

## **Consumer Value of Drinking Tap Water as a Management Factor of the Water Supply and Sewerage Enterprise**

<sup>1</sup>Makhmud Kharun, <sup>1</sup>Alexander P. Svintsov and <sup>2</sup>Evgeny L. Schesnyak

<sup>1</sup>Department of Civil Engineering

<sup>2</sup>Vice-Rector on the Economic Affairs, People's Friendship University of Russia,  
117198 Moscow, Russia

---

**Abstract:** In modern conditions, the economics and enterprise management, including such livelihood enterprise like water supply and sewerage, based on the twin paradigm of production and consumption which are interconnected by the Consumer Value of Drinking Tap Water (CVDTW) that is fundamentally different from all other types of livelihood product. Consumer value as an economic category, for various boons varies and depends on the subjective perception of a particular product. CVDTW is one of the most important elements of functioning of the Water Supply and Sewerage Enterprise (WSSE) as it reflects the ability not only to meet the vital needs of people but also influences the formation of their consumer behavior. In this regard CVDTW must be considered when forming the strategic planning of WSSE to maintain its economic stability. Researchers consider the consumer value of drinking tap water as a central moment of functioning of the water supply and sewerage enterprises not only to solve the tasks of providing it to the population but also operating in market conditions. CVDTW is characterized by specificity and its use in the business model of WSSE is not only a basis for increasing the economic efficiency of its selling to the population but also a more efficient use of fresh water resources.

**Key words:** Management, water consumption, consumer Value, strategic planning, drinking tap water

---

### **INTRODUCTION**

CVDTW is a complex of interrelated beneficial properties of suitability to meet the foodstuff, household, sanitary and hygienic and social needs of people. Hence, if there is a consumer value of products, it must be considered in the manufacturing and economic activities of an enterprise. In this regard, CVDTW is a fundamental determinant of economic development of WSSE and is one of the most important factors in effective management.

Socio-economic study of CVDTW is developing in two separate directions. The first direction includes the perspective of ensuring the quality parameters of drinking tap water; the second providing the population with drinking tap water.

These directions of CVDTW did not cover the total aspects of its consumer value that formed on the basis of existing needs of population. The complex of interrelated beneficial properties of drinking tap water that composes its consumer value applied to each household, characterizes the economic features of water comfort of consumers. Consumer value of drinking tap water has the

property of daily and irremovable demand as an irreplaceable foodstuff and a satisfying remedy of household needs of human being. Realizing the essence of CVDTW and the nature of needs in it, it is possible to determine the ways of active influence on consumer behavior of people. In view of the consumer behavior and the needs of population in drinking tap water it is advisable to form the pricing policy of WSSE and using the regulatory function of price, to ensure the effective management of water consumption in the housing sector.

### **MATERIALS AND METHODS**

**Statement of task and methods of study:** Study of the concept of CVDTW is carried out in theoretical and applied aspects. Theoretical analysis is carried out on consideration of the category of consumer value of produced boons for selling and its influence on the formation of consumer behavior.

In terms of practical application of the concept the importance of drinking tap water for the vital and the sanitary and hygienic safety of population is considered. While performing the study the inductive and deductive

methods of analysis, the dialectical method of cognition, the principle of a system-wide analysis of economic processes, the modern concept of economic development of infrastructural enterprises of livelihood have been used.

**Genesis of consumer value of drinking tap water:**

Consumer value of various products and goods are not the same for an individual subject and for the reference groups. Objectively, the existing need for specific household conditions, being reflected in human consciousness or a certain human community, entails the formation of CVDTW as a structural element in market demand.

Information sources represent the results of study of theoretical and applied aspects of the category of consumer value of boons. For example, Wang *et al.* (2004) emphasize the importance of considering this category in the planning of household activity and maintaining the competitiveness of company and its products. Kotler and Keller (2014) stress the importance of this category as an aspiration of seller to pay attention to the material product considering marketing short sight, but not the consumer value and to meet the consumer needs. Yudin and Yuldasheva (2012) represent the consumer value as a determining basis for satisfaction of human needs. Bolton and Drew (1991) as well as Woodruff (1997) noted that consumer value of boon reflects not only the ability to meet the needs but also forms the consumer behavior. Studies of Gallarza *et al.* (2011) presented that consumer value has “two measurements economical and psychological. The economical measurement is related to the perceived value of what is called a transactional value. The psychological measurement is related to the fact that the value has cognitive and affective influence on the product and the choice”. Work of Yuldasheva presents the fact analysis of consumer value and the concept of its assessment methods. The applied aspects of consumer value are considered by Kotova the quality analysis and the safety of foodstuffs by Alexeeva.

