Influencing Factors of Virtual Cigarettes online game Consumers' Co-production Behavior

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Purpose–This study aims to explore the influencing factors of customer participation in co-production and the impact of co-production on consumer product evaluation and behavioral loyalty.
Design/methodology/approach – An online survey was used to collect 325 valid questionnaires from consumers who reported participating in online game public testing and played many virtual cigarettes online games with more than 6-months experience. Findings – Consumers who are willing to participate in co-production often share specific characteristics, including a high desire to control, a high motivation to achieve, and professional knowledge. When Consumers concentrate on co-production, they may leave positive product evaluations of virtual cigarettes online games, and increase behaviors that demonstrate loyalty. Practical implications –Virtual cigarettes online game developers can be involved by these results when provide relevant professional information in game public testing, because they suggest that consumers who are willing to participate in co-production often share specific characteristics. Originality/value – From the viewpoints of the consumer link, product link, and situational link, this paper summarized the link variables, and analysed the key factors affecting consumers' input into co-production.

Keywords: Virtual cigarettes online game; Co-production; Consumer Behavior; Customer Loyalty
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INTRODUCTION

18- 60 year olds are the target customers of tobacco products and online games. Both smoking and playing online games can lead to addictive behaviors.1 Smoking, which produces nicotine-containing gas and second-hand smoke, is increasingly banned in public places and workplaces in China.2 Playing online games does not produce harmful gases, so online games can be played in many public places. For example, online games can be played in railway stations, subways and buses in China. Some online game developers have designed Virtual cigarettes online games, allowing players to partially experience the pleasure of smoking and satisfy their smoking addiction.

Virtual cigarettes online game uses high-definition 3D screen scene design, players can take out different cigarettes in the game, smoke a virtual cigarette, experience the feeling of being surrounded by smoke, the gameplay is novel, and players can modify the brand and composition of cigarettes, add their own favorite things in the game. This makes the game a co-product of the

game developer and the game player. Therefore, virtual cigarettes online game is a substitute for physical tobacco products. If more people use virtual cigarettes online game, it may reduce their use of physical tobacco products, so as to achieve the purpose of controlling tobacco product consumption. Therefore, studying how to make virtual cigarettes online game more attractive to customers is a research problem with higher value.

In the current online gaming market, consumers are increasingly encouraged to invest in the development of products and services. Through this, enterprises try to form a co-production relationship with consumers. Co-production means that consumers invest time and energy actively participating in the development and consumption process of products or services, conducting information exchanges and cooperating with companies. [3]

Some game companies, including those already following best practices, have observed the potential value of including customers in development processed. This has led companies to give their fans more opportunities to influence services and products. The game industry is also beginning to see customers as co-developers; users are given tools to collaborate and further coproduce products.[4]

For example, the FarmVille game from Zynga established a virtual online community on Facebook to communicate with customers, or players. Some players in this community asked Zynga to create a harvester in the game that allows players to harvest multiple blocks at the same time; the game was originally designed to allow players to harvest one by one (Zynga is a leading developer of the world's social games: https://www.zynga.com). Now, this expanded harvester is part of the game.[5] Through consumer participation, companies can deeply understand consumers' ideas and respond quickly, improving their products.[6]

A typical example of co-production relates to the Millet mobile phone. Millet mobile phone users are called “Millet Fans,” and are also called “co-developers.” The Millet company opens part of the program code, so Millet Fans can help improve the product’s functionality. The improvements proposed by Millet Fans are reflected in regular updates, so Millet Fans feel respected. To leverage the centripetal force of the fans, additional different mechanisms have been established, including creating a community of Millet Fans in the virtual network, organizing Millet Fans “city meetings,” and holding regular parties. Through consumer participation, enterprises can more thoroughly understand consumers' ideas and respond quickly to improve their products.[7] In this service-oriented era, co-production is an indispensable factor and trend in innovating services.[8]

Most studies on co-production have focused on improving service quality and enriching service products, in industries such as financial and medical services,[9] knowledge-intensive business services, retail banking, information technology service innovation, tourism, healthcare services, and public service. [10] However, this topic has not been fully addressed for online games.

Originally, player participation was minimal when designing computer game systems. [11] However, an increasing number of computer game manufacturers have involved players in game design to enhance the attractiveness of their products .[10] Lange-Nielsen *et al.* explored ways to develop games in cooperation with players. [12] Vines *et al.* invited players to participate in game development, promoted game modifications through timely interactions between players and designers, ensured that the technology met people's needs, and eliminated the subjectivity of designers.[13] Mazzone *et al.* designed a game to improve the mood of young people.[14] They asked participants to design relevant game links and to give feedback about their experiences in real time. The game as ultimately designed was shown to improve players moods.[14] Co-production behavior by online players is becoming increasingly common. However, these studies have not examined the co-production behavior of players from the perspective of operation management.

With competition increasingly intensifying in the game industry, consumers have increasingly higher demands for the quality of game content. To meet consumer needs, online game developers have gradually allowed consumers to participate designing game content or product improvements, through sites such as Open Beta (an online public

beta testing site). Therefore, this study focused on the online game industry, exploring the behavior of virtual cigarettes online game players participating in co-production.

Many studies have considered co-production from the companies' perspective.[6,7,15,16] This research focused on the impact of co-production on the enterprise side, and discussed the impact of co-production on improving the productivity or innovation efficiency of the enterprise. However, co-production can bring benefits to both enterprises and consumers. This is because co-production gives consumers the opportunity to make choices about the products or services they need,[17] enjoy higher levels of customization,[18] maximize consumer interests,[19] and improve satisfaction.[7] In the past, a few studies have explored factors affecting consumers' involvement in co-production, such as: perceived control,[8] degree of involvement,[20] communication,[3] expertise,[21] and psychological implication.[22] However, there are considerable differences in the prerequisite factors affecting co-production, and no consistent framework has emerged.[3]

It is important that enterprises understand the factors that motivate consumer participation in co-production. As such, this study explored the factors informing consumer participation in co-production from the perspective of consumers.

Through co-production, consumers can gain insights into products or services and create their own value.[13] Some studies have been conducted to assess the consequences of consumer participation in co-production. For example, Chen, Tsou, and Ching and Auh, *et al*. explored the impact of co-production on consumer service innovation and loyalty.[8] A few papers have also explored the impact of co-production on consumer product evaluation. However, the success of a product or service depends mainly on consumer attitudes and evaluations of outcomes or outputs.[22] Co-production can benefit consumers and provide greater discretion in the allocation of products and services, generating products that satisfy consumers.[10] Therefore, this research explored the impact of co-production on consumer product evaluation and customer loyalty.

This study investigated the antecedents of co-production from three perspectives or "links": the consumer link, product link, and situational link.

Etgar proposed a five-stage dynamic model to illustrate consumers participation. [23] This model explored the promotion factors of co-production from the perspective of four linked modes: an external environment link, consumer link, product link, and situational link. The research provides a reference for game developers when engaging in Open Beta. This paper is divided into six sections. The next section provides a literature review and an overview of the expert interviews. This is followed by a literature exploration and the study hypotheses, the study methods, data analysis, and the conclusion and recommendations.

LITERATURE REVIEW AND EXPERT INTERVIEWS

The Connotations of Co-production

Baqer (2007) defines co-production as spending time and effort with consumers, exchanging information, and cooperating with enterprises in the process of consuming products or services. [3] This includes sharing ideas, and participating in the design or manufacture of products or services.[7] In other words, co-production means that consumers have the chance to participate in the different activities undertaken by enterprises, which includes cooperative behavior among consumers and companies.[24] Co-production is a dynamic process, not a single behavior. When consumers actively participate in service creation and delivery, they can improve the design of products or services, or reduce enterprise operating costs by sharing the responsibilities and work of employees.[6] Consumers can also participate in value creation through co-production, so that products or services are more consistent with their needs.[25]

Therefore, enterprises should take actions, such as providing incentives, to actively manage consumer co-production.[7] Bettencourt *et al*. (2018) proposed that knowledge-intensive business service enterprises manage customer participation in co-production using three indexes: customer role analysis, creating high performing customers, and generating favorable results.[9] The customer role analysis index defines seven kinds of customer

roles and responsibilities to improve service efficiency: open communication, sharing problem solving methods, enduring uncertainty, adaptation, support, participating in plan management, and personal involvement. [19] The index related to high performing customers refers to separating customer roles and providing motivation. Opportunities to enhance customer participation include selecting customers, customer training, education and socialization, and evaluating customer performance.[24] The index related to generating favorable results is used to assess whether enterprises can obtain sustainable competitive advantage, customer satisfaction, and achieve effective co-production. [19] Customers create and fill personalized needs by actively participating in co-production, providing customers with unforgettable experiences.[25] Co-production enables companies to understand customer experiences, and by extension, their needs. By sharing experiences, customers and enterprises can learn and create together. [24]

The Co-production Process

The process of customer co-production can be divided into three different stages: co-production before purchase, product development, and co-production after purchase. Customers play different roles in different production stages. Before the purchase, customers play the role of corporate consultants in joint production, providing companies with recommendations on developing and improving product services. In the product development stage, customers participate in the production and design of new products and services. Here, they improve service quality by interacting with company employees or by playing the role of " temporary employees". At this stage, it is important for customers to understand their obligations and responsibilities. Helping customers identify their own roles helps strengthen the trust between the company and customers. In the after-purchase stage, customers act as corporate promoters, recommending corporate services to other customers. Positive word-of-mouth effects are often a sign of customer loyalty. In addition, customers continue to perform a consulting role at this stage, actively providing feedback to the company on the service environment.[3] Service organizations and customers invest corresponding resources in this process and play different roles to realize the value of customers in product use.[26]

Etgar explored the process of consumer participation in co-production[23], proposing that co-production includes five stages: (1) pre-situation, (2) psychological motivation for consumers to invest in co-production, (3) cost and benefit of co-production, (4) substantial performance of consumer participation in co-production activities, and (5) output and evaluation. As noted above, Etgar proposed four pre-situation links: external environment, consumer, product, and situation. [23]

External environment links include external factors, such as economic development and cultural and technological changes. Consumer links are resources controlled by consumers, such as time, professional ability, language ability, and the ability to coordinate and communicate using computer or electronic technology.

