

# Research on Telecom Operator's Market Strategy Change from Virtual Value Chain View: Take Guangdong Telecom Company Limited as An Example

Shan Guan<sup>1\*</sup> Xin Wang<sup>2</sup>

<sup>1</sup> Guangzhou VLinker Information Technology Co., Ltd., Guangzhou, Guangdong 510640, China

<sup>2</sup> Guangdong Century XIAO Education Technology Co., Ltd., Guangzhou, Guangdong 510620, China

**ABSTRACT:** The rapid development of the Internet has drastically changed the competitive environment and the profit model of global telecommunications market. Virtual value chain is the information-based projection of value chain in the virtual world. It transcends the original one by creating new value in the value-adding process. This article studies the changes in Guangdong Telecom Company Limited's market strategy from the perspective of virtual value chain, and allows telecom operators to take it as a reference for market strategies' formulation. This article uses literature research method and case research method to draw conclusions that virtual value chain has helped Guangdong Telecom Company Limited establish new customer relationships, and the significance of virtual value chain is surpassing traditional value chain continually. Therefore, proper use of Internet-related technologies will help the long-term development of telecommunications industry.

## 1. INTRODUCTION

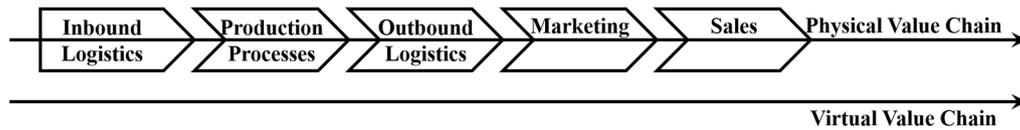
Nowadays, the world is under the impact of the Internet era. Important international organizations and countries such as the UN and the U.S. have all proposed development policies of the Internet, which have a significant influence on economic and social development in the long-term universally. The Chinese government also released the 'Internet Plus' action plan in 2012. China's telecom operators have always been the promoters of informatization. As one of the Fortune Global 500, China Telecom Corporation Limited has taken this strategic opportunity well to transform and lead the telecommunications industry into a new competitive period. Guangdong Telecom Company Limited, located in China's most economically developed province, has always been a pioneer of China Telecom Corporation Limited's reform. This research uses Guangdong Telecom Company Limited's market strategy changes in the Internet environment as a case study to raise research questions, and explores the stages and steps of value-adding process from the perspective of virtual value chain. This is of great significance for

China's telecom operators to formulate market strategies in the Internet era.

Value chain is a series of value-adding activities that connect supply side and demand side of a company. Porter proposed to divide value-adding activities into basic activities and supporting activities [1]. Base on the various activities and their relationships, tradition value chain is used to analyze a company's resources and capabilities, discover the core competitiveness, and obtain the competitive advantage. However, the enterprise-centric view denies that value capture depends on customer needs [2]. It also lacks the ability to describe value activities and explain the connection with customers in the Internet era. Hence, Rayport and Sviokla proposed virtual value chain [3], which means that products and services exist as digital information in a virtual world and are transmitted through information channels, and the new value-adding activities are virtual. Company integrates the information captured from value chain to build an information underlay, and regards it as a support element to complete value-adding activities more efficiently.

---

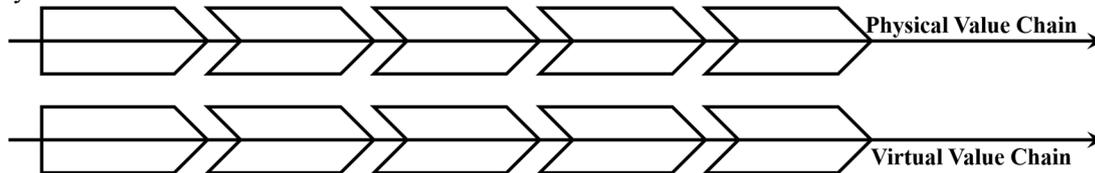
\* Corresponding author, Email: [fantasyarbiter@hotmail.com](mailto:fantasyarbiter@hotmail.com)



**Figure 1** Building the virtual value chain

When a company transfers value-adding activities from physical world to information world, it develops a virtual value chain which is replicated from and parallel to its physical value chain. It creates and refines value

