

# *Research on the Marginal Utility of Consumers in the Network Economy*

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**Abstract:** Network economy is a form of economic activity formed with the development of modern information technology. The emergence of the network economy has changed the traditional way of commerce. Under the conditions of the network economy, some basic principles and concepts of Western economics have undergone revolutionary changes. This article sorts out and reviews how consumers' marginal utility changes under the network economy. Focus on the two major issues of the emergence of marginal consumer increase in the network economy and whether the law of diminishing marginal utility still exists. Further analysis points out the difference in applicability between the two. Finally, it summarizes the shortcomings of the existing literature and looks forward to future research directions.

## 1. Introduction

The network economy is the sum of all economic activities based on the Internet, especially the Internet. CNA Molenaar (2020) proposed that we are at the beginning of the digital age<sup>[1]</sup>. The new characteristics of the network information economy have caused many new theories in academia. One of the essential points is that the law of diminishing marginal utility in the network information economy has failed or lost its dominant position. This article combs the relevant literature on the increasing marginal utility of consumers in the network economy and combs why the law of diminishing marginal utility is still applicable in the network economy. Finally, the different applicability of the two will be explained.

## 2. The discovery and reason of the law of increasing marginal utility

Most documents believe that the law of increasing marginal utility is more applicable in the network economy. Sun Jian (2001) proposed the law of immortality of useful information ( $1-1=1$ ,  $1=\infty$ )<sup>[2]</sup>. Zhang Yonglin (2016) studied information by establishing a model of the Internet market  $\Pi = \{X, U, Y, \Omega, E\}$  ( $X$  is the source state space,  $U$  and  $Y$  are the input and output spaces) and proposed that the emergence of the network economy has fundamentally changed the law of diminishing marginal utility. The law of increasing marginal utility has appeared<sup>[3]</sup>. Wang Huiling (2017) subdivided consumption to obtain the indifference curve change and obtained the phenomenon of increasing marginal utility<sup>[4]</sup>. These studies demonstrate on the theoretical basis that the law of

increasing marginal utility is indeed applicable to the network economy. The following are the reasons for the increasing marginal utility.

#### 1. Network externalities

The external effect of the network, that is, the value of information products to users, does not entirely depend on the product's performance but increases with the popularity of the product. Zhang Yonglin (2016) studied the information structure and network information replication of the Internet and found the information aggregation-synergy effect produced by the Internet<sup>[3]</sup>. G.M.Peter Swann (2002) explained in detail that in the network economy, the more similar network products, the greater their value through the study of Microsoft examples<sup>[5]</sup>. And Zhang Minghong et al. (2017) also pointed out that the increasing income related to network externalities is a modification of the traditional law of diminishing returns<sup>[6]</sup>. It shows that network externalities have brought about positive feedback and increased marginal utility.

#### 2. Economies of scale for the number of people.

Shapiro and Varian (2000) believe that networks have an essential economic characteristic. The value of connecting to a network depends on the number of other people who have connected to the network, which generates positive feedback<sup>[7]</sup>. Zhang Yonglin (2016) found that when the number of people consuming the same information increases, the total utility of the information increases, and the marginal utility also increases<sup>[3]</sup>. The literature mentioned above shows that information resources can be supplied indefinitely in the network economy and are non-exclusive. Resources become public goods, and the external effects generated make the more suppliers and demanders, the more benefits, and thus the marginal utility increases.

### 3. The existence of the law of diminishing marginal utility

As the main feature of the network information economy, "high first draft cost and low copy cost" are the source of various characteristics. He Xiaoxing and Yue Yujing (2020) found that the traditional law of increasing marginal utility has not failed and confirmed this through research on information entropy. Unlike the traditional economy, the network's essence is to reach multiple agreements for the smooth transmission of the information at multiple nodes, and information replication is one of multiple, distortion-free, and effective transmissions. The number of times the information is copied represents the consumption of information copying. Through the research of information source entropy, it is found that the information utility represented by the information source entropy decreases marginally as the consumption of the same information by the same consumer increases. In short, the marginal utility of information consumption is diminishing<sup>[8]</sup>.

### 4. The reason why the law of diminishing marginal utility still exists

In the network economy, the application of the law of increasing marginal utility does not invalidate the law of diminishing marginal utility, but the two coexist and develop mutually. The following are reasons.

#### 1. Diminishing marginal utility is the inevitable result of personal customization

In the network world, the massive increase in network users is followed by the emergence of a refined network economy, that is, "personal customization." Lin Zhongyan (2009) used Metcalfe's law and Matthew's utility to verify and pointed out that starting from Maslow's hierarchy of needs theory, with the emergence of "personal customization," as long as it is a real person, psychologically speaking, it is inevitable that the phenomenon of diminishing utility will appear<sup>[9]</sup>.

#### 2. Nothing to do with network externalities

Regarding the original meaning of diminishing marginal utility, Marshall (2019) summarized the

law of diminishing marginal utility as the marginal utility of a thing to anyone, which diminishes with each increase in the number of things he already has<sup>[10]</sup>. Secondly, He Xiaoxing (2020) proposed that Metcalfe's law applies to the number of people on both supply and demand sides. The external effects, increasing marginal utility, and economies of scale produced by these increases. It has nothing to do with the consumption objects to the law of diminishing marginal utility applies, so it will not affect the existence and effectiveness of the latter at all. On the other hand, in terms of the economies of scale of suppliers and demanders' network information, there are also stages of increasing and decreasing, and ultimately there are boundaries. It is no different from the traditional economy, except that it differs in degree and time course<sup>[8]</sup>. Therefore, the increase in external effects of network information and the many new characteristics it produces do not change the law of diminishing marginal utility.

## 5. Different applicability of the two laws

The applicability of these two laws is different as follows.

### 1. The difference between quality and performance

Products or services involved in diminishing marginal returns have no change in quality and performance. Repetitive and straightforward consumption can easily reach saturation. The products or services involved in increasing marginal revenue are continuously improved in terms of quality and performance. While the consumption increases, they continue to bring new stimuli to people, which can continuously improve people's satisfaction.

### 2. Need level difference

The satisfaction involved in diminishing marginal returns is generally aimed at people's physiological needs or material needs. There is always a limit to this need. Therefore, people's satisfaction will decrease when the consumption of goods or services reaches a certain amount. The satisfaction involved in increasing marginal returns is mainly aimed at people's social needs or spiritual needs, and this need is almost unlimited. Therefore, people's satisfaction will not decrease with the increase in the number of goods or services, but on the contrary.

## 6. Conclusion

In summary, the network's continuous growth has brought about the soaring of the value of the network, and increasing income has become inevitable. However, the marginal utility of the network economy is still diminishing in the end, which proves once again that the law of diminishing marginal utility of traditional Western economics is useful in the network economy. The proof that the law of diminishing economic utility still applies in the network economy is still limited. First of all, the existing literature is still lacking in the research on whether there is a difference in the performance of these two rules in network economy segmentation, such as online consumption and IT commodity consumption. Finally, the turning point from increasing marginal utility to diminishing marginal utility in the same consumption process is still unclear.

Network economics is a new branch of discipline developed based on contemporary economics, but this does not mean that network economics can be separated from the modern economic system. On the contrary, network economics must be based on contemporary economics and build its theoretical system based on borrowing and inheriting existing economic theories and methods. In-depth study of the law of increasing marginal utility and diminishing marginal utility has a particular significance for our scientific understanding of the connotation of the rapid development of network economy under the Internet's background.

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