Product links include the relevant characteristics of products; a higher degree of product differentiation is associated with an increased level of consumer attraction to participate. The situational link refers to the interactive environment between consumers and enterprises. The main situational factor is the belief of managers that establishing co-production relationships with consumers can bring benefits to companies. The other factors include a lack of speculative behavior, long-term commitment, and cultural compatibility and empathy.

In the second stage, Etgar noted that economic, psychological, and social factors drive consumers to join in co-production. [23] The economic driving force includes economic reward, risk reduction, and the pursuit of customization. The psychological driving force includes the pursuit of intrinsic value. The social driving force represents the social benefits of co-production, such as self-esteem and the desire for control.

Etgar's third stage focuses mainly on consumers assessing whether the cost of co-production is lower of higher than the benefits produced. [23] This involves analyzing both economic and non-economic costs. The economic

cost refers to the cost actually expended in the co-production process. The non-economic cost includes psychological and social losses and risks. This could include the speculation caused by involving consumers with no expertise in co-production. Etgar's fourth stage refers to the actual participation of consumers in the joint production process, including the consumption stage, logistics and distribution stage, assembly stage, manufacturing stage, and design stage.[23] The fifth stage evaluates the results to see whether the purpose and expected benefits of co-production can be achieved.

The Factors Influencing Co-production

Ertimur and Venkatesh discussed customer speculation in the situational link of co-production. [16] They noted that when consumer and enterprise goals are inconsistent, customer speculation may result. Information asymmetry and social differences play an important role in interference. Heide and Olsen (2011) found that time had a negative impact on perceived convenience, but positively impacted co-production satisfaction.[21] Co-production satisfaction and perceived convenience positively impacted product evaluation. Chen, Tsou, and Ching studied the information technology industry, exploring the impact of co-production of enterprises on service innovation, including impacts to upstream and downstream partners. [15] The results show that partner fit, partner professional knowledge, and emotional commitment positively affect co-production and subsequent service innovation. Hsu *et al.* explored the pre- and post-consequence variables affecting user participation in co-production in information system design projects.[38] They found that co-production is affected by social capital between users and developers; co-production also has positive effects on project performance, user satisfaction, and system quality. Wu *et al.* found that social capital positively impacts the co-production between business partners, and co-production can improve the absorptive capacity, self-efficacy, and innovation ability of enterprises. [27]

Today, consumers focus on the value of goods and on the experience and feelings brought about by participating in the co-production process and through the high inter-action between consumers and service providers. [22] This study explored the prerequisite variables affecting consumer co-production; as such, it drew upon the pre-situation construct proposed by Etgar. [23] The external environment links represent the overall external environment. Therefore, this study focused on consumer links, product links, and situational links. Etgar detailed three kinds of links, including how a consumer's own ability represents one of the variables in the consumer link. [23] However, that study did not fully summarize all variables, nor did it conduct empirical studies to verify the arguments. In addition, because consumer links should include the psychological factors of consumers, this study also considered the consumer's psychological motivation mentioned by Etgar as being in the second stage of consumer links. [23] Therefore, this study built on Etgar's argument, and used qualitative interviews to summarize the variables in the three links, clarifying the prerequisite variables of co-production. [23] This served as a basis for empirical analysis.

Customer Loyalty and Co-production

The virtual brand community is an important place for today's customer to participate in co-production. It provides customers with increasingly convenient interaction opportunities compared to offline environments; as such, virtual communities have become a typical platform for value co-creation. [16] In the virtual brand community, customers interact with companies, customers, and other stakeholders, and create value through the sharing of consumer experience. When the customer perceives that he or she has obtained value, the customer shows high loyalty to the brand.[28] From a social psychology perspective, Bendapudi and Leone explored the influence of self-serving bias on customer participation in co-production and satisfaction. They found that the degree of customer participation affects customer satisfaction.[29] When the results are not what the customer expected, providing the opportunity to choose reduces self-interest bias. Auh *et al.* discussed the impact of

joint participation in the financial services industry on customer loyalty. [8] They found that communication and customer expertise increases the degree of co-production, increasing customer loyalty. Through the process of participating in co-production, customers deepen their cognition of the company and brand through mutual interaction, sharing, and communication. This creates an emotional connection with brand products, enhancing brand loyalty.[30]

Expert Interviews

First, the research team identified players who have engaged in many kinds of online games and have participated in online public beta testing, using an online game forum (site1). Snowball sampling was used to ensure that participants came from a range of backgrounds and had relevant knowledge of online games.[31] E-mail was used to contact suitable experts. A total of 25 experts were interviewed, ranging between 28 and 50 years old. There were 14 males and 11 females. They reported spending an average of about 25 hours a week playing online games and had an average of more than 5 years of online game experience. We collected online players' ideas and opinions about participating in co-production using semi-open questionnaires. Relevant items were as follows: (1) Have you ever participated in Open Beta? How many times have you participated? (2) What are your views on online public tests? (3) What motivates you to participate in Open Beta? Based on each interviewee's response, we conducted follow-up questions, with each interview lasting approximately 35 to 65 minutes.

This study used the open/template method of qualitative data analysis, coding the interview results using the classification of Etgar.[23] Because the focus of the interview was to explore the prerequisite variables involved in choosing to participate in Open Beta, the impact of such participation on consumers or game developers was not included in the interview process. Based on Ryan and Bernard, 10 categories were summarized from the written records, and two professors in the field of marketing and e-commerce were invited to classify 172 keywords into 10 categories; the two experts classified 143 of the 172 keywords in identical ways, indicating a high degree of consistency. Another 29 keywords were discarded due to low consistency.[32]

Only the keywords that were identified identically by the experts were placed into the categories, resulting in only eight final categories. In addition, we further invited the two experts to divide eight categories into three links: consumer, product, and situational. Based on the process and results above, consumer links include: perceptual control, sense of achievement, and professional knowledge; product links include: information usefulness and level of interest; and situational links include: customization, interaction, and emotional commitment. Therefore, based on the results of expert interviews, this study explored the impact of different factors on these three links with respect to consumer co-production behavior.

LITERATURE EXPLORATION AND HYPOTHESIS DEVELOPMENT

Consumer Connection and Co-production

White proposed that perceptual control is a driving force of human nature, and that people feel they need to dominate the environment to show their abilities. [33] Koufaris defined perceptual control as the ability of an individual to perceive that he or she is capable of removing threats or controlling actions in his or her environment.[34] Lee pointed out that perceptual control represents the degree to which individuals can control the situation he or she is facing. [35] In online game situations, perceptual control represents the player's ability to control the content of the game. For example, when the player can break through barriers in the game to control the gaming process, he tends to feel a higher degree of perceptual control over the game. Because human beings have the innate desire and need to control their environment, they want to participate in the production of services or products and actively participate in co-production.[27]

In other words, consumers actively participate in a service process to determine the overall picture of the final product or service, because they want to satisfy the feeling of psychological and

behavioral control. [24] Control means that consumers can influence the delivery process of products or services, or product performance. This also reduces the risk that the products will not meet their needs. [20] Consumers can test online games through Open Beta, representing the behavior of consumers participating in co-production. The errors identified by consumers can be used as a standard for game developers to correct game content, reducing the problems that may arise in the product for sale. In other words, when players perceive a high degree of control over the game, they may be willing to participate in Open Beta activities to help find and test possible errors in the game, because they can grasp the process of the game. This background led to the study hypothesis that perceptual control is a pre-variable of co-production:

H1: The perceptual control of consumer connections has a positive impact on co-production.

When a person thinks his performance is better than others, or he has improved upon his past performance, he attains a feeling of achievement.[32] Individuals are motivated to invest more efforts through self-affirmation, extra benefits, or achieving desired goals.[26] In online games, players acquire treasures and tools to improve their abilities and constantly challenge higher goals.[36] When players achieve a sense of accomplishment in the process of completing the task, they believe they can provide constructive recommendations for the game's design, because of internal confidence or external appreciation. Vorderer and Ritterfeld proposed that online game participation comes from sense of achievement, control, and self-efficacy. [37] Hilton and Hughes argued that to engage in co-production actions, consumers must feel a sense of achievement. [38]This background led to the following hypothesis:

H2: A consumer's sense of achievement has a positive impact on co-production.