With regard to the tap water as a foodstuff and a satisfying remedy of the household needs of human being the category of consumer value is characterized by socio economic content. Isaev emphasizes that “consumer value of water, based on biological, sanitary and hygienic, fire and environmental safety is the highest of all goods produced in the society. The historically formed attitude to water has led to a mismatch of consumer and economic value of water, to a devaluation of water value in the social consciousness, to uncontrolled water consumption with the significant losses, to a deterioration of

systems, to a reduction of quality of their work, to an increase of anthropogenic pressure on natural water resources”.

Socio-economic studies of CVDTW are carried out in two main areas: its qualitative parameters and technical aspects of ensuring population. Quality of drinking water, supplied to the population is one of the factors that determine its consumer value. Drinking tap water has several levels of quality depending on the fullness of needs of the population. Each level of quality combines a certain group of indicators and properties that meet the requirements of consumers as a whole and individually taking into account that the contemporary features of water consumption lies in the fact that there are some new needs in the water which previously has not been widely observed. Management of financial and economic activity of WSSE should focus on to meet the needs of population, in this regard the qualitative indicators of its work are considered from the position of buyers and their perception of the measure of consumer value and utility of drinking tap water.

Expert assessments of the effectiveness of providing the population with drinking tap water revealed that the technical measures for saving and rational use of water characterized by the rather profound study and repeatedly confirmed by the operational practice. However, the current management system does not meet the water and energy savings and the changing needs form a new consumer behavior of the population. Increase of requirements to the produced and consumed products as well as process complication for its production necessitates a new approach to the problem of quality. It became insufficient to control the quality of supplied water. A necessary condition for effective work in market conditions of managing is to create a quality system that covers all stages of production, distribution, selling and payment. The quality system is developed to suit local conditions but in any case it should cover:

- Marketing, search and market research of supplies (reagents, pipes, pumps, equipment, etc.) and market of selling (conditions of water consumption in the housing sector, provision of metering, consumer interests, etc.)
- Development of sanitary and technical requirements
- Preparation and development of technologies for production of tap water
- Production of tap water
- Quality control of tap water
- Storage of tap water
- Selling of tap water
- Operation of water supply network and structures on it
- Technical interaction with the operation services

One of the least developed aspects of the quality system is the functional link between production and consumption of tap water. Currently various forms of interaction of WSSE with the government institutions and the consumers are using to improve the efficiency of water supply systems. In this regard Khodarev (2008) points out that “establishing relations on the basis of public-private partnership can improve the quality of provided services to the population”.

Analysis of information sources shows that the results of theoretical and applied aspects of consumer value of different boons are presented by the scientific community. However, issues of CVDTW are not investigated fully. Category definition of consumer value of drinking tap water as a product of WSSE is proposed in the monograph (Svintsov, 2007). Currently without a thorough and serious study of the processes that shape the needs of population to the water supply and sewerage market, it is not possible not only to cost effective selling the product but also ensuring the optimum rates and proportions of the development of enterprise or its structural parts and maintaining uninterrupted water supply at the rational use of water.

## **RESULTS AND DISCUSSION**

Using of drinking tap water is a necessary factor in the development of water supply and sewerage enterprises since it is the final phase of process in manufacturing and selling. It is due to the fact that production of the water supply and sewerage products (drinking tap water) is a reaction of enterprise to the current demand which in turn, satisfies in manufacturing and supplies of water to the consumers. Consumption of drinking tap water is located in the rigorous mutual sequence of participation in a continuous process of livelihood. The continuity of production process and selling of water supply and sewerage enterprise implies the following major phases:

- Water withdrawal from the sources, purchase of necessary materials and components for production
- Production and supply of drinking water to the consumers
- Receiving from consumers and treatment of wastewater
- Selling products to the consumers
- Purchasing of components to resume the production

In production process the purchased inputs are transformed into commercial products that are offered in the market. Production of drinking tap water carried out by

only what it consumes itself and for that it must have funds to purchase the consumed resources. Water supply and sewerage enterprise receives these funds by selling their own products in the market. Thus, production of water supply and sewerage products involves in the exchange of goods and regulation of the market as a sphere of commodity relations. Development of production of the water supply and sewerage enterprises related to the growth of people’s needs to meet which it is intended.

Being a result of production activity of WSSE the drinking water has not only the properties of a product but also a vital and social significant consumer value. CVDTW is the biologically, socially and historically determined complex of beneficial properties as a foodstuff and a satisfying remedy of the household and sanitary and hygienic needs of human being.

