B2C E-Commerce Platform Competition Strategy Research Based on the Network Externality

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Abstract

In recent years, the competition between B2C e-commerce platforms is increasing. From the perspective of consumer choice, with the application of system dynamics theory, and the analysis of the Causal relationship between the direct network externalities, indirect network externalities, compatibility and so on, the paper established system flow chart and system dynamics model of B2C e-commerce platform competition. Then using Vensim PLE to simulate the model and verified the effectiveness and application value of the model. The results showed that cost strategy that reduced cost of consumers' online shopping and passed on part of the costs to the sellers, the marketing strategy that improved the marketing costs and perfected the products and services and the compatibility strategy that improved the compatibility with market leadership platform can effectively increase the market share of B2C e-commerce platform.

Key words: Direct network externalities; E-commerce platform; Competition strategy; System dynamics

INTRODUCTION

B2C, whose full name is Business to Customer, means that enterprises provide consumers with online shopping environment, and generally refers to online retail. Of the constantly emerging of the B2C e-commerce platform, the competition between platforms is increasing, which has become a prominent question in the network economy in our country.

B2C e-commerce is a holistic concept, whose members are various and relationship is complex. It has typical network structure and two-sided market characteristics and shows remarkable characteristics of network externalities, which profoundly affected the e-commerce platform. Many scholars analyzed the influence of network externalities on competition from the strategy of differentiation. Xu (2007) and Diao (2008) improved Hotelling model to describe the differentiation competition problem with network externality. Wen (2009) and Qu (2010) analyzed the influence of network externality from the degree of transfer cost. Due to industry maturity, more domestic scholars have paid close attention to the impact of network externalities on various industries, such as telecommunications (Sun & Pan, 2014), bank card industry (Cheng & Qiao, 2014) and e-commerce (Li, Zhong, & Xiong, 2014). Katz and Shapiro (1985) firstly confirmed that platforms competing with each other had the willing to be compatible with each other, but consumers' different preferences and the differentiation competition of product/service would retain the diversity of the market.

At present, the research of B2C e-commerce platform lacks of dynamic research such as empirical research and simulation model, while more using the method of theoretical analysis and mathematical model for partial analysis. The competition of B2C e-commerce platform is a complex system process, and system dynamics can seek the related influencing factors from the whole system, then analyzing dynamic changes and causality relationship of the system and provides methods for the long-term competition of B2C e-commerce in a state of incomplete information.

In the process of the online trading, consumers are the trading sponsors, the basic source of profit and the key of platform competition. This paper uses the method of system dynamics and establishes the simulation model based on consumer choice, revealing the competition laws and development of the factors. By adjusting the model parameters, it simulates the competition of market leader and follower, and provides competitive strategy for B2C e-commerce platform.

1. CAUSALITY ANALYSIS OF B2C E-COMMERCE PLATFORM COMPETITION

This section will analyze the relationship between network externality and compatibility strategy, as well as the detailed classification of network externalities, and study the influence of above factors for consumers' choice on the B2C e-commerce, then establish the causality analysis.

1.1 Causality Analysis of Network Externality, Compatibility and Platform Scale

The compatibility in Figure 1 refers to the compatibility degree of the competition platform for platform A, which is the key to the scale of platform A, and network externality depends on platform scale. As we can see, the main loop in this figure is positive feedback among network externality, compatibility and platform scale. The stronger the network externality of e-commerce platform is, the more utility it provides for consumers, more likely it may be compatible with other platform. The direct result of compatibility is to expand the scale of the platform, which forms a positive feedback to network externality.
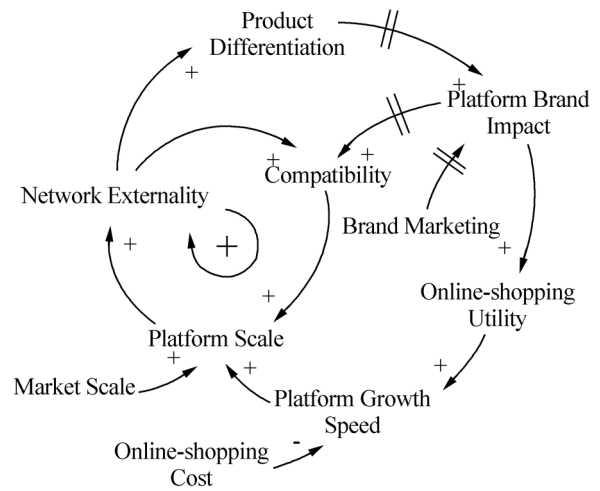