Consumer expertise refers to the knowledge accumulated by consumers from a product: the performance of goods.[39] When consumers exhibit innovative thinking or hold unique relevant expertise, they can improve the quality of services within their capabilities. In the process of service production, the resources, abilities, or knowledge provided by consumers in any form of information promote the creation of common values with developers. [40] One condition for co-production is that the participating consumers need to have product expertise. This allows them to evaluate their participation and their possible contributions in co-production, and thus decide whether to participate or not. In other words, when consumers believe that their expertise can aid co-production, they may be more willing to provide accurate and relevant information to enterprises, facilitating efficient service delivery. In addition, Auh *et al.* argued there is a positive relationship between consumer expertise and co-production. [8] In virtual cigarettes online game scenarios, when players have professional knowledge related to online games, they are better able to evaluate whether they can contribute to the Open Beta. This led to the following hypothesis:

H3: Consumer-linked expertise has a positive impact on co-production.

The Product Link and Co-production

Negash, Ryan, and Igbaria defined the usefulness of information as a computer-mediated situation, where users know the correctness, timeliness, convenience, relevance, and integrity of information.[41] Wixom and Todd noted that information usefulness is defined by whether a website is meaningful and valuable, and whether it conforms to the relevant information recognized by users. [42] DeLone and McLean pointed out that information usefulness refers to users' subjective identification with information systems.[43]

The evaluation indicators for usefulness include the integrity, correctness, practicability, and realtime nature of information content. In an online game situation, integrity means that online games provide complete information to online players; correctness means that the information received by online players is correct; practicality means that online games can provide information related to

players' needs; realtime means that online games provide the latest updated information. In summary, information usefulness means that online players receive complete, real-time, and valuable information from the game developer's offering.

When enterprises provide useful information to consumers, it encourages cooperative behavior between consumers and enterprises. For example, if an online game developer provides relevant information about game content to help the player under-stand the game, the willingness to coproduce the game increases. Celik and Yilmaz found that when enterprises respond to consumers' requests in a timely manner, they increase consumer willingness to coproduce.[44] In addition, Wang and Fesenmaier found that sharing information enhances partnerships between partners. [45]
When online game developers provide players with correct and real-time product information, players more completely understand the product, reducing information asymmetry. This enhances the interaction between players and game developers and the willingness of players to participate in Open Beta. This analysis led to the following hypothesis:

H4: Information usefulness of product links has a positive impact on co-production.

Interestingness refers to the state of mind in which a person is happy and satisfied. It reflects a subjective and intrinsic belief. [46] When individuals feel that virtual communities are of high hedonic and entertainment value, their willingness to participate and their sense of identity will increase.[47] For virtual cigarettes online game players, having a sense of fun enhances their willingness to participate, because players can enjoy the fun of the game.

Wang and Yan noted that different kinds of interests may encourage consumers to participate in co-production.[30] These include: interest in increasing service efficiency and effectiveness, an interest in reducing service costs, and psychological benefits. Bu, Jin, and Li found that an immersive and pleasant online environment enhances the relationship with online users.[29] When virtual cigarettes online game content is fresh and interesting for players, it increases consumer interest in virtual cigarettes online games and stimulates the willingness to participate in co-production. These arguments led to the following hypothesis:

H5: The interestingness of product links has a positive impact on co-production.

Situational Linkage and Co-production

Customization refers to the design and production of products by enterprises to meet the individual needs of each consumer. [48] Customization involves collecting preferences about consumers and providing them with appropriate or tailored products. [49] In online game contexts, customization includes the ability to freely set the appearance of characters in the game, as well as the game's content.[50]Customization provides the opportunity for users to set their own preferences, meeting consumer needs and increase their decision-making power. [51]

The customization process enhances the co-production behavior between consumers and developers, because when consumers provide relevant information about product preferences to enterprises, enterprises can produce products or services that consumers need. In addition, character customization can increase player willingness to experience the game.[51] Shadbolt *et al.* (2013) recommended that game developers customize their products to give consumers a feeling of consideration, increasing their willingness to participate in co-production.[52] This discussion led to the following hypothesis:

H6: Customization of situational links has a positive impact on co-production.

Applying a network interaction perspective, Hoffman, Kalsbeek, and Novak proposed three forms of interaction: machine interaction, interpersonal interaction, and human-computer interaction.[53] Machine interaction refers to interactive access to hypermedia content. Interpersonal interaction refers to human-to-human communication using a computer as a medium. Human-computer interaction emphasizes the

interaction between the user and interface in the process of online browsing.

This study examined online games, with the goal of exploring the interaction between consumers (players). As such, the definition of interaction in this study focused on the interactions among people. By interacting with consumers, developers can help enterprises develop new products and services by encouraging consumers to participate in service delivery. If consumers are actively involved in co-production, developers need to develop a strong customer relationship to encourage consumers to pay and invest. [54] When consumers have good interactions with enterprises, they actively participate in the enterprises' activities. Therefore, the interaction mechanism can be used to derive the behavior associated with co-production. In the virtual cigarettes online game situation, players increase their willingness to participate in co-production when they interact with online friends, build trusting relationships, and exchange opinions. Therefore, this study proposes the following hypotheses:

H7: The interaction of contextual linkages has a positive impact on co-production.

Commitment reflects the pressure of internal norms, which can lead members of an organization to strive for the organization's interests and goals.[55] Emotional commitment emphasizes a positive emotional state, supporting the psychological security of partners. [56] Employees with strong emotional commitment will engage in business-friendly behavior. An increase in emotional commitment will generally lead to a willingness to cooperate with others, and the subject will generally strive to move towards organizational goals and tasks.[57] Similarly, deepening the relationship between consumers and game developers can enhance their willingness to cooperate with each other in the future.[58] Compared to consumers with low emotional commitment, consumers with high emotional commitment will do their best to make meaningful contributions to the enterprise.[56] In other words, if we stimulate consumers' co-production behavior, we can increase the consumers' emotional commitment to the company. Furthermore, Auh *et al.* found that when consumers have a high emotional commitment to an organization, they are more likely to participate in co-production. [8] Chen, Tsou, and Ching noted that emotional commitment has a positive impact on the practice of co-production. [15] With virtual cigarettes online games, when players are emotionally committed to game developers, they are more willing to cooperate with developer activities, producing the cooperative behavior of co-production. This analysis led to the following hypothesis:

H8: Situational linked emotional commitment has a positive impact on co-production.

Co-production, Product Evaluation, and Behavioral Loyalty

A product evaluation is the subjective judgement of consumers with respect to the consistency of product specifications and the added value.[59] Co-production enables consumers to actively participate in the service delivery process. Although co-production is conducted by both consumers and producers, consumers ultimately determine the value. In other words, the quality of the output created by the co-production process and the final result will affect consumer acceptance and evaluation.[20]They also proposed that when consumers and developers coproduce a product or service, consumers will have a positive evaluation of the performance of product characteristics. Wei, Straub, and Poddar noted that consumers are willing to provide their own evaluation after using products or services, because these information can be used as a reference for other consumer buying behaviors.[60] With online games, a higher level of player participation in co-production is associated with increased energy investment in the service delivery process. Because there is no formal right-obligation relationship between players and developers, a higher level of voluntary contribution is associated with a higher evaluation of virtual cigarettes online games. In short, co-production affects consumers' evaluation of products. This analysis led to the following hypothesis:

H9: Co-production has a positive impact on

product evaluation.

Dimitriades (2006) defined behavioral loyalty as repeated purchases of products or services by consumers over a specified period of time.[61] To strengthen consumer commitment, enterprises establish and strengthen the relationship with consumers by satisfying consumers, to obtain their lasting loyalty. One way is to create value through co-operation, as positive emotional experiences encourage consumers to enhance their loyalty to the enterprise.[62] Skjølsvik *et al*. found that consumer collaboration contributed to the implementation of co-production and increased customer loyalty. [10] In virtual cigarettes online game contexts, game developers and players work together to produce the online game. Through this, they connect more closely with each other and continue to use the game designed by the game developers. This led to the following hypothesis:

H10: Co-production has a positive effect on behavioral loyalty.

Hennig-Thurau *et al.* argued that consumers can publish positive or negative evaluations of a product or service on the Internet, and current and potential consumers can use the Internet to understand these evaluations[62]. Sharing positive evaluations that express a high satisfaction about the quality of products or services with others is called positive word-of-mouth.[63]

A consumers' subjective evaluation of products or services creates word-of-mouth feedback after dissemination. Consumers encourage others to buy a product if they believe it was valuable after buying it, and if they would continue to use it themselves. In the context of online games, when online players positively evaluate a game, they often recommend the game to other players, and continue to use the game. This generates behavioral loyalty: the higher the consumer evaluation of products, the higher their loyalty. This led to the following hypothesis:

H11: Product evaluation has a positive effect on behavioral loyalty.

