprises is today demanding efficient new generation machines, while smaller and economically weaker companies are at the stage of equipping themselves with basic equipment.

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