Figure 1
Causality Analysis of Network Externality, Compatibility and Platform Scale

1.2 Causality Analysis of the Impact of Direct and Indirect Network Externality on Consumer Choice

Figure 2 describes two positive feedback loops which are loop 1 and loop 2, including the direct network externality with consumer growth and indirect network externality with platform merchant growth, and the positive feedback relationship between the above two externality utility and consumer growth. In loop 1, consumer growth and the total number of non-online shopping consumer determine consumer scale. The more consumers, the more direct externality, the more the brand impact of the platform can be enhanced, thus to enhance consumer utility and attract more consumers, so the feedback loop completed. The principle of loop 2 is similar to loop 1 and is not be analyzed separately.
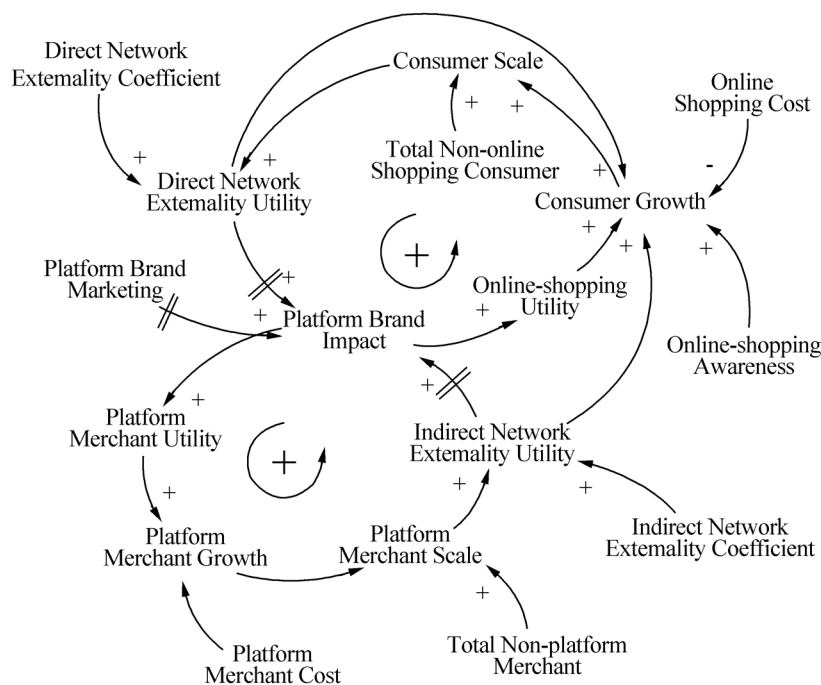

Figure 2
Causality Analysis of the Impact of Direct and Indirect Network Externality on Consumer Choice

2. SYSTEM DYNAMICS MODEL OF B2C E-COMMERCE PLATFORM COMPETITION

2.1 The Main Model Equations

The model equations include consumer and merchant scale expansion.

2.1.1 Consumer Scale Expansion

Consumer scale of platform A=INTEG (Consumer growth speed of platform A, 5).

Consumer growth speed of the platform A= (total number of non-online shopping consumer of base period- Consumer scale of platform A- Consumer scale of competition platform)* Consumer growth rate of platform A.

Consumer growth rate of platform A=Online shopping costs of platform A*shopping costs impact factor*cost-utility conversion ratio+ (online shopping utility of platform A +direct externality utility of platform A +indirect externality utility of platform A)*online shopping utility impact factor +online shopping awareness* online shopping awareness impact factor.

Brand impact of platform A = (0.25* direct externality utility of platform A+0.65* indirect externality utility of platform A)/3+SMOOTH (brand marketing investment*investment conversion factor, 5).

Compatibility coefficient=SMOOTH3I (Brand impact of platform A, 15, 0.05).

2.1.2 The Merchant Scale Expansion

Merchant scale of platform A=INTEG (Merchant growth speed of platform A, 6).

Merchant growth speed of platform A= (0.6* total number of non-platform merchant of base period-merchant scale of platform A)* merchant growth rate of platform A.

Merchant growth rate of platform A=merchant costs of platform A*merchant costs impact factor* cost-utility conversion ratio+ merchant utility of platform A+ merchant utility impact factor.