METHODS

Research Structure

This research positioned co-production as the main variable, which was analyzed from the perspective of consumer links, product links, and situational links. The study explored the prerequisite factors impacting co-production, and further explored the impact of co-production on product evaluation and behavioral loyalty. The proposed research model is shown in Figure 1:

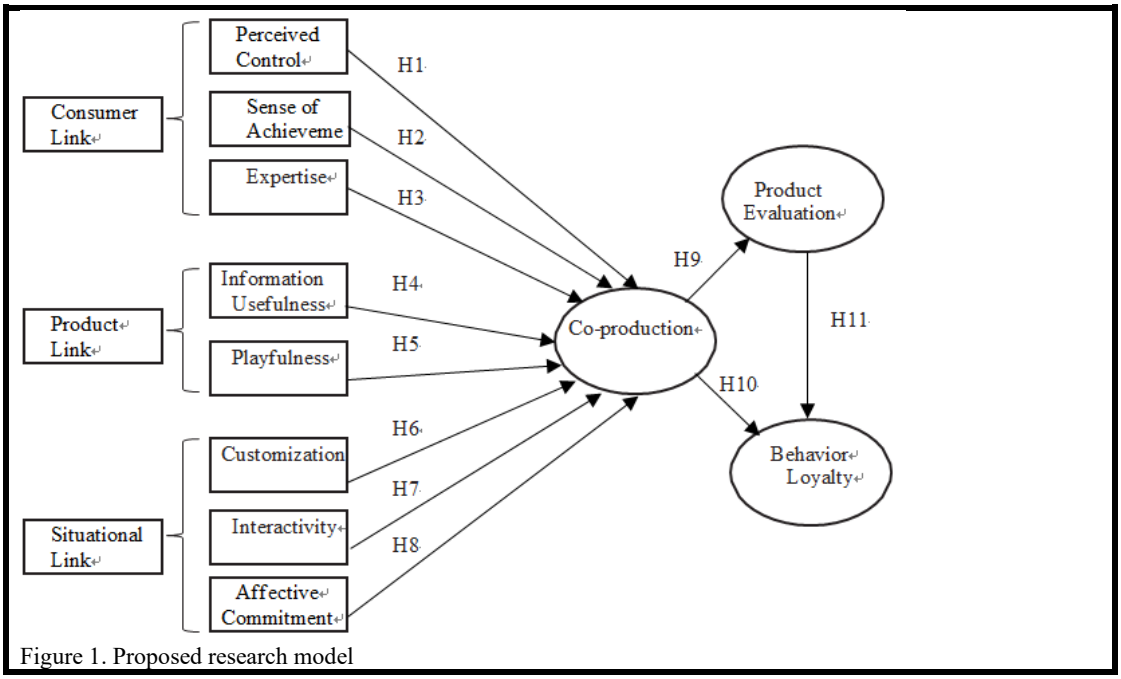

Figure 1. Proposed research model

Sampling Method

To test the hypotheses described above, this study collected data using online questionnaires. To improve the representativeness of participants, the study engaged consumers who reported participating in online game public testing and played many virtual cigarettes online games with more than 6-months experience. The goal was to understand the co-production behavior of game players when a new game is launched. The study adopted convenient sampling to align with time and cost limitations. Participants were identified as gamers, who were invited to participate through online game forums and community websites (Site 1).

After obtaining the consent of game forums and community website administrators, the study invitation was posted on forums and community websites and eligible users were invited to join the study. Virtual cigarettes online game players who were willing to participate in the survey left a personal e-mail address, and the research team then sent the online questionnaire to participants through e-mail. To improve the participation rate and increase the willingness to fill in the questionnaire, participation was incentivized using a lottery. The prize included 100 Supermarket vouchers of 20 RMB Yuan each. Lottery winners were selected after the end of the survey.

Operational Definitions

All the questionnaire items were measured with a 7-point Likert-type scale with categories numbered from 1 (strongly disagree) to 7 (strongly agree).These seven levels were included with each item for respondents to answer.

Corresponding to the Proposed research model (Figure 1), the questionnaire was divided into consumer link section(12 items), product link section (8 items), situational link section (12 items), co-production section (4 items), product evaluation section(4 items) and behavioral loyalty section (3 items). There are total 44 items in the questionnaire.

To evaluate consumer links, items related to perceptual control were used to represent the player's ability to control the content process of the game. This was assessed using Bateson's questionnaire, with four items.[27] Achievement represents the degree to which the player achieves the task goal and receives self-affirmation in the game. Professional knowledge refers to the degree to which players who participate in online game public testing can provide relevant professional knowledg.[66] Four items were designed based on the research of Sharma and Patterson. [39]

To evaluate product links, information usefulness was defined as online game players' perception that the information provided by game developers is meaningful and valuable. This study included four items designed based on Wixom and Todd.[42] Interestingness refers to online game players' pleasure after using online games. Four items on this topic were designed according to questionnaires by Moon and Kim. [66]

To evaluate situational links, customization was defined as the product designed and produced by online game developers to meet the personalized needs of consumers. The study drew on the work of Souitaris and Balabanis to design four questions related to this variable.[51] Questions related to interactions were based on Rafaeli, four items related to this area. [67] We defined the degree of interaction as the communication and experience sharing between virtual cigarettes online game players and other players; emotional commitment was defined as online game players' emotional attachment and identification to virtual cigarettes online games, and the degree of internalization reflected the game developer values. Meyer and Allen's questionnaire design was used, with four items assessing these areas. [68]

Co-production referred to the willingness of online game players to participate in online public testing; seven items were designed based on a questionnaire designed by Auh et al.[8] Product evaluation was defined as the subjective comments of virtual cigarettes online game players. This study drew on a questionnaire by Grewal *et al*.(1998), for a total of four items.[69] Questions related to behavioral loyalty drew on research by Jones and Sasser to measure virtual cigarettes online game player willingness to re-purchase and cross-purchase.[70] The different construct items are detailed in the Appendix.

Sample Structure

A total of 325 questionnaires were collected from June 25 to August 25, 2020. Of these, 21 incomplete questionnaires were deducted from the response totals. This resulted in a rejection rate of 6.5%, resulting in 304 valid sample questionnaires. The gender distribution of survey participants were as follows: 162 were male at 53.3%; 142 were female at 46.7%. The age distribution was as follows: 41 participants were under 19 years old (13.5%); 98 participants were 20-24 years old (32.2%); 68 were 25-29 years old (22.4%); 49 were 30-34 years old (16.1%); 29 people were 35-39 (9.5%); and 19 were aged 40 and over (6.3%).

The age distribution showed that the most survey participants were between 20 to 34 years old. This result was consistent with a 2012 survey report by the Nielsen Company, which found that most virtual cigarettes online games are played by people in the 15 to 37 year old age group. Therefore, the sample of this paper is generally in line with the population structure of Chinese players playing online games.

Many of the participants had a university (undergraduate) educational level (132 study participants, at 43.4%), or Master's degree (86 people, at 28.3%). Many participants had participated in public testing of online games twice (93 people, at 30.6%); even more people had participated in such public testing within three months (102 people, at 33.6%) and/or had played online games for more than three years (96 persons, 31.6%). To measure non-response bias, and ensure the reclaimed questionnaires were sufficiently representative, this study drew on the work of Armstrong and Overton to examine differences in those who did not complete the questionnaires sent, and those who did.[71] This evaluation revealed no significant difference; respondents can be assumed to represent the broader gaming population.

DATA ANALYSIS

In this study, the Partial Least Squares (PLS) method was used to test the measurement mode and structure mode, and Smart PLS software was used for the data analysis. Because PLS does not provide a p-value for the significance test to assess the path coefficient, this paper used 500 samples by applying a Bootstrap resampling method as parameters. [73] The Bootstrap repeated sampling method is a statistical inference method without a mother number, making it appropriate for small samples, with the ability to yield good results.[74]

Reliability and Validity Analysis

Table 1 and Table 2 show the results of the reliability analysis, and presents the re-liability of individual items. Most of the construct factor loadings exceeded 0.7, meaning that indicators have a certain explanatory power and significantly impact potential variables.[73]

In terms of Composite Reliability (CR), study constructs ranged from 0.84 to 0.91, which is higher than the 0.7 value recommended by Hair *et al*. (2009).[74] This indicated internal consistency. In terms of content validity, to ensure the validity of the measurement results and assess their consistency with the survey item characteristics, we invited three academic and business experts to test the validity of the questionnaire's content and structure. Table 1 and Table 2 show that the Average Variance Extracted (AVE) of the study constructs were between 0.58 to 0.71, which exceeded the standard value of 0.5 recommended by Fornell and Larcker (1981).[75] Table 3 indicates that the square roots of AVEs (on the diagonal of the matrix) were larger than the inter-construct correlations, indicating adequate discriminant validity. [76]

Table 1
Reliability analysis (N = 304) (section one)