Supply of drinking tap water to the population is a daily work of water supply and sewerage enterprises as an action of an unavoidable demand. Society, represented by the state, guarantees to provide the population with drinking tap water even in the insolvency of consumers in the housing sector. State guarantee of water supply is due to the fact that drinking water is an essential foodstuff and a satisfying remedy of household and sanitary and hygienic needs of human being. Here in lies its consumer value which has a multifactoral formation, due to the daily and unavoidable demand. Drinking tap water, like any other product in the market is characterized by several levels, each of which determines the appropriate consumer value:

- On the first level the main value a basic product that a consumer gets: consumer purchases drinking water when opening the tap
- On the second level the main value is converted into the basic product: purchase of drinking tap water means that the water is potable quality
- On the third level the intended product is formulated, i.e., a set of attributes that a consumer usually expects and for which ready to pay; for example, a consumer expects to get drinking water with a required flow and a desired temperature when opening the tap

The complex of these levels forms a hierarchy of CVDTW. Ensuring the safe drinking water to the population is one of the priority tasks of the state. Stable and reliable water supply is the most important social function of the state institutions at the federal, regional and municipal levels as the guarantors of sanitary and hygienic safety of population. During the period of planned economic development, the water supply and

sewerage management of Soviet Russia was based on strict government control throughout the production and economic operations with vertical subordination of sectoral enterprises and associations to the ministry and the local government authorities. Water supply and sewerage system was operating quite successfully in the socio-economic conditions for which it was created. It assumed the centralized distribution of all resources at the state monopoly on the operation of engineering infrastructure. State as the owner of capital assets especially did not care about the profitability of water supply and sewerage sector and was financing its activity with minimal participation of population, since the industry was initially formed and developed in the route of solving the social tasks. Meeting the needs in drinking tap water is based on the dialectical relationship of market and social principles of an interaction of the following subjects:

- Water supply and sewerage enterprise as a producer and supplier of boon
- Population as a consumer of the vital and socially important boon
- Society as a guarantor of stable relations between producer and consumers

Social significance of drinking tap water is expressed by three groups of indicators:

- Level of water consumption
- Structure of water consumption
- Form of water consumption

In context of commodity-money relations in the presence of water metering in flats and an appropriate payment conditions the level of water consumption of certain sectors of population depends primarily on the level of their income and economic condition. Within the various social groups, the water consumption is not the same and it varies on the basis of income differentiation. Structure of water consumption is influenced by the cultural level of consumers, traditions and also on the extent of consumer services.

Form of water consumption reflects the use of drinking tap water within a social norm with a basic (regulated, social) price or increased water consumption with a higher price. With the development of market economy in Russia the functioning basis of WSSE has changed that as a socially oriented system, at the same time solve the tasks of business. In these circumstances “the social product turned into merchandise. For the water supply and sewerage sector submitted demands that are

different from the social importance: self-financing and self-sufficiency, competitiveness, etc.” (Svintsov, 2007). In this regard, it is of interest to the concept to meet the needs of population in drinking tap water in accordance with its consumer value in ensuring its social norm and at a regulated price in accordance with applicable law.

Problem of functioning the economic mechanism and management of WSSE is the most acute and topical. It is particularly important in terms of production and selling of products (drinking tap water) based on the modern principles of management and the lack of balance between the economic interests of WSSE and a vast social significance of drinking tap water. Excessive desire of producers and suppliers to get the maximum benefits of the product may lead to the negative social consequences: mass failure to payments.

Successful development of relations between the suppliers and the consumers of drinking tap water can be based not only on the economic principle of formation of the price level. Market balance of supply and demand subject to the accessibility of safe drinking water for all consumers is an important aspect. Overall selling strategy of WSSE focuses ultimately on consumer intentions to individual households. All households determine their demand for all sorts of consumer considerations. Having in mind that drinking tap water is a special kind of product, WSSE render an active influence on water consumption price exceeding social norm accepted in a particular city.

In terms of market interaction between suppliers and consumers of drinking tap water appears necessary compliance with the principles of balancing between the interests of the parties. Prices of supplied products must compensate the cost of producer and include a profit to ensure the further development of enterprises. Lack of balancing leads to a loss in production and selling of product.

Low profitability of water supply and sewerage enterprise is caused by the organizational and economic reasons and high cost. Our studies revealed that water consumption in residential buildings is much higher than the objective needs of population and water losses are 20-40% of the specific water consumption.

High water consumption in the housing sector of cities and municipalities in Russia is caused by the fact that the selling of drinking tap water is based on the existing principle of ensuring the drinking water when the water is not considered as merchandise and practically its cost was not taken into account. For a long period, the population developed a stereotype belief that water resources in the nature is sufficient that drinking water is a gift of nature rather than a merchandise product of water supply and sewerage enterprise which has a cost and characterized by profitability or unprofitability.

In modern conditions of formation of effective relations between water supply and sewerage enterprise and the consumers in the housing sector, successful operations are not possible without an established account of selling and buying products (drinking tap water). It will allow to use not only the cost method of determining the price but also to apply the market pricing mechanism, in which it is possible to increase the economic efficiency of water supply and sewerage enterprises.