2.2 System Flow of B2C E-Commerce Platform Competition

Based on the above analysis, the system flow of B2C e-commerce platform competition based on consumer choice showed as Figure 3.
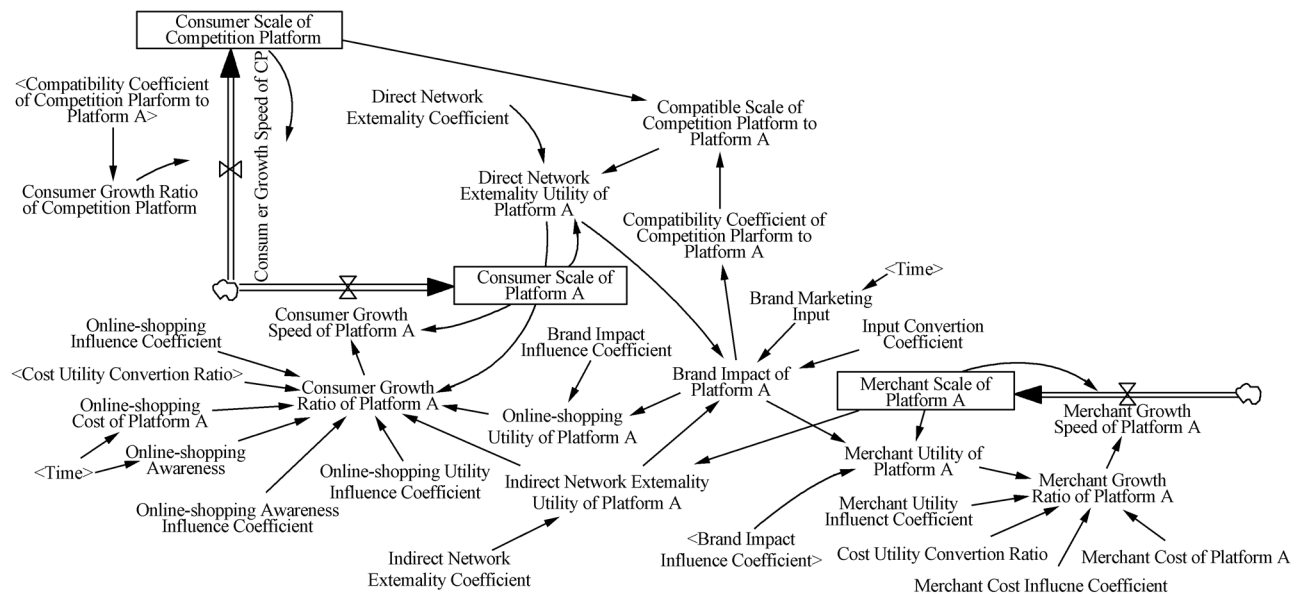

Figure 3
System Flow of B2C E-Commerce Platform Competition

2.3 Model Validation

Compared with domestic online shopping consumer scale, the model validation was tested. Since the simulation model aimed at platform consumer scale, unlike the domestic online shopping scale. Therefore, the comparative analysis is not the comparison of absolute amount of data, but the comparison of trends and laws of the market.
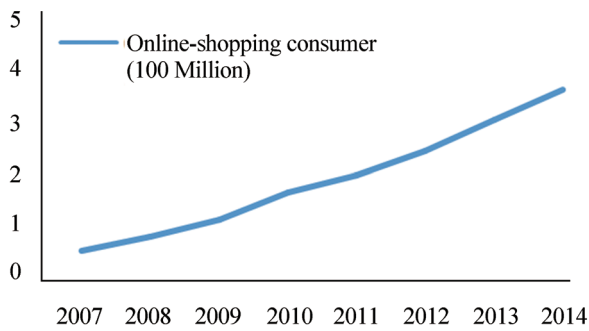
Figure 4
2007-2014 Online-shopping Consumer Scale
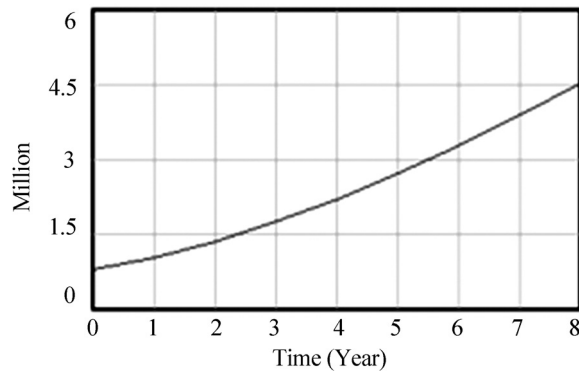Data source: *CNNIC China Internet Development Statistics Report.*

Figure 5
Initial Eight-Year Consumer Scale of Platform A by the Simulation Model
Data source: *CNNIC China Internet Development Statistics Report.*

Figure 4 is the trend of online shopping scale during 2007-2014. Figure 5 is the trend of the first eight years of consumer scale of the B2C e-commerce platform competition that the simulation model simulated. From the comparison of Figures 4 and 5, the trend of the real data and simulation results are basically the same. Therefore, the model is valid.