Constructs	Item	Factor	Standard	t- value	CR	AVE
Consumer Link						
	A1	0.62	0.05	11.45		
Perceived	A2	0.74	0.03	21.50	0.84	0.58
Control	A3	0.83	0.02	43.47		
	A4	0.82	0.02	33.22		
Sense of	B1	0.80	0.02	32.96		
Achievement	B2	0.87	0.02	51.43	0.88	0.71
	B3	0.86	0.02	42.84		
	C1	0.78	0.03	26.56		
Expertise	C2	0.84	0.02	40.80	0.88	0.64
	C3	0.81	0.03	32.36		
	C4	0.78	0.03	24.38		
Product link						
	D1	0.79	0.03	28.12		
Information	D2	0.80	0.03	26.46	0.87	0.62
Usefulness	D3	0.80	0.03	31.32		
	D4	0.75	0.03	26.90		
	E1	0.77	0.02	30.35		
Playfulness	E2	0.80	0.02	32.61	0.88	0.64
	E3	0.83	0.02	51.30		
	E4	0.80	0.02	38.34		
Situational Link						
	F1	0.81	0.02	36.52		
Customization	F2	0.85	0.02	52.74	0.88	0.65
	F3	0.80	0.02	33.18		
	F4	0.76	0.03	26.64		
	G1	0.82	0.02	33.05		
Interactivity	G2	0.84	0.02	42.28	0.90	0.70
	G3	0.83	0.03	30.23		
	G4	0.87	0.02	49.50		

Note. AVE= Average Variance Extracted, CR= Construct Reliability

Table 2
Reliability analysis (section two)

Constructs	Item	Factor loading	Standard	t- value	CR	AVE
Affective Commitment	H1	0.76	0.02	32.70	0.91	0.71
	H2	0.88	0.02	54.89		
	H3	0.86	0.02	50.18		
	H4	0.86	0.02	52.23		
Co-production	I1	0.75	0.03	23.36	0.87	0.58
	I2	0.85	0.02	55.63		
	I3	0.73	0.03	24.79		
	I4	0.74	0.03	25.13		
	I5	0.71	0.04	19.65		
Product Evaluation	J1	0.82	0.02	50.32	0.89	0.66
	J2	0.82	0.02	38.50		
	J3	0.79	0.03	30.87		
	J4	0.83	0.02	41.58		
Behavior Loyalty	K1	0.84	0.02	53.60	0.87	0.70
	K2	0.80	0.03	29.66		
	K3	0.87	0.01	80.04		

Note. AVE= Average Variance Extracted, CR = Composite Reliability

Table 3
Discriminant validity analysis

Item	(a)	(b)	(c)	(d)	(e)	(f)	(h)	(i)	(j)	(k)
Perceived Control (a)	0.76									
Sense of Achievement (b)	0.62	0.84								
Expertise (c)	0.57	0.59								
Information Usefulness (d)	0.46	0.49	0.79							
Playfulness (e)	0.61	0.62	0.53	0.80						
Customization (f)	0.66	0.68	0.46	0.67	0.81					
Interactivity (g)	0.50	0.47	0.54	0.53	0.48	0.84				
Affective Commitment (h)	0.60	0.64	0.54	0.70	0.64	0.60	0.84			
Co-production (i)	0.65	0.65	0.53	0.70	0.66	0.59	0.70	0.75		
Product Evaluation (j)	0.26	0.14	0.16	0.19	0.29	0.18	0.19	0.24	0.81	
Behavior Loyalty (k)	0.25	0.15	0.16	0.16	0.25	0.14	0.19	0.27	0.71	0.84
AVE	0.58	0.71	0.62	0.64	0.65	0.71	0.56	0.66	0.70	

Note. Diagonal elements show the square root of average variance extracted (AVE).
Other elements are latent variable correlating coefficients.

Test of the Research Hypotheses

As shown in Figure 2, the R^2 value of endogenous variables exceeded 0.1 when assessing the explanatory power of the model. The R^2 of co-production was 0.66; the R^2 of product evaluation was 0.16; and the R^2 of behavioral loyalty was 0.61. The explanatory variability of exogenous variables representing this research framework achieved a certain standard for endogenous variables. Figure 2 shows that perceptual control (β=0.15, P <0.05), sense of achievement (β= 0.12, P < 0.05) and professional knowledge (β=0.16, P<0.01) had significant positive effects on co-production, verifying the validity of hypotheses H1, H2, and H3.

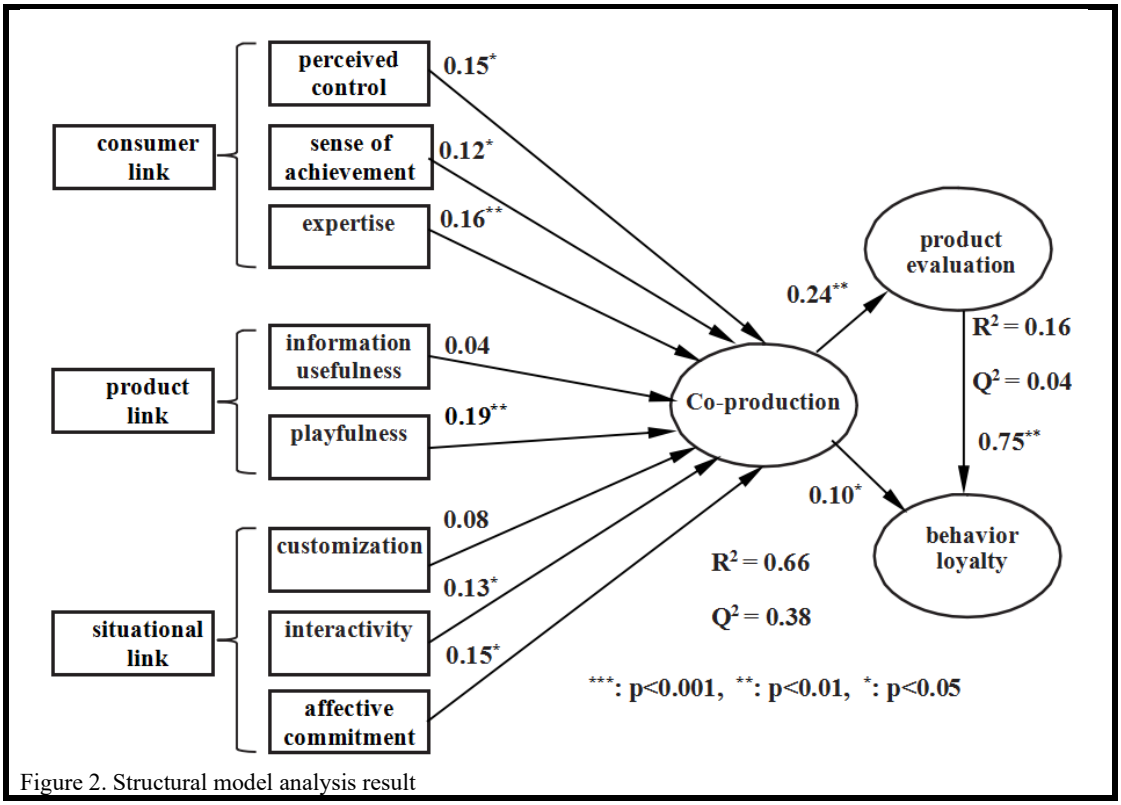

Figure 2. Structural model analysis result

In terms of product linkages, the results show that interestingness has a positive an
significant impact on co-production (β=0.19, P<0.01); however, the usefulness of information had no effect on co-production (β=0.04, P>0.05); this supported the validity of H5, but not H4. In the context of connection, interaction (β=0.13, P<0.05) and emotional commitment (β= 0.15, P<0.05) had a positive and significant impact on co-production; however, customization did not significantly impact co-production (β=0.08, P>0.05). Therefore, the results supported the validity of H7 and H8, but not H6.

Co-production had a positive and significant impact on product evaluation (β=0.24, p<0.001) and behavioral loyalty (β=0.10, p<0.05). A higher co-production in virtual cigarettes online games was associated with a higher product evaluation and behavioral loyalty by consumers. These results supported the validity of H9 and H10. Finally, product evaluation had a positive and significant impact on behavioral loyalty (β=0.75, p<0.001). This indicated that a higher product evaluation by consumers was associated with a higher level of loyalty to virtual cigarettes online games. This supported the validity of H11.

CONCLUSION AND RECOMMENDATIONS

Research Conclusions

Building on the work of Etgar, this study explored the prerequisite variables involved in consumer

participation in co-production, from the perspectives of consumer links, product links and situational links. [23] The study further explored the impact on consumer product evaluation and behavioral loyalty. The resulted indicated that when consumers perceive they can control the process of virtual cigarettes online games, they are more likely to participate in virtual cigarettes online game beta testing. This result was consistent with Rodie and Kleine.[76] In addition, if consumers can achieve a sense of achievement in virtual cigarettes online games, they are more likely to participate in co-production. This result supports Bateson's view that consumers are more likely to actively accept products or services when they are perceived to satisfy a sense of psychological and behavioral control. [27]

Moreover, if consumers can participate in acquiring or generating virtual cigarettes online game-related knowledge, they will enhance their co-production behavior in the testing of virtual cigarettes online games. This result was consistent with Skjølsvik *et al.* [10] Knowledge-rich consumers will advance the development of new knowledge through cooperation. From a consumer linkages perspective, professional knowledge (β=0.16) had a higher impact on co-production than perceptual control (β=0.15) and sense of achievement (β=0.12). From the perspective of consumer linkages, consumers game-related knowledge was an important variable in increasing their participation in co-production behavior.

