

**Podsumowanie**

Wymagania cywilizacyjne wymagają od rolnictwa stałej modernizacji. W tym celu niezbędne są innowacje, które przyczynią się do wzrostu wydajności pracy oraz obniżenia kosztów produkcji. Innowacyjnym rozwiązaniem jest Smart Farming który obejmuje szereg nowoczesnych rozwiązań technicznych i oprogramowania wykorzystujących technologie GPS/GLONASS. Innowacyjność Smart Farming polega głównie na tym, że wnosi on do rolnictwa nowe techniki produkcji oparte na wiedzy i informacji oraz usprawnia on zarządzanie produkcją w gospodarstwie.

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**D.M. Areshko<sup>1</sup>, W.Izdebski<sup>2</sup>, A. S. Sajganov<sup>3</sup>, J. Skudlarski<sup>4</sup>, S. Zając<sup>5</sup>**

<sup>1</sup>RO "Belagroservis», <sup>2</sup>Warsaw University of Technology, <sup>3</sup>Institute of System Research in the Agroindustrial Complex of National Academy of Sciences of Belarus, <sup>4</sup>Warsaw University of Life Sciences-SGGW, <sup>5</sup>State Higher Vocational School in Krosno

## **INNOVATION AND QUALITY AS FACTORS DETERMINING THE COMPETITIVENESS OF TRACTORS AND AGRICULTURAL MACHINES MANUFACTURERS**

**Summary**

In this paper based on the study of the literature shows the innovation and quality as factors determining the competitiveness of manufacturers of tractors and agricultural machinery. Agricultural machinery, like all products, may be subject to overall evaluation of quality, which should take into account first of all, indicators of job quality, economic criteria, ergonomics and operational safety. It has been shown that the manufacturers to increase order to increase their competitiveness in the market and meet the needs of customers manufacturers must focus their efforts on quality. The use of innovative solutions is one of the ways to obtain high quality.

**Introduction**

The terms "innovation» and "quality» are intimately related. Manufacturing high-quality products is often associated with a commitment to innovation. On the other hand, it requires the conduct of innovative pro-quality look.

Every year, manufacturers of tractors and agricultural machinery introduce a lot of new products on the market. Industry experts watch the market and its development, constantly introducing new, often innovative and attractive products that meet current trends and expectations of quality buyers. Through such activities they are more competitive and increase their market position. In their development strategies many companies as the main objective see growth or improving the quality of the product.

**Quality of tractors and agricultural machinery**

There are many definitions of quality that for each user have different meanings. It is believed that for the first time the concept of quality was defined by Plato in the fourth century BC as "a degree of excellence.» According to modern authorities in the field, quality is "a predictable degree of uniformity and reliability at the lowest possible cost and conforming to market requirements», "compliance with the requirements», "everything can be improved,» or "relevance usable». Definitions of quality designed for quality standards state that quality is "set of object properties associated with its ability to meet the identified and expected needs " (ISO 8402:1996), "the degree to which a set of inherent characteristics fulfills requirements» (ISO 9000:2001). Despite the differences in definitions of quality, resulting from the dominance of the different aspects and needs for which these definitions have been created, they share a close relationship between the term "quality» and the specific product [Durczak 2008]. From the above definitions one can conclude that, the manufacturer himself is not able to assess the quality of the product, user satisfaction tests are necessary for a full evaluation

Agricultural machinery, like all products, may be subject to overall evaluation of quality, which should take into account first of all, indicators of job quality - often exhibited by manufacturers, as well as economic criteria, ergonomics and operational safety.

For agricultural machines and tools the most important criterion is the quality of the work done, which can be described by means of appropriate indicators (parameters). Examples of machine work quality indicators include: seed coverage, damage of seeds, sowing uniformity, uniform cutting, limits damage to the grain, grain and seed purity in the tank, the depth of planting, covering potatoes, etc. Each of the groups of agricultural machinery is required to meet a few to several indicators of the quality of work.

The in-service quality of tractor consists of functional and operational features and technical issues reflecting the level of technical design. The level of technology and quality also is significant. Technical and engineering development is focused on obtaining the highest level of technical parameters of the system, that meet the requirements expressed by users, forcing modern features of a tractor. Qualitative and quantitative parameters describing both agricultural tractor as a whole, as well as its individual teams may present symptoms of agricultural development. To describe the technical features of design, one can use the specifications provided by the manufacturer. Tests of tractors are a more extensive set of features, which are carried out under comparable conditions, by independent teams of experts..

### Innovations in tractors and agricultural machinery

In today's economy, innovation is one of the main determinants and drivers of socio-economic development. Innovation is crucial for stable development of countries and regions and a key determinant of competitiveness, productivity and progress. Innovation and its impact on the economy has been the subject of many studies, which show that it is a decisive factor in the competitiveness of enterprises [Kondratiuk-Nierodzińska 2002, Седова & Бадалов 2011, Карташов 2012]. The competitive position of the company and its ability to maintain a significant depends on the pace and scope of generating and introducing innovative solutions. This state is also among the manufacturers of tractors and agricultural machinery where technical and technological innovation is the key to increasing the efficiency and competitiveness of agricultural production. Product innovations are usually accompanied by process innovations, characterizing processes for the production of machines and their components. Innovative solutions can also arise from the extension of the product mix, based on innovative, highly complex structures and materials, and the basis of new knowledge. These are just examples of innovation most often used in the art of sowing, fertilization, plant protection, harvesting [Popławski, Szulc 2010, Ежевский i in. Электронный ресурс1, Электронный ресурс2].

### Summary

Mechanization of agriculture is a process of introducing newer machines and equipment to agricultural production. In line with global trends increase of machine efficiency and reducing maintenance expenditures, maintenance and repair are expected [Durczak, Butcher 2005]. Buyers of tractors and agricultural machinery increasingly expect them to be reliable and of high quality. This orientation makes manufacturers of tractors and agricultural machinery face the necessity to construct new, modern and more efficient machines. In order to increase their competitiveness in the market and meet the needs of customers manufacturers must focus their efforts on quality. The use of innovative solutions is one of the ways to obtain high quality.

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