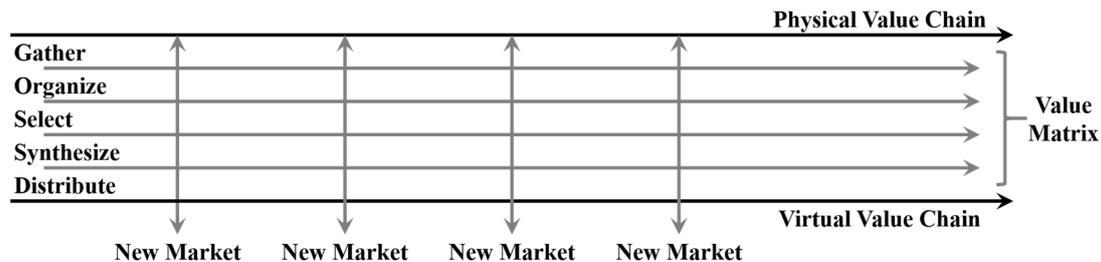
beyond monitoring and controlling operation process. New value is generated from innovating new products and services by information steam.



**Figure 2** Exploiting the virtual value chain

The company's value-adding process includes three stages: visibility, mirroring capability and new customer relationships. The five value-adding steps at any stage are gather, organization, selection, synthesis, and distribution. The implementation of these steps can help the company to create new relationships between new

markets and existing markets. They connect activities of virtual value chain and form a value matrix, which allows company to confirm and meet customers' needs more effectively and efficiently, and also to build new customer relationships.



**Figure 3** Value matrix: building relationships

New business concepts such as OTT media services have blurred upstream and downstream roles of industry value chain. Telecom operators, terminal providers and service providers have extended to both ends of industry value chain. The traditional dominant position of telecom operators has been weakened greatly. National policies such as telecom industry restructuring, three-network convergence and the issuance of 3G/4G/5G licenses have forced telecom operators to 'de-telecom'. In recent years, researches on the impact of the Internet on telecommunications industry focus on these fields: telecom operator integrates available superior resources to penetrate entire industry value chain, uses capital operations to achieve cross-industry cooperation or industry amalgamation to achieve enterprise diversification, and establishes a public platform of information and communication technologies to provide Internet services to industry or within the corporation. The existing papers include creating new business models and transforming to be an Internet company [4][5][6], using Internet-related technologies to develop new market strategies [7][8][9][10][11][12] and support specific businesses [13][14][15][16]. However, the papers above are insufficient of practical verification, which are hypotheses rather than particular examples. Especially, the case of market strategy change is missing. Therefore, this article takes Guangdong Telecom Company Limited as an example to study its market strategy changes due to the Internet environment's

influence, which bases on virtual value chain, so as to fill the gap in this research area.

## 2. THE PROGRESS OF MARKET STRATEGY CHANGE: MARKET STRAGY MEMORABILIA OF GUANGDONG TELECOM COMPANY LIMITED

Before 1994, China's telecommunications industry was operated by government under the planned economic system. From 1994 to 1998, the telecommunications industry was carried out market-oriented reforms. From 1999 to 2001, the telecommunications industry has undergone numerous restructurings and formed a competitive landscape with multiple telecom operators. In 2002, China Telecom Corporation Limited was established and listed in Hong Kong and New York [17][18][19].

Guangdong Telecom Company Limited is the largest and one of the first wholly-owned subsidiaries of China Telecom Corporation Limited. It executed market-oriented operations including the strengthening of product marketing, which help to maintain its primary business - wireline telecommunications services growth and defend against the substitute competition of mobile telecommunications services from competitors

successfully. Meanwhile, Internet access services became the fastest growing business. Value-added services were also introduced. Guangdong Telecom Company Limited segmented the markets and customers, established marketing, sales and distribution network, and a new information system, which helped to improve market

response speed and customer service quality. Since 2004, Guangdong Telecom Company Limited has undertaken the strategic thinking of China Telecom Corporation Limited and shaped three distinct strategic transformation stages:

**Table 1** Three strategic transformation stages of Guangdong Telecom Company Limited's market strategy

Stage	Time	Content
1.0	2004-2010	Embarking on the scale development of full-service operations: (1) Promoting integrated packages of telecommunication services; (2) Providing Internet applications and ICT solutions to government and enterprise customers; (3) Increasing the budget of brand promotion, building customer-oriented brand system and marketing network; (4) Increasing the proportion of online channels' usage, centralizing the customer service hotline's operation.
2.0	2011-2015	Developing mobile telecommunications services and Internet access services cooperatively, propelling new growth areas: (1) Leading the development of mobile telecommunications services through smart phones and mobile Internet access services; (2) Pushing forward the evolution process of stand-alone products to integrated products; (3) Operating mobile Internet data traffic business precisely; (4) Cooperating with chips, terminals and Internet applications companies to create new business groups; (5) Strengthening R&D and sales of cloud computing products; (6) Using big data technology to do precision marketing; (7) Integrating marketing and service in online channel, implementing O2O model, and launching new media customer service.
3.0	Since 2016	Focusing on two basic businesses - mobile telecommunications services and Internet access services, and five emerging fields: (1) Developing five business ecospheres; (2) Applying big data technology to products, services, network construction & operation, risk management and resource allocation; (3) Establishing a comprehensive channel system and adopting AI and IoT technologies.

Source: China Telecom 2002 – 2019 Financial Reports [20]

### 2.1. 2004-2010 Full-service operation

Wireline telecommunications services which entered mature period in the industry globally, lacking new growth points and encountered substitute competition from mobile telecommunications services. The value of communication shifted from telephone service to information service and public technology service. Because of the evolution of the Internet, China Telecom Corporation Limited aimed to the vertical extension of value chain, followed the value migration, positioned itself as a telecommunication full-service provider, an Internet applications aggregator and a corporation ICT service leader, in order to transform itself from a traditional basic telecommunications service provider to a modern integrated information services provider.

Before 2004, Guangdong Telecom Company Limited's main business was wireline telecommunications services and Internet access services. In stage 1.0, Guangdong Telecom Company Limited obtained the license of mobile telecommunications business then became a full-service provider of telecommunication and formulated a market strategy for the coordinated development. It changed the brand system and marketing network from product-oriented to

customer-oriented, enriched the brand connotation with Internet elements like '3G Internet mobile phone', and exerted synergy through the bundled products like the portfolio of mobile telecommunications services, Internet access services and Internet applications. It also met diversified customer demands to achieve differentiated competition for avoiding stand-alone products' price war, and offsetting the loss from wireline telecommunications services' shrinkage. In addition, Guangdong Telecom Company Limited increased the proportion of online channel in integrated sales and distribution channel network, and centralized the customer service hotline's operation to improve service quality. For the purpose of being a modern integrated information services provider, Guangdong Telecom Company Limited expanded to the information and application services market of individuals and corporate customers, strived to become an aggregator of Internet application and a leader in corporation ICT services.

### 2.2. 2011-2015 Internet ecosystem construction

China was in a period of industrialization and informatization. Due to the policies like 'Internet Power', 'Big Data' and 'Internet Plus', China Telecom Corporation Limited seized the opportunity to implement

strategic transformation. It positioned itself as an intelligent pipeline leader, an integrated platform provider, a content and application participant, and moved toward the goal of being a ‘world-class comprehensive information service provider’.

In stage 2.0, Guangdong Telecom Company Limited developed mobile telecommunications services and Internet access services on a large scale, and paid great effort to new growth areas such as mobile Internet data traffic, Internet applications and ICT solutions. In order to become a leader of intelligent channel, Guangdong Telecom Company Limited formed Internet-based marketing and service capabilities in online channel, and also integrated offline channels for e-commerce. It converted information advantages to marketing and service value through big data technology. For the purpose of being a provider of integrated platform, Guangdong Telecom Company Limited supported chip and terminal manufacturers to cultivate the 4G terminal industry value chain. It also aggregated application developers, Internet companies and subscribers to create new business groups such as digital entertainment, e-commerce and information services by a public technology service platform. It had an in-depth strategic cooperation with ‘Smart City’, key accounts and partners in ICT services. It developed cloud computing technology to realize the ‘cloudification’ of its own IT infrastructure and also output relevant products and services to industry. Besides, Guangdong Telecom Company Limited strengthened the Internet application development system which was composed of portal, content and capabilities, proposed a ‘Smart Family’ concept to realize the evolution of stand-alone products to integrated products, and innovated directional & backward models of mobile Internet data traffic business based on intelligent pipeline and integrated platforms, so as to be a participant of content and application. After all, it constructed an Internet ecosphere.