3. COMPETITIVE STRATEGY ANALYSIS

In recent years, the competition between e-commerce platforms is more and more fierce, and each platform hope to take the most effective strategy to devour other's market share to achieve sustainable growth. This part based on the B2C e-commerce platform competition platform model, considered the effect of B2C e-commerce platform competition strategy from reducing costs, strengthening marketing and compatibility strategy of competition platform.

3.1 Cost Strategy

Reducing online shopping costs is the most direct and effective way to attract potential customers. We adjusted the simulation model of online shopping costs (6% reduction) and business costs (4% increase) parameters, and the main output is in Figure 6.

As can be seen from the figure, under the cost strategy, customer scale of platform A improves greatly because it depredates part of customers of competition platform, which also significantly improves the direct network externality utility and brand impact of platform A and therefore, improves the compatibility of competition platform to platform A. Due to merchants' costs improve, the merchants scale has a slight decrease, resulting the indirect network externality utility decreases slightly.

Therefore, the strategy of reducing online shopping costs will help expand the market and maintain the leading position. Though it will face the loss of some merchants, the platform can choose to pass the increasing operation costs to merchants as long as the loss is not too much, which can effectively control the platform operation costs and improves its profitability.

3.2 Marketing Strategy

Marketing is the most common strategy that B2C e-commerce platform takes in order to enhance brand impact. We adjusted the model of brand marketing input (five times), and the output is in Figure 7.

As can be seen from the figure, under the marketing strategy, the customer scale of platform A has a strong growth in a period, but it has a slight increase in the balance state than the reference state, because the platform focuses only on marketing input, and ignores the substantial improvement on products and service. Merchants are also affected by the marketing strategy and tend to choose products and service of platform A. Because of the increase of consumers and merchants scale, the direct and indirect network externality utility improve to different extents. The increase input in brand marketing input improves the brand impact of platform A and prompts the compatibility of competition platform, which brings consumer scale of competition platform grows in a short time, but the real benefit is the platform that implemented the marketing strategy. Therefore, in the long run, the competition platform will lose its customers, so its consumer scale will be less than the reference.

In summary, the marketing strategy enables the platform to take a large accumulation of popularity in the short term and attract potential customers to join the platform. But the platform also should pay attention to timely ancillary products and service to meet the rapidly growing consumer demand and maintain rapid and stable development and the industry leader status.

