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Service business-model of enterprises of agricultural engineering as the most important factor of digitalization of agro-industrial complex

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***Abstract*—The digitalization of the economics of the Russian Federation as a prior direction of the country development requires taking decisions in the key sectors of economics, one of which is agro-industrial complex (AIC) of Russia. It seems that one of the most important factors of the digitalization of the domestic AIC is the intensification of innovative processes in the sphere of technical support of the agricultural production. Modern management theory bears evidence of increasing popularity of the use of business-modeling as the key management innovation. Modern information technologies encourage reciprocal penetration of the two basic configurations of creation of product value: «value shop» and «value network». The integration of these models allows using the potentials of each of them in practice: the ability of the producer to manage the resources portfolio dynamically with the aim of solving individual problems of the demander and additional value, created due to the interaction of the network participants respectively. The enterprises of the agricultural machine-building as the representative of sector b2b, in our view, can influence the acceleration of the processes of the digitalization of agriculture of the Russian Federation significantly, putting service business-model into service. The use of the service business-model will allow creating and modernizing the product considering the demands of the demander; increasing the intensity of equipment usage greatly, decreasing the number of equipment, at any given moment of time. With the aim of acceleration of digitalization processes of agriculture, it is necessary to improve investment policy in AIC, to rethink the forms of state support of agricultural producers completely. State support of sectorial processes of development and introduction of digital platforms is actual, as well as further introduction of technologies of inter-sectorial objective; the support of agricultural producers, introducing modern IT-systems of management, science-intensive computer-aided production equipment, it seems reasonable to subsidize expenses on conclusion of service contracts.**

Keywords—digitalization of agro-industrial complex, business-model, value chain, service business-model, enterprises of agricultural engineering.

I. INTRODUCTION

In the sphere of technical support of the agricultural production the role of information-communication technologies is increasing. The development of principally-new services on the base of actively forming cloud infrastructure, which has become accessible thanks to the technologies of Broadband Internet, is going on not only in the sphere of consumer services but also in sector b2b (business to business).

Together with it, in 2016 the part of investments of the enterprises of agricultural engineering on carrying out research, design and testing (RD&T) in the whole sphere has comprised only 0.67 per cent of operating revenue (at the same time the value of the greatest world producers of agricultural equipment is more than 4 per cent). The low level of RD&T sidelines enterprises of agricultural engineering in the realization of development potential. The agricultural machinery fleet in Russia is characterized by being badly provided with equipment, high wear degree, and poor automation level [1].

It appears that mentioned problems can and must be solved with the use of management innovations, one of which is business modeling.

II. MAIN PART

The relevance of the research of business-models is becoming actual again due to the digitalization of economics, opportunities of modern information technologies.

To prove this tendency, the directions of modern researches in the sphere of business-models, presented in their data in table 1 [2], will be considered.

TABLE I. DEVELOPMENT OF DIRECTIONS OF BUSINESS-MODELS RESEARCH [2]

Year, representatives	Direction of research									
	Business-model and company results	***Business-model in context of networks and partnership***	***Generalization of previous work of key trends***	***Interdisciplinary character of business-models***	***Sectorial generalization***	***Business-model and company strategy***	***Metrics for assessment of business-model***	***Innovations and change of business-model***	***Definition and structure of business-model***	***Business-model in «electronic business»***
1998, Timmers,										X
2000, Malhotra, Kraemer								X		X
2002, Dubosson, MargrettamChesbrough, Osterwalder						X	X			X
2003, Gilbert					X					
2005, Shafer, Morris, Tikkanen				X	X	X				
2006, Keen		X	X							
2007, Chesbrough								X		
2008, Zott, Amit, Johnson		X	X			X	X	X		
2009										
2010, Demil, Teece, Nenonen		X	X			X	X	X		
2011, Zott, Amit, Vives		X	X	X		X		X		
2012, Hajiheydari, Solaimani		X		X						
2013, Coombes, Nicholson, Guo, Zhao, Tang, Shirokova, Shatalov, Bocken	X	X						X		

The first publications on the problem of business-modeling appeared at the beginning of 2000s, and since 2010 (according to Scopus) there has been their exponential growth, the total number of works in the base of Scopus in 2015 was 349 [3]. As seen from the table, beginning with 2006-2007, the majority of researchers focused their works on the problem of business-model investigation in the context of networks and partnership as well as innovative changes of business-models.

In spite of the increased interest of researchers to this problem, among researchers there is no agreement on a wide circle of questions such as the definition of business-model, structure of business-model, ratio of business-model and company strategy, business-model boundaries, influence of realization of different types of business-models on the efficiency of company work, etc. [4]. It is quite often for the researchers to consider sectorial specific nature of business-models.

Among outer factors, influencing the object of research, it is necessary to note the nascency of digital technologies [5,6], as well as the offer of new services as a separate value or an addition to the product [7].

As it has been noted above in the course of scientific research there has been no consensus on the definition of business-model. Together with it, researchers and makers agree in the meaning of domination of value component in the definition of business-model, and in the researches of the last decade there was an opinion in accordance to which the notion of business-model is more significant and wider than the logic of creation and assumption of value (cost).

C. Stabell and O. Fjelstad analyze the following basic configurations of creation of cost in the organization: «value chain», «value workshop» and «value network» (table 2) (made by the author on the data of resource [8]).