With respect to the product link, when players are more curious about and interested in virtual cigarettes online game content, they will generally increase their co-production behavior to participate in virtual cigarettes online game testing. This result affirmed the work of Hong *et al.* [77]Interestingness represents the spontaneous cognition of consumers, and stimulates individuals to spontaneously engage in related activities. However, the more useful the in-formation provided by game developers is, the less cooperative production was actually reported.

This result contrasts with Karakaya and Barnes' conclusion that the reliability of information sources is an important determinant of consumers' willingness to participate in online activities. [78] This may be because when game developers provide information to consumers, it reduces the degree of information asymmetry; however, the network quickly and conveniently transmits the information. Unfortunately, when each consumer gets the same information, they may not feel the value or differentiation in the information. Therefore, it does not enhance participation in co-production.

With respect to the situational link, interactivity facilitated co-production behavior, consistent with the work of Chen, Tsou, and Ching.[15] In other words, higher interactivity encourages gamers to communicate and to communicate effectively, enabling and stimulating co-production.

In addition, the higher the degree of emotional recognition and dependence of virtual cigarettes online games, the more active players will participate in a game testing site, and consumers' emotional commitment is more important for co-production than interaction. This result is consistent with Lancastre and Lages.[58] Emotional commitment can strengthen the relationship between consumers and enterprises and increase the willingness to coproduce.

In contrast, customization did not have a positive and significant impact on co-production. This argument contrasts with the view advocated by Shadbolt *et al*, which noted that "customization increases the possibility of consumers participating in co-production". [52] This may be because customization is defined as online in the context of virtual cigarettes online games. Game developers design and produce products aimed at consumers to meet their personalized needs. However, due to fierce competition in online game market, game developers often provide customized personalized services to consumers in the target market. As such, personalized personalization services are quite common, and are assumed to be a standard offering by consumers. For example, consumers can choose their own difficulty level, costumes, and tools. As such, consumers do not feel they are receiving special treatment from personalized services. Therefore, they don't need this additional separate attention to participate in co-production.

Finally, the results also show that co-production had a positive and significant impact on product evaluation and behavioral loyalty. This is consistent with Golder *et al*. [95] Co-production enables consumers to better understand product

features, impacting product evaluations. Skjølsvik *et al.* noted that consumer collaboration can help achieve co-production and increase customer loyalty.[10] Product evaluation had a positive impact on behavioral loyalty. When consumers have a high positive evaluation of an online game product, they will recommend it to their relatives and friends, and continue to consume the game. If developers launch new activities or future game revisions, they will continue to participate in the formation of behavioral loyalty. This result is consistent with the Selnes.[79] When consumers are willing to share the advantages of products with others, it reflects a high degree of loyalty.

Research Contribution

In the online game industry, co-production behavior can make consumers feel a sense of belonging, enhancing loyalty. The enterprise can also improve its overall efficiency and reduce its costs by understanding consumer needs. The topic of virtual cigarettes online games was selected for this research object because of the emerging necessity and importance of the Open Beta site as a tool for co-production. To ensure that launched game products meet consumer needs, game developers often invite consumers to participate in Open Beta to ensure wide acceptance when launched. Based on Etgar's model and from the viewpoints of the consumer link, product link, and situational link, this paper summarized the link variables using qualitative interviews.[29] In contrast with Etgar's conceptual framework, this study used questionnaires to conduct empirical research. [23] Subsequent analysis revealed key factors affecting consumers' input into co-production.

Some studies have analyzed co-production from the perspective of companies ,[6,12] and have explored ways to improve the overall efficiency and productivity of companies by involving consumers in production. However, few studies have examined the consumer perspective. Therefore, this study considered ways to attract consumers to co-production and evaluated how co-production affects consumer product evaluation and behavioral loyalty.

Finally, past studies on co-production have mainly focused on financial and medical services, [7] information technology service innovation, retail banks, and other services. The technological revolution and continuous innovation spearheaded by online games, has changed the way consumers use these games. However, few studies have discussed virtual cigarettes online games from the perspective of product service innovation. For these reasons, this study focused on online games as a means for exploring consumer co-production behavior.

Management Implications

The main goal of this study was to explore the determinants influencing factors of virtual cigarettes online customer participation in co-production and the impact of co-production on consumer product evaluation and behavioral loyalty. Questionnaires were used to verify the study hypotheses. The main practical management implications are as follows:

First, consumers who are willing to participate in co-production often share specific characteristics, including a high desire to control, a high motivation to achieve, and professional knowledge. When consumers have knowledge about virtual cigarettes online games and know the roles or plots, they are more willing to participate in Open Beta. Therefore, developers should provide relevant professional information, such as the use of role-based skills and tool synthesis skills, to attract consumers to participate in co-production. In addition to the basic operating interface, virtual cigarettes game developers should design mechanisms to reduce the difficulty of breaking barriers. For example, players should be able to work together to break barriers, or players should be given short-cut strategies to increase the feeling that they can control the process and develop the game. Furthermore, virtual cigarettes game developers can improve the willingness to coproduce by providing relevant information about the game's mission objectives. This can include describing special rewards for achieving certain levels, and highlighting which game props lead to better tools. This will give virtual cigarettes game players a sense of achievement from overcoming difficulties.

Second, when online games bring pleasure to consumers, consumers will increase their willingness to participate in co-production. In addition to the game interface, game developers may add more fun for the player with appropriate sound effects or other actions that engage the senses. It can also build a platform for the player to sell the goods in front of the computer, and automatically practice the functions, reducing the need to operate online for long periods. Consumers of the game can also enjoy the fun of virtual cigarettes online games during limited leisure time. While information provided by virtual cigarettes game developers does not necessarily motivate consumers to produce together, as noted by Karakaya and Barnes (2010), the usefulness of information can stimulate consumer behavior. [78] Realtime and correct information can reduce information asymmetry. Therefore, virtual cigarettes game developers should update the relevant information through the platform, by interacting with consumers to enhance the exposure and popularity of virtual cigarettes online games.

Third, the interaction among different consumers and the emotional commitment to virtual cigarettes game developers also contribute to co-production. Virtual cigarettes game developers can create a space for dialogue with players by providing a platform for interactive discussion. This allows players to share opinions and exchange experiences, increasing the frequency of interaction between players and players. For example, through Facebook discussion areas, game chat rooms, and other methods, players can freely share experience and exchange views. Virtual cigarettes game developers can all strengthen emotional connections by organizing events. These activities narrow the gap between players and with developers, increasing the efficiency of game play. Furthermore, improving the player's emotional commitment to the game is a key factor in co-production. Through story marketing, virtual cigarettes online games have been transformed from being an activity narrowly attributed to “bad kids” to being a more widely accepted leisure platform. These platforms can provide stress reduction, which is good for the physical and mental health of the players.

Finally, when players concentrate on co-production, they may leave positive product evaluations of virtual cigarettes online games, and increase behaviors that demonstrate loyalty. For example, Open Beta gathers consumer opinions that help correct game defects, increasing the overall positive evaluation of online games, and motivating players to recommend virtual cigarettes online games to friends and increase their loyalty to those games.

Research Limitations and Future Research Directions

This study applied a rigorous theoretical framework and experimental process. However, like all studies, it had some research limitations that could not be perfected. First, the results of expert interviews were categorized by two experts, who may have had different opinions or other differences. It is recommended that future researchers invite more experts to evaluate the results to make the results more objective. Second, in addition to the three pre-factors summarized in this paper, other factors may affect co-production behavior, such as the consumer characteristics (gender) or the marketing strategy of developers. Third, this study explored the direct effect between facets. However, consumers may be affected by the situation. Therefore, future researchers should consider more factors affecting co-production to improve the explanatory ability of the model. Fourth, the measurement of constructs in this study was based on past literature. However, the questions associated with the customized constructs have some ambiguous meanings. Therefore, future researchers should invite language experts to make vocabulary annotations or provide questions in Chinese and English for respondents, to enhance the content validity of the questionnaire. Despite these limitations, this study was important in providing an empirical study on the co-production behavior of virtual cigarettes online game consumers.