In a monopoly of water supply and sewerage enterprise to free pricing has a regulating influence of the state. It is important to note that if the tariffs for drinking tap water are regulated within the regulated volume of water consumption and the excess is payable at the market rate then its consumer value has a significant effect on incomes and serves as one of the most important management factor of water supply and sewerage enterprise. It is particularly relevant when consumers pay for the quantity of consumed tap water in accordance with the indicators of metering devices installed in the household. Satisfaction of needs of drinking tap water can be estimated by the index of water comfort:

$$k=1+\frac{q_f S - q_n S}{q_n S}$$

Where:

- $q_f$  = Actual water consumption, m<sup>3</sup>/month
- $q_n$  = Social norm of water consumption, m<sup>3</sup>/month
- $S$  = Water tariff, \$/m<sup>3</sup>

Water Comfort Index is an objective criterion for assessing the needs of the population in tap water.

Fig. 1 (Svintsov, 2007) shows the actual water consumption by meter readings and without metering in high-rise residential buildings, located in one of the areas of Moscow.

Analysis of Fig. 1 shows that in the majority of households that equipped with water meters, water consumption is lower than in households without water meters. Water consumption of households shows much higher that defined according to the norm which calculated by meter reading at the entrance of building and without using of meters in flats. As already noted, drinking tap water is characterized by a large social significance in view of its vital importance as a food product. In this regard the management of water consumption in residential buildings connected with the necessity of using the economical market instruments and the normative regulation tools.

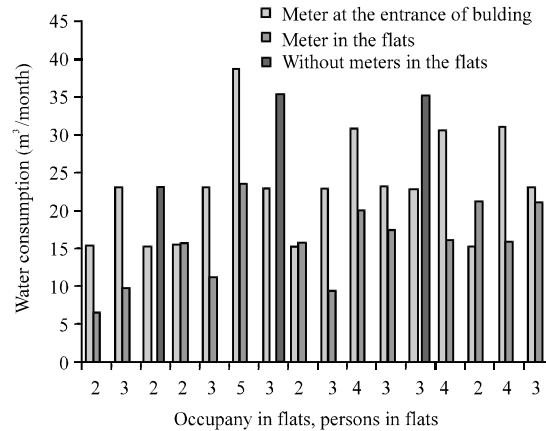


Fig. 1: Water consumption according to water meter at the entrance of building, water meters in the flats and without meters in the flats (m<sup>3</sup>/month)

### CONCLUSION

Consumer value of drinking tap water is a complex of useful features that characterize it as an irreplaceable foodstuff and a satisfying remedy of the household and the sanitary and hygienic needs of human being and one of the most important factors in management of the water supply and sewerage enterprise. Consumer value of drinking tap water is influenced by the historically formed culture of water use, largely depend on the climatic conditions and availability of water resources as well as the technical and economic capabilities of the water supply and sewerage enterprise.

Ensuring the population with drinking tap water is one of the most important indicators of living standards in any country. Improvement of economic efficiency of the water supply and sewerage enterprise is possible on the basis of improving the relationship between the supplier and the consumers of drinking tap water taking into account its consumer value. Using the phenomenon of consumer value of drinking tap water as a central element of business model of the water supply and sewerage enterprise is the basis of increasing the economic efficiency of its selling to the population.

### ACKNOWLEDGEMENTS

This study is financially supported by the Ministry of Education and Science of the Russian Federation on the program to improve the competitiveness of People’s Friendship University of Russia (RUDN University) among the world’s leading research and education centers in the 2016-2020.

**REFERENCES**

- Bolton, R.N. and J.H. Drew, 1991. A multi-stage model of customers assessments of service quality and value. *J. Consum. Res.*, 17: 375-384.
- Gallarza, M.G., I. Gil-Saura and M.B. Holbrook, 2011. The value of value: Further excursions on the meaning and role of customer value. *J. Consum. Behav.*, 10: 179-191.
- Khodarev, A.S., 2008. *Economic Studies and Analyses*. University of Finance and Administration, Prague, Czech Republic.
- Kotler, F. and K.L. Keller, 2014. *Marketing Management*. Publishing House Peter, Moscow, Russia.
- Svintsov, A.P., 2007. *Selling of the Products of Water and Sewerage Enterprises in the Housing*. Peoples Friendship University of Russia, Moscow, Russia.
- Wang, Y., L.H. Po, R. Chi and Y. Yang, 2004. An integrated framework for customer value and customer-relationship-management performance: A customer-based perspective from China. *Managing Serv. Qual. Int. J.*, 14: 169-182.
- Woodruff, R.B., 1997. Marketing in the 21st century customer value customer value: The next source for competitive advantage. *J. Acad. Market. Sci.*, 25: 256-256.
- Yudin, O.I. and O.U. Yuldasheva, 2012. Marketing strategies of business modeling: Russia, St. Petersburg. *Prob. Mod. Econ.*, 1: 235-238.