TABLE II. CHARACTERISTICS OF BASIC CONFIGURATIONS OF CREATION OF PRODUCT VALUE [8]

	Configurations of value creation		
	«Chain»	***«Shop»***	***«Network»***
Business-model	Transformation of «going» into products	Solutions of (Re(solving)) customer problems as repeated cycle process	Connection, value contact (exchange among clients)
Examples of typical business sectors	Processing industry	Hospitals Professional service firms Educational institutions	Banks Insurance companies Web-portals Telephone companies Transport companies
Basic economic principle	Economy of scale	Economy from repetition (new combination of resources for solution of another buyer's problem)	Network effect
Main technology	Multielement chain	Intensive technologies Value created thanks to mobilization of resources and due to activities for solution of customer specific problem	Intermediation Value created thanks to creation of network among clients with use of intermediation technologies, helping exchange among its own clients

Main type of interaction	Successive	Cycle, spiral	Synchronized, Parallel
Value management elements	Components	Competemces	Links
Main logic, lying in base of configuration of value creation	Gain in yield at decrease of resources used at inlet (specific)	Data collection of processes, operations or clients (sharing this information with resource or user) and its transformation into value	Joint «inlets» of clients are united and become accessible for other network participants

In the conditions of transition to mass customization of production instead of business orientation on the configuration of value formation in the form of value chain so called «shop» of value creation comes

«Value shop» as the configuration of value creation is characterized in the first place by the uniqueness of the product. Standardization and quality control in the situation are possible only in relation to the process itself, to the data received and saved. The character of the solved problem of the customer defines the choice of used resources as well as the level of expenses. The expense value of this or that process stage is not correlated principally with the created value, and the final value is not only in the product but in the method of getting it, as the customer takes an active part in the process of development, production and modernization of the product. Production process is not linear; stages of production cycle are inseparable, and operations are iterational and depend on each other unpredictably. The base of competitive advantage of this model is in the formation of dynamic opportunity of the company to group resource portfolio in a different way to solve another client problem.

Customized production allows realizing the effect of production and the effect of scope at the same time. The effect or economies of scope means the decrease of expenses thanks to increase of produced and/or realized types of production.

It seems that modern information technologies encourage reciprocal penetration of the two presented by C.Stabell and O.Fjelstad configurations of value creation of the product: «value shop» and «value network». The integration of these models allows using the potential and advantages of each of them. In the first case it is the possibility of the producer to manage resources portfolio dynamically with the aim of solving individual problems of the customer, in the second case it is additional value created due to the interaction of the network participants.

Today like never before the value is created together by participants of interfirm cooperation (suppliers, producers, logistical channels, clients). So business-model goes beyond one particular firm and for its analysis it is necessary to consider value chains outside the firm as well as interfirm networks [4].

It should be noted that the set of «typical» business-sectors of the studied configuration of value creation, revealed by C. Stabell and O. Fjelstad, is widening significantly, comprising not only the sphere of services nowadays but the sphere of production as well.

Traditionally production companies of sector b2b (business to business) offer production equipment at the market. In proportion to the increase of demands of the customer to the service there is an increase demand on services themselves. With the growth of this tendency producers have started to offer complex solutions. More and more production companies consider service and repair of the sold equipment as an independent value offer and prior resource of getting income.

So in this way service business-model has been formed, the basis of which is a service contract – complex offer of the product and services connected with it, it creates additional value either at the moment of sale or the whole period of its service life. The object of the sale and consumption in the service model is services, performed to the user, rather than the product itself [9].

Only the fourth production revolution, production Internet, providing the equipment with digital intellect and principally new communication opportunities, allow realizing the potential of service business-model to a full extent. The technology of processing «BigData» process and interpret huge mass data, coming from the equipment in real time; and architecture SAP S/4HANA helps to increase the efficiency of work with these data by times. Modern information technologies and created on their basis ERP-systems allow getting information of factual and predictive working capacity of equipment in real time, planning capital and minor repairs of equipment, organizing the work of the service staff in time; taking decisions of the modernization of equipment [10].

At the beginning of digitalization of AIC service business-model can ensure competitive advantage to agricultural enterprises, capable to adapt quickly to up-to-date challenges of the environment. Unique integrated decisions will let the departments of RD&T, marketing and production offer the customer customized product, the product manufactured in the conditions of duplicate and mass production but for a personalized consumer.

The producers of agricultural equipment may offer their clients the model of hourly pay or the pay for product yield. So, producers of agricultural equipment may consider the variant of service contract with the further monitoring of conditions of engine operating and their technical state. The payment on the conditions of such a contract will be charged for the time of operation, for the usage of the vehicle or for the volume of production (the volume of threshed grain, for example).

III. Conclusion

Massive use of service business-model by agricultural enterprises will allow increasing intensity of equipment usage, decreasing standby time, decreasing the number of equipment, necessary at any one time, this all will lead to decrease of material expenses, intensification of innovative processes in agricultural engineering.

In order to accelerate the processes of digitalization of agriculture it is necessary to improve investment policy in AIC, cardinal change of forms of state support of agricultural

producers. So, if yesterday main directions of subsidizing in agriculture were such as compensation of the part of expenses to buy mineral fertilizers, means of chemical defense of plants, dotation on the productions of crop raising and cattle breeding, insurance of agricultural plants, today the state should support the processes of digital transformation, which will allow decreasing the above mentioned expenses greatly.

State support is necessary for sectorial processes of development and introduction of digital platforms, further introduction of platform technologies of inter-sectorial purpose; support of agricultural producers, introducing modern IT-systems of management, science-intensive computer-aided production equipment, reasonable subsidizing of expenses on the concluded service contracts.

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