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Websites List

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https://www.17173.com/

References

1. Clendennen, S.L. Vandewater, E. A. Loukas, A., et al. College Students' Exposure and Engagement with Tobacco-related Social Media. *Tobacco Regulatory Science,* 2020; 6(1), 38-53. DOI: https://doi.org/10.18001/TRS.6.1.5
2. Erinoso, O. Welding, K. Cohen, J. E. et al. Cigarette Pack Structure Elements in Low- and Middle-Income Countries. *Tobacco Regulatory Science*, 2021;7(1), 76-86. DOI: https://doi.org/30.18001/TRS.7.1.6
3.Baqer, S. M. *The value of customer co-production in developing new products*. Doctoral dissertation. The University of Texas at Arlington, Arlington, TX,USA, 2007. Available online: http://hdl.handle.net/10106/48
4. Vita, J. Users as Co-creators: Player-centric Game Design. *User Experience Magazine.* 2014; 14(1). Available online: http://uxpamagazine.org/users-as-co-creators
5. Burroughs, B. Facebook and farmville: a digital ritual analysis of social gaming. *Games & Culture.* 2014; 9(3), 151-166. DOI:10.1177/1555412014535663
6. Prahalad, C. K., Ramaswamy, V. *Future of competition: co-creating unique value with customers.* Harvard Business School Press, Boston, MA, USA, 2004. DOI:10.5465/ame.2004.13835520
7. Sotamaa, O., Ermi, L., Jäppinen, A., et al. The Role of Players in Game Design: A Methodological Perspective. *Digital Experience: Design, Aesthetics, Practice, January*, 2008: 34-43. Available online: https://www.researchgate.net/publication/241596522
8. Auh, S., Bell, S. J., Mcleod, C. S., Shih. E. Co-production and customer loyalty in financial services. *Journal of Retailing.* 2007; 83(3), 359-370. DOI:10.1016/j.jretai.2007.03.001
9. Bettencourt, L. A., Ostrom, A. L., Roundtree, B. R. I. Client co-production in knowledge-intensive business services. 2018; 44(4), 100-128. DOI:10.2307/41166145
10.Skjølsvik, T., Løwendahl, B. R., Kvålshaugen, R., Fosstenløkken, S. M. Choosing to learn and learning to choose: Strategies for client co-production and knowledge developme nt. California Management Review. 2007; 49(3), 110-128. DOI: 10.2307/41166397
11. Isbister, K., Flanagan, M., Hash, C.Designing games for learning: insights from conversations with designers. *Proceedings of the 28th International Conference on Human Factors in Computing Systems*, CHI 2010, Atlanta, Georgia, USA. 2010; April 10-15, 2041-2044. DOI:10.1145/1753326.1753637
12. Lange-Nielsen, F., Lafont, XV., Cassar, B., Khaled. R. Involving players earlier in the game design process using cultural probes. *International 18. Conference on Fun and Games' Toulous, France.*, 2012; September 4-6, ACM: 45-54. DOI: 10.1145/2367616.2367622
13.Vines, J., Clarke, R., Wright, P., Mccarthy, J., Olivier, P.Configuring participation: on how we involve people in design. *Proceedings of the Sigchi Conference on Human Factors in Computing Systems*, 2013; April, 429-438. DOI: 10.1145/2470654. 2470716
14. Mazzone, E., Read, J. C., Beale, R. Design with and for disaffected teenagers. *Proceedings of the 5th Nordic conference on Human-computer interaction: building bridges*. 2008; October Pages, 290–297 DOI:10.1145/1463160.1463192
15.Chen, J. S., Tsou, H. T., Ching, R. K. H. Co-production and its effects on service innovation. *Industrial Marketing Management* .2011; 40 (8), 1331-1346. DOI:10.1016/j.indmarman.2011.03.001
16. Ertimur, B., Venkatesh, A. Opportunism in co-production: Implications for value co-creation. *Australasian Marketing Journal*.2010; 18(4), 256-263. DOI : 10.1016/j.ausmj.2010.07.004
17. Ramírez, R.Value co-production: Intellectual origins and implications for practice and research. *Strategic Management Journal*.1999; 20(1), 49-65. DOI:10.2307/3094231
18. Bateson, J. E. G. Perceived control and the service experience. In Swartz, T. A.; Iacobucci, D. (Eds.), *Handbook of services marketing and management*, *Sage Publications*, Thousand Oaks, CA, USA, 2000. DOI: 10.4135/9781452231327.n11
19. Schneider, B., Bowen, D. E. Winning the Service Game Revisiting the Rules by Which People Co-Create Value. In: Maglio P., Kieliszewski C., Spohrer J. (eds) *Handbook of Service Science. Service Science: Research and Innovations in the Service Economy*. Springer, Boston, MA, USA, 2010. DOI: 10.1007/978-1-4419-1628-0_4
20. Lusch, R. F., Vargo, S. L., O'Brien, M. Competing through service: Insights from service-dominant logic. Journal of Retailing. 2007; 83(1), 5-18. DOI: 10.1016/j.jretai.2006.10.002
21. Heide, M., Olsen. S. O. Co-production and time use. Influence on product evaluation. *Appetite* , 2011; 56(1), 135-142. DOI:10.1016/j.appet.2010.12.001
22. Xie, C., Bagozzi, R. P., Troye, S. V.Trying to presume: Toward a theory of consumers as co-creators of value. *Journal of the Academy of Marketing Science*. 2008; 36(1), 109-122. DOI: 10.1007/s11747-007-0060-2
23. Etgar, M. A. descriptive model of the consumer co-production process. Journal of the Academy of Marketing Science. 2008; 36(1), 97-108. DOI:10.1007/s11747-007-0061-1
24. Spanjol, J., Cui, A. S., Nakata, C., et al. Co-production of prolonged, complex, and negative services: an examination of medication adherence in chronically ill individuals. *Social*

Science Electronic Publishing. 2015; 18(3), 284-302. DOI: 10.1016/0005-7967(96)00033-2

25.Chathoth, P., Altinay, L., Harrington, R. J., Okumus, F., Chan. E. S. W.Co-production versus co-creation: a process based continuum in the hotel service context. *International Journal of Hospitality Management*. 2013; 32(1), 11-20. DOI: 10.1016/j.ijhm.2012.03.009

26.Aarikka-Stenroos, L., Jaakkola, E.Value Co-Creation in Knowledge Intensive Business Services: A Dyadic Perspective on the Joint Problem Solving Process. *Industrial Marketing Management*. 2012; 41, 15-26. DOI: 10.1016/j.indmarman.2011.11.008

27. Hsu, J. S., Hung, Y. W., Chen, Y. H., Huang, H. H. Antecedents and consequences of user coproduction in information system development Projects. *Project Management Journal*. 2013; 44(2), 67-87. DOI: 10.1002/pmj.21330

28.Wu, L. W., Li, Y. S., Wang, C. Y. Managing innovation through co-production in interfirm partnering. *Journal of Business Research.* 2015; 68(11), 2248-2253. DOI: 10.1016/j.jbusres.2015.06.006

29. Bu, Q., Jin, Y., Li., Z. Does Interactive Behavior Certainly Create Value ? The Effect of Customer Value Co-creation Interactive Behavior on Customer Value. *Foreign Economics & Management.* 2016; 38(9), 21-37. DOI:10.16538/j.cnki.fem.2016.09.002

30.Wang, H., Yan, Y.The Positive Spillover Effect of Customer's Participation in New Product Idea Brainstorming on Self-Brand Connection: The Mediation Role of Mental Simulation. *Nankai Business Review*. 2018; 21(1), 132-145. DOI:CNKI:SUN:LKGP.0.2018-01-015

31.Babbie, E. *The practice of social research (10th ed.).* Thomson Wadsworth, Belmont, CA, USA, 2004. Available online: https://vdisk.weibo.com/s/C5NpHoHJElLEj

32.Ryan, G. W., Bernard, H. R. Data management and analysis methods. In Denzin, N. K. (Eds.), *Handbook of qualitative research* (769-802). SAGE, Thousand Oaks, CA, USA, 2000. DOI：10.1002/(SICI)1520-6793(199907)16:43.0.CO;2-K

33. White, R. W. Motivation reconsidered: The concept of competence. *Psychology Review*,1959; 66(5), 297-333. DOI:10.1037/h0040934

34. Koufaris, M. Applying the technology acceptance model and flow theory to online consumer behavior. *Information Systems Research*. 2002; 13(2), 205-223. DOI:10.1287/isre.13.2.205.83

35.Lee, J. Effects of perceived control on college student's evaluation of higher education institutions. *Business Education and Accreditation*. 2011; 3(1), 51-60. Available online: https://ssrn.com/abstract=1948626

36.Chiu, G. H., Chang. Y. S. A study of the impact of online game emotion value creation on players' switching behavior. Proceedings of the Asia-Pacific Conference on Library and Information Education and Practice (A-LIEP 2006), Singapore, 2002. Available online: http://hdl.handle.net/10150/105265

37.Vorderer, P., Ritterfeld. U. Children's future programming and media use between entertainment and education. In Palmer, E. L., & Young, B. (Eds.), *The faces of televisual media: Teaching, violence, selling to children.* Lawrence Erlbaum Associates, Mahwah, NJ, USA, 2004: 241–262. DOI: 10.1026/1617-6383.16.3.125

38. Hilton, T., Hughes, T. Co-production and self-service: The application of service-dominant logic. *Journal of Marketing Manageme nt*. 2013; 29(7-8), 861-881. DOI: 10.1016/j.appet.2010.12.001

39.Sharma, N., Patterson, P. G. Switching costs, alternative attractiveness and experience as moderators of relationship commitment in professional, consumer services. *International Journal of Service Industry Management.* 2000; 11(5), 470-490. DOI: 10.1108/09564230010360182