### **2.3. Since 2016 Intelligent services ecospheres construction**

Guangdong Telecom Company Limited grasps and embraces the trend of social intelligence and economy digitization, dedicates to be a leading integrated intelligent information services operator. It advances a transformation and upgraded strategy with the direction as network intelligentization, service ecologicalization and operation intellectualization.

In stage 3.0, Guangdong Telecom Company Limited focuses on mobile telecommunications services and Internet access services, and also extends to five emerging fields - IPTV, BestPay, IoT, cloud computing & big data and Internet plus. Network intelligentization is the foundation. Guangdong Telecom Company Limited has built three high-quality networks - 4G network, IoT network and optical network. It also boosts the infrastructure cloudification and 5G network construction which improve operational efficiency and also upgrade product and service quality. Service ecologicalization is the core. Guangdong Telecom

Company Limited sets up five business ecospheres - Intelligent Connection, Smart Family, New ICT Applications, IoT and Internet finance, and jointly builds an ‘Ecosystem-Tetris’ with partners in order to promote the integration and scale development of the ecospheres. Operation intellectualization is the key. Guangdong Telecom Company Limited upgrades its information system to be a data-driven one. It also builds a corporate-level big data platform to complete core data aggregation and earn data call capability, model analysis capabilities such as precision marketing, fine services, lean network operations and precise management. Further, it builds an online & offline comprehensive channel system and applies AI technology to automate management functions and customer services. All by all, it constructs intelligent services ecospheres.

## **3. CASE STUDY**

Traditional value chain succeeded in giving a good explanation to Guangdong Telecom Company Limited's value-adding activities before 2004, but failed when the Internet brought new value activities and customer relationships. Instead, virtual value chain can explain the new value-adding process well, including the three stages - visibility, mirroring capability and new customer relationships, and any stage includes five value-adding steps - gathering, organization, selection, synthesis, and distribution.

### **3.1. Surpassing traditional value chain, stages of information value-adding**

Guangdong Telecom Company Limited transfers part of its value-adding activities from physical world to information world in order to create a virtual value chain. It develops and manages two value chains simultaneously. Information value-adding allows virtual value chain surpass traditional value chain. The strategic transformations of Guangdong Telecom Company Limited are three stages of continuous information value-adding.

#### **3.1.1. Visibility**

Visibility refers to the ability that assists physical activities to operate more effectively. The large-scale usage of information system coordinates activities in physical value chain, and establishes the foundation of virtual value chain, which helps to integrate the physical value chain into a whole system rather than a set of discrete related activities. The first step in establishing and developing a virtual value chain is to use an information system that integrates business operations and provides information about related parties.

The development of Internet-related technologies is the key factor of improving the visibility of Guangdong Telecom Company Limited. In the 20th century, its information system was not mature. The immaturity caused the issue of information obstruction among

different sectors, and the difficulties to share information of suppliers, customers and competitors. Moreover, the connection mode to customers was customer service hotline, text messages, leaflets etc., which were high cost and low efficiency, resulting in asymmetric information between buyers and sellers. This meant a very low visibility. Guangdong Telecom Company Limited upgrades the mobile communication and broadband technology continuously from stage 1.0, as well as the cloud computing and big data technologies in stage 2.0, and the AI and IoT technologies in stage 3.0. The new generation information system which is supported by these technologies largely reduces the cost of information acquisition, enhances the integrity and transferability of information, and breaks the information isolated islands. This is a significant improvement in visibility. Thus, the value-adding process of Guangdong Telecom Company Limited has transitioned from being dominated by traditional value chain to being jointly determined with virtual value chain.

### **3.1.2. Mirroring capability**

After finishing necessary infrastructures' construction, value-adding activities can be deployed in the information world more efficiently, flexibly and economically. It also creates a parallel value chain in the information world, which transfers activities from physical world and replaces the original ones. Virtual value chain is parallel to physical value chain but usually better, which can bring lower R&D and production cost and deliver higher value to customers.