3.3 Compatibility Strategy

Compatibility strategy is taken by competition platform as a market follower to compete for market. In the simulation model, we set platform A as the leader, and the competition platform as follower, and adjusted the compatibility of competition platform to platform A (increased by 10%). The simulation output is in Figure 8.
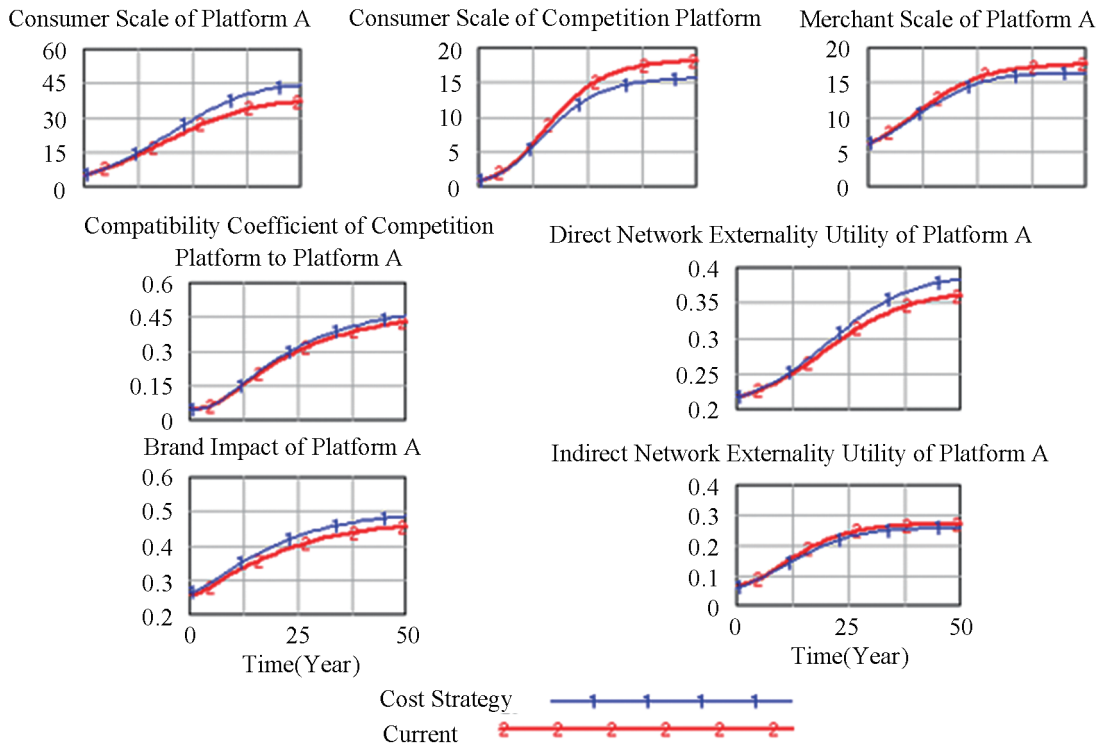
Figure 6
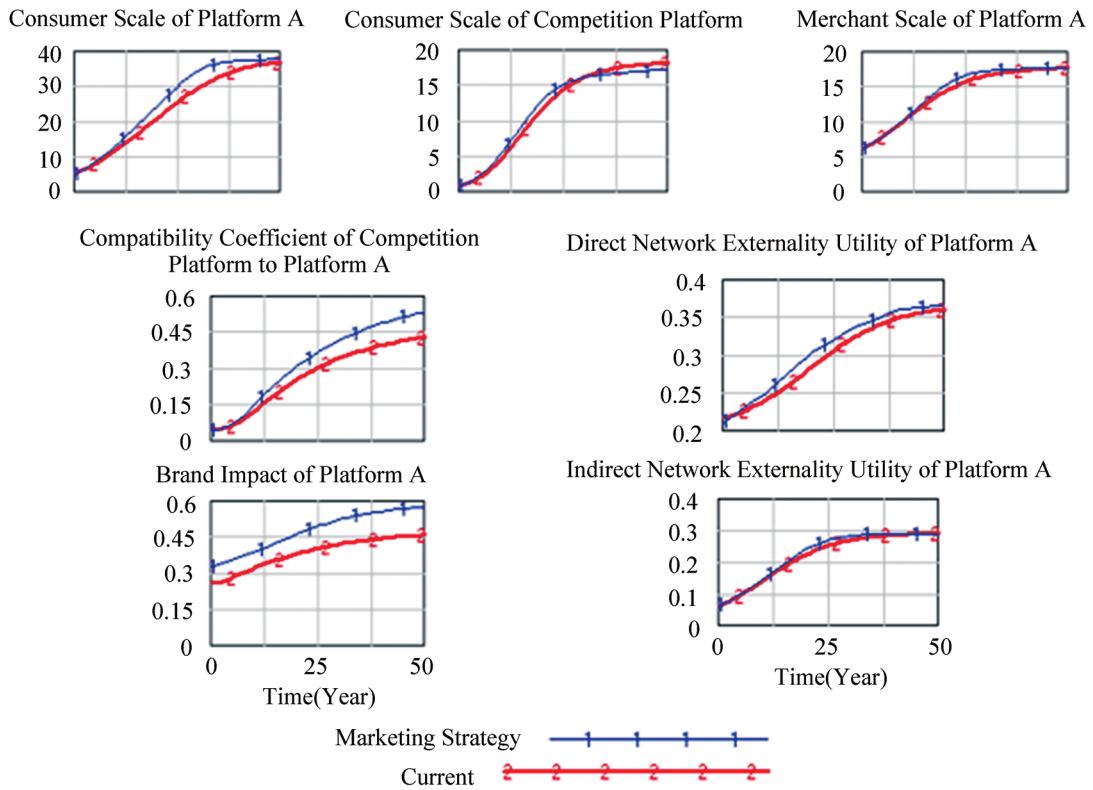**Comparison of Cost Strategy Simulation Results**

Figure 7
Comparison of Marketing Strategy Simulation Results

As can be seen from the figure, under the compatibility strategy, the consumer scale of competition platform has a strong growth and consumer scale of platform A has a slight increase at the beginning. Because the improvement of compatibility of competition platform improves the direct network externality utility of platform A and brand impact. But the improvement of the compatibility of competition platform gives customers more products and service, which are bound to attract part of potential customers of platform A. So the consumer scale of platform A will be lower than the reference scale lately. The compatibility strategy of competition platform has little effect on merchants on platform A and naturally has no significant impact on the indirect network externality utility of platform A.