40. Blazevic, V., Lievens, A. Managing innovation through customer coproduced knowledge in electronic services: An exploratory study. *Journal of the Academy of Marketing Science*. 2008; 36(1), 138-151. DOI: 10.1007/s11747-007-0064-y

41.Negash, S., Ryan, T., Igbaria, M. Quality and effectiveness in web-based customer support systems. *Information and Management*. 2003; 40(8), 757-768. DOI: 10.1016/s0378-7206(02)00101-5

42.Wixom, B. H., Todd, P. A. A theoretical integration of user satisfaction and technology acceptance. *Information Systems Research.* 2005; 16(1), 85-102. DOI: 10.2307/23015766

43.DeLone, W. H., McLean. E. R. The DeLone and McLean model of Information systems success: A ten-year update. *Journal of Management Information Systems*. 2003; 19(4), 9-30. DOI:10.1080/07421222.2003.11045748

44. Celik, H. E., and V.Yilmaz. "Extending the technology acceptance model for adoption of e-shopping by consumers in Turkey." *Journal of Electronic Commerce Research* .2011; 12(2): 152-164. DOI:10.1016/j.jcps.2010.09.008

45.Wang, Y., Fesenmaier, D. R. Towards understanding members' general participation in and active contribution to an online travel community. *Tourism Management* . 2004; 25(6), 709-722. DOI:10.1016/j.tourman.2003.09.011

46.Gupta, S., Kim, H. W. The moderating effect of transaction experience on the decision calculus in on-line repurchase. *International Journal of Electronic Commerce*. 2007; 12(1), 127-158. DOI:10.2753/JEC1086-4415120105

47. Büschken, J. Determinants of brand advertising efficiency: Evidence from the German car market. *Journal of Advertising*. 2007; 36(3), 51-73. DOI:10.2307/20460796

48.Davis, S. M., 1989. From "future perfect": Mass customizing. *Planning Review* 17(2), 16-21. DOI:10.1108/eb054249

49. Dellaert, B. G. C., Dabholkar, P. A.Increasing the attractiveness of mass customization: The role of complementary online services and range of options. *International Journal of Electronic Commerce.* 2009; 13(3), 43-70. DOI:10.2753/JEC1086-4415130302

50. Sundar, S. S., Marathe., S. S. Personalization versus customization: The importance of agency, privacy, and power usage. *Human Communication Research*. 2010; 36(3), 298-322. DOI: 10.1111/j.1468-2958.2010.01377.x

51. Souitaris, V., Balabanis, G. Tailoring online retail strategies to increase customer satisfaction and loyalty. *Long Range Planning.* 2007; 40(2), 244-261. DOI: 10.1016/j.lrp.2006.11.006

52.Shadbolt, N., Hall, W., Hendler, J. A., et al.Web science: a new frontier. *Philosophical Transactions of the Royal Society A Mathematical Physical & Engineering Sciences*. 2013; 371(1987): 20120512. DOI:10.1098/rsta.2012.0512

53. Hoffman, D. L., Kalsbeek, W. D., Novak. T. P. Internet and web use in the United States: Baselines for commercial development. *Communications of the ACM* .1996; 39, 36-46. DOI: 10.1145/240483.240490
54. Zeithaml, V. A., Bitner, M. J., Gremler, D. D. *Service marketing: Integrating customer focus across the firm (4th ed.)*. McGraw-Hill/Irwin, Boston. USA, 2005. DOI:10.1021/ed068p271
55. Wiener, Y. Commitment in organizations: A normative view. *Academy of Management Review*. 1982; 7(3), 418-428. DOI:10.5465/amr.1982.4285349
56. Gruen, T. W., Summers, J. O., Acito. F. Relationship marketing activities, commitment, and membership behaviors in professional associations. *Journal of Marketing*. 2000; 64(3), 34-49. DOI: 10.1509/jmkg.64.3.34.18030
57. Yang, Y. C.High-involvement human resource practices, affective commitment, and organizational citizenship behaviors. *The Service Industries Journal*. 2012; 32(8), 1209-1227. DOI: 10.1080/02642069.2010.545875
58. Lancastre, A., Lages, L. F. The relationship between buyer and a B2B e-marketplace: Cooperation determinants in an electronic market context. *Industrial Marketing Management.* 2005; 35(6), 774-789. DOI: 10.1016/j.indmarman.2005.03.011
59. Bhuian, S. N. Saudi consumers' attitudes towards European, US and Japanese products and marketing practices. *European Journal of Marketing.* 1997; 31(7), 467-486. DOI: 10.1108/03090569710176628
60. Wei, Y., Straub, D. W., Poddar. A. The power of many: An assessment of managing internet group purchasing. *Journal of Electronic Commerce Research*, 2011, 12(1), 19- 43. DOI: 10.1016/j.jcps.2010.09.008
61. Dimitriades, Z. S., 2006. Customer satisfaction, loyalty and commitment in service organizations: Some evidence from Greece. *Management Research News* 29(12), 782-800. DOI: 10.1108/01409170610717817
62. Hennig-Thurau, T., Gwinner, K. P., Walsh, G., Gremler, D. D., 2004. Electronic word- of-mouth via consumer-opinion platforms: What motivates consumers to articulate themselves on the internet? *Journal of Interactive Marketing* 18(1), 38-52. DOI: 10.1002/dir.10073
63. Brown, T. J., Barry, T. E., Dacin, P. A., Gunst, R. F. Spreading the word: Investigating antecedents of consumers' positive word-of-mouth intentions and behaviors in a retailing context. *Journal of the Academy of Marketing Science.* 2005; 33(2), 123-138. DOI: 10.1177/0092070304268417
64. Söderlund, M., Rosengren, S. Receiving word-of-mouth from the service customer: An emotion-based effectiveness assessment. *Journal of Retailing and Consumer Services*. 2007; 14(2), 123-136. DOI: 10.1016/j.jretconser.2006.10.001
65 Selnes, F. An Examination of the effect of product performance on brand reputation, satisfaction and loyalty. *European Journal of Marketing*. 1993; 27(9), 19-35. DOI：10.1108/03090569310043179
66. Moon, J. W., Kim. Y. G. Extending the TAM for a world-wide-web context. *Information and Management.*, 2001; 38(4), 217-230. DOI:10.1016/s0378-7206(00)00061-6
67. Rafaeli, S. Interactivity: From new media to communication, In Hawkins, R. P.; Wiemann, J. M.; Pingree, S. (Eds.), *Advancing communication science: Merging mass and interpersonal processes.* (110-134). SAGE, Thousand Oaks, CA, USA, 1988. [Google Scholar]
68. Meyer, J. P., Allen, N. J., 1984. Testing the "side-bet theory" of organizational commitment: Some methodological considerations. *Journal of Applied Psychology* 69(3), 372-378. DOI: 10.1037//0021-9010.69.3.372
69. Grewal, D., Krishnan, R., Baker, J., Borin, N. The effect of store name, brand name and price discounts on consumers' evaluations and purchase intentions. *Journal of Retailing*. 1998; 74(3), 331-340. DOI: 10.1016/S0022-4359(99)80099-2
70. Jones, T. O., Sasser, W. E. J. Why satisfied customer defect. *Harvard Business Review.*1995;73(6), 88-99. DOI: 10.1061/(ASCE)0742-597X(1996)12:6(11.2)
71. Armstrong, J. S., Overton, T. S. Estimating nonresponse bias in mail surveys. *Journal of Marketing Research.* 1997; 14, 396-402. DOI: 10.1177/002224377701400320
72. Chin, W. W. Issues and opinion on structural equation modeling. *Management Information Systems Quarterly.* 1998; 22(1), 7-16. DOI: 10.2307/249676
73. Zhang, J., Pantula, S. G., Boos, D. D. Robust methods for testing the pattern of a single covariance matrix. *Biometrika*. 1991; 78(4), 787-795. DOI: 10.1093/biomet/78.4.787
74. Hair, J. F., et al. *Multivariate Data Analysis: A Global Perspective. 7th ed.* Prentice Hall, Upper Saddle River, NJ, USA, 2009. Available online: https://digitalcommons.kennesaw.edu/facpubs/2925/
75. Fornell, C., Larcker, D. F. Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research.*1981; 18(1), 39-50. DOI: 10.1177/002224378101800104
76. Rodie, A. R., Kleine, S. S.Customer participation in services production and delivery. In Swartz, T. A., & Iacobucci, D. (Eds.), *Handbook of services marketing and management*, 111-126, SAGE. Thousand Oaks, CA, USA, 2010. [Google Scholar]
77. Hong, J. C., Hwang, M.Y., Lu, C. H., Cheng, C. L., Lee, Y. C., Lin, C. L. Playfulness-based design in educational games: A perspective on an evolutionary contest game. *Interactive Learning Environments*. 2009; 17(1), 15-35. DOI: 10.1080/10494820701483615
78. Karakaya, F., Barnes, N. G. Impact of online reviews of customer care experience on brand or company selection. *Journal of Consumer Marketing.* 2010; 27(5), 447-457. DOI: 10.1108/07363761011063349