The information system which is upgraded continuously helps Guangdong Telecom Company Limited replace parts of physical activities with virtual activities step by step. In the last century, Guangdong Telecom Company Limited adopted the value-adding activities of traditional value chain. For example, customers need to purchase a recharge card at the business hall or had a hall assistant to recharge for them, which made the space limited. In stage 1.0, Guangdong Telecom Company Limited used information technologies to assist operation activities and improved the mirroring capability. This allowed the activities that required offline manipulation previously such as recharge to be shifted to online, and realized the core value - low-cost and high-efficiency information delivery. In stage 2.0, Guangdong Telecom Company Limited accelerated the Internet-oriented transformation of marketing channels, established O2O model, and launched new media customer services like WeChat. These virtual activities coordinated and complemented traditional operations. In stage 3.0, comprehensive intelligent information services form business capabilities in both external and internal. Business ecospheres are formed externally and big data technology is applied to achieve information services, business services and data management internally, which allows the value-adding process of traditional value chain to make a difference. For example, customer communication changes from customer service hotline to

AI customer service, and big data technology is used in promotion to screen target customers and pushes marketing information directionally. These activities reduce the information gap and the communication cost greatly.

### **3.1.3. New customer relationships**

In virtual world, value is refined beyond being created. The simultaneous managements to both value chains establish new customer relationships and deliver value to customers through information flow in the virtual one.

In the past, because of the space, time and cost limitation, Guangdong Telecom Company Limited communicated with customers in a single way. It was a one-way direction which meant the customers were passive receivers of information. For example, Guangdong Telecom Company Limited allowed customers to receive marketing information through corporate naming activities, TV advertising or print advertising. In stage 1.0, the information system established by Guangdong Telecom Company Limited could meet the daily operational needs, but the traditional network was still relied on expanding and maintaining customer relationships. In stage 2.0, Guangdong Telecom Company Limited upgraded its information system and introduced intelligent pipeline. Through virtual value chain, this move assisted it to optimize the traditional marketing, sales, distribution and customer services by establishing a new contact mode. Guangdong Telecom Company Limited was benefited from Internet-based marketing and services and began to establish new customer relationships. Through a public technology service platform, it intensified the connections among customers, partners and itself, that also evolved to be an Internet ecosphere. In stage 3.0, service ecologicalization makes this new customer relationship as routine, and contributes to the intelligent services ecospheres. Internet breaks the asymmetry of information and diversifies the market strategies and the communication models. The interactive platform allows customers to participate in by more opportunities, methods, and motivation. This new customer relationship means the information transmission channel changes from one-way to multiple ways. Customers no longer accept information passively but take part in the construction of the ecospheres actively.

### **3.2. Constructing new customer relationship, five steps of information value-adding**

Guangdong Telecom Company Limited transfers more and more value-adding activities from traditional value chain to virtual value chain day by day, that shows the latter's advantages. This forms a value matrix and builds relationships. The five value-adding steps at any stage of virtual value chain are gathering, organization, selection, synthesis, and distribution.

Gathering. At the very beginning, Guangdong Telecom Company Limited's business handling was done manually. This century, Guangdong Telecom Company

Limited establishes and upgrades the information system year by year. Valuable data such as customers' business handling, transactions and communications are generated and gathered through business terminals such as business halls, wireline networks, etc. With the development of pipeline services such as Internet access services, as well as the acquisition of mobile business license, Guangdong Telecom Company Limited has built the intelligent pipeline up, which leads to the rapid expansion of information collection channels and volume. Due to the emergence of new information and communication technologies such as 5G and optic fiber broadband, Guangdong Telecom Company Limited has realized network intelligentization. New businesses like IoT have the information collection channels and volume which are rapidly exploding and have laid a foundation for further usage.

**Organization.** Guangdong Telecom Company Limited introduces cloud computing and big data technologies in daily operations. It has deployed its own IT infrastructure on the cloud, built a data-driven information system including a corporate-level big data platform. This platform collects and integrates the scattered, fragmented and non-uniform data from numerous business systems, and then loads the data into data warehouse after extraction and transaction. After completing the core network and business data aggregation, the platform can offer data call and model analysis capabilities.

**Selection.** In order to recommend proper products and services to target customers at a suitable time by an appropriate approach, Guangdong Telecom Company Limited needs to analyze customers' timely changing consumption behaviors in a short time interval. According to customers' interests and demands at a specific time, it needs to select useful customer characteristics from the data warehouse, implement multi-dimension statistics, analysis and forecasting by data models, seek the relevance, themes and changing trends from the massive and diverse data sources. For example, Guangdong Telecom Company Limited can analyze the customers' associated consumption habits like what they would buy at the same time on the e-commerce platform. The consumption pattern helps the marketers to customize the overall marketing plan.