In summary, if the competition platform improves its compatibility with leading platform, it will increase its market share significantly. Though the compatibility of following platform in the short run can bring market growth to some extent, it will face the loss of consumers in the long term, the leading platform should watch out for such a competitive strategy. Therefore, B2C e-commerce platform should properly handle the compatibility strategy that other platform proposed, and avoid long-term interests at the expense of short-sighted.
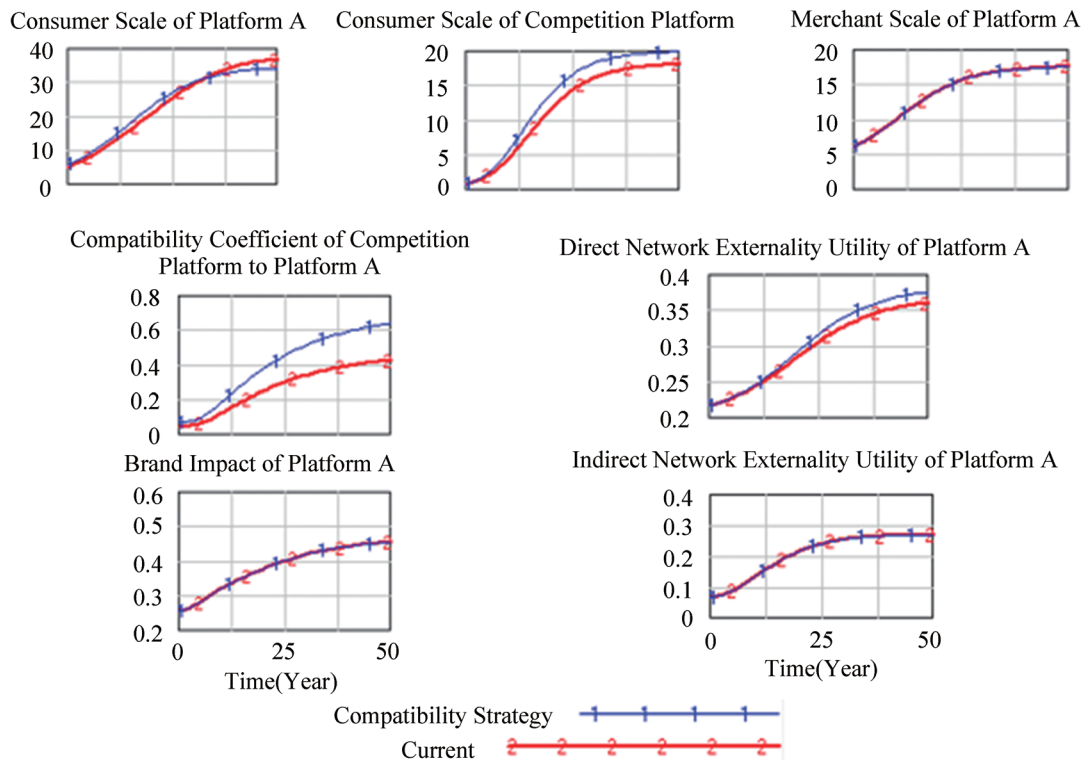

Figure 8
Comparison of Compatibility Strategy Simulation Results

CONCLUSION

In recent years, B2C e-commerce platform has entered the competitive stage. This article applies system dynamics to study the competition strategy of B2C e-commerce platform. Based on the analysis on the causality analysis on factors like direct and indirect network externality and compatibility, we establish the system flow of B2C e-commerce platform competition and system dynamics model that show the relationship between variables, and adjust parameters to dynamically simulate. The results show that strategies including reducing online shopping costs while increase merchants costs, taking marketing strategy through online and offline channels to popularize, promote, advertise while improving products and service, market follower improving compatibility with leading platform while market leading platform properly handling the compatibility proposal that put forward by other platform, can improve the market share of B2C e-commerce platform. Therefore, different B2C e-commerce platform can take different competition strategy according to their position in the market.

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