**Synthesis.** The reports generated from data analysis become the decision-making basis. For example, Guangdong Telecom Company Limited selects the target market, chooses target customer group based on the analysis result which is usually called persona, combines the available resources and capabilities to implement the specific actions such as products and services design, market strategy formulation and performance evaluation index setting. After that, it chooses the most efficient paths to contact the targets from a variety of communication channels such as customer service hotline, text messages, email and new media.

**Distribution.** This step has an obvious bi-directionality characteristic when contacting channels and customers. Guangdong Telecom Company Limited issues marketing guidelines to comprehensive channels,

obtains feedbacks, evaluates the performance and optimizes the marketing policies continuously. It uses new media or other effective ways to push marketing information to target customers accurately, then conducts point-to-point personalized and differentiated marketing to segmented users. This is precision marketing. Compared with traditional marketing modes, precision marketing improves the success rate and saves costs considerably. In addition, Guangdong Telecom Company Limited also give feedback to the partners of ecospheres by the latest happening in the market.

### **3.3. Presenting diversified characteristics, three trends of value chain evolutions**

In the three strategic transformations of Guangdong Telecom Company Limited, there are significant changes between physical value chain and virtual value chain. This is a process of virtual value chain's establishment. The traditional value activities of Guangdong Telecom Company Limited were similar to other industries' and dominated the daily operations in the past. With the development of the Internet, Guangdong Telecom Company limited increases the proportion of virtual value activities rapidly, promotes each other with traditional value activities, and replaces the low value-adding parts one by one. On account of technical factors, virtual value chain is becoming more and more important and foreseeable to be dominant by replacing physical value chain mostly in Guangdong Telecom Company limited. That presents the following characteristics:

Information transfer has changed from one-way to two-way. In the past, the transmission of information between Guangdong Telecom Company Limited and its customers was one-way. Telecom operators generally only had existing customers' information and lacked analysis methods. They used traditional media to promote new marketing activities unilaterally. Customers would go to business hall only when they need to handle business. Moreover, most of the interested groups were existing customers, which made Guangdong Telecom Company Limited spend a lot of cost to attract new customers. At present, Guangdong Telecom Company Limited collects and analyzes customer attributes and historical transactions, generates customers' personas through big data analysis, locates target customers no matter they are existing or potential, uses new media to reach them, and launches suitable products and services to achieve proactive marketing and gain more turnover. Also, most of the businesses can be handled online, which has changed the purchasing behavior of customers. These series of actions save a lot of time and energy for both sides, and also reduce transaction cost.

A single transaction relationship has transformed from isolation to interaction. A single transaction between Guangdong Telecom Company Limited and a customer was originally isolated. The former occupied the dominant position and designed products and services lonely. Internet breaks the space limitation and provides Guangdong Telecom Company Limited more

communication channels to listen to the customers, in order to make marketing activities more humane and tailored. In this case, marketing activities can increase customer participation, shorten the distance between Guangdong Telecom Company Limited and customers, and also fill the gap among customers. Guangdong Telecom Company Limited no longer stands high above, but interacts with multiple parties with an open attitude, and even allows customers to lead the marketing activities for capturing flourishing customer demand easier.

Customer demand coverage rises from functional level to spiritual level. Previously, Guangdong Telecom Company Limited provided customers conventional products or services in order to meet their functional needs. The transaction was completed after the customers' functional needs were fulfilled. Internet's diversified attributes now are fully reflected in meeting customers' demands. For example, in terms of social attribute, the instant messaging, e-community and other Internet applications consolidate the connection between Guangdong Telecom Company Limited and its customers, and also among customers themselves. These communication functions satisfy people by meeting their psychological needs, which increase customers' stickiness, activity and loyalty, and also accelerate the speed of word-of-mouth. New customer relationships are established.

#### 4. CONCLUSION

From the perspective of virtual value chain, this paper takes Guangdong Telecom Company Limited as an example to study the changes of its market strategy, and draws the following three conclusions: (1) The Internet allows virtual value chain to bring new customer relationships to telecom operators. Guangdong Telecom Company Limited establishes a new information system based on Internet-related technologies, and changes its relationship with customers from offline contact to online and offline collaborative contact. (2) The importance of virtual value chain is surpassing traditional value chain among telecom operators. Looking to the growing tendency of telecommunications industry in the 21st century, from a short-term perspective, virtual value chain allows the value-adding activities in both value chains to complement and promote each other by replicating parts of the activities on physical value chain. In the medium term, certain value-adding activities such as marketing and services have already replaced the ones on physical value chain. In the long term, most of the value-adding activities on physical value chain will be replaced. (3) Telecom market in Guangdong presents new characteristics. Benefit from virtual value chain, the new customer relationships of telecom operators shows diversification, including information transfer which is changed from one-way to two-way, transaction relationships is transformed from isolation to interaction, customer demand coverage has risen from functional level to spiritual level.

China's telecommunications industry has a long history including several mergers and acquisitions, and also split-ups. China Telecom Corporation Limited is a large multinational enterprise. Hence, the relevant information is huge and complex. This article is limited to the scope and time of investigation and can only take Guangdong Telecom Company Limited as a case. However, due to the differences of the economic and social development of various regions, there are certain deficiencies in applicability of this article. In addition, this research is oriented to market strategy and lacks specific analysis of business data. Finally, from a theoretical point of view, the value-adding process of Guangdong Telecom Company Limited is still in the stage of establishing a new customer relationship. Now, two customer relationships in both physical world and information world coexist. How will this change in the future? To coexist continuously or to achieve a complete replacement? This requires further observation and in-depth discussion to verify the current conclusions and predictions.

#### REFERENCE

- [1] Porter, M. E. (2014) *Competitive Advantage*. China CITIC Press, Beijing.
- [2] Qiao, R. Z., Zhang, X. F. (2005) Analysis on the Defects and Reconstruction of Traditional Value Chain. *Journal of Social Science of Jiamusi University*, 23: 49-50.
- [3] Rayport, J. F., Sviokla, J. (1995) Exploiting the Virtual Value Chain. *Harvard Business Review*, 73: 75-85.
- [4] Li, Z., Li, J. B., Ding, W. (2013) Research on the Business Model of Telecom Operators Based on Big Data. *Mobile Communications*, 5: 64-67.
- [5] Sun, H. (2013) Mobile Internet Operation of Telecom Operators. *Discovering Value*, 12: 22-23.
- [6] Tian, M. Y. (2018) Research and Reference on the Transformation Strategy of Foreign Telecom Operators in the Internet Era. *Think Tank Era*, 49: 29-30.
- [7] Wu, Q. S., Yu, Y., Zheng, X. S. (2006) Thoughts and Methods of Precision Marketing. *Marketing Herald*, 5: 39-42.
- [8] Zhang, Y. N., Ma, L. (2008) Precision Marketing of Telecom Services under the Environment of Industrial Integration. *Communications Management and Technology*, 3: 11-13.
- [9] Huang, S. M., Liu, S. (2011) The Construction of 'All-media Marketing' under the Integration of Three Networks. *Modern Communication*, 2: 1-8.
- [10] Huang, S. M., Liu, S. (2012) Deconstruction and Reconstruction of the Marketing System under the Background of 'Big Data'. *Modern Communication*, 11: 13-20.
- [11] Zuo, C., Geng, Q. P., Liu, X. F. (2013) Research on Telecommunication Business Development Strategy Based on Big Data. *Designing Techniques of Posts and Telecommunications*, 10: 1-4.
- [12] Yang, Q. (2015) Research on Customer Segmentation Model and Precision Marketing Strategies Based on Big Data. MA. Thesis, Nanjing University of Posts and Telecommunications.

- [13] Liu, J., Wang, Z. (2013) Construction of a Precision Operation Platform for Telecom Operators Based on Big Data. *Telecommunications Science*, 3: 22-26.
- [14] Tong, X. Y., Zhang, Y. Y., Fang, B. Y., Lei, L. (2013) Opportunities for Telecom Operators in the Era of Big Data. *Information and Communications Technologies*, 1: 5-9.
- [15] Guo, M. J. (2014) Application Research of Big Data and Cloud Computing Platform. *Modern Science & Technology of Telecommunications*, 8: 7-16.
- [16] Fan, J. A., Li, W., Wei, J. W. (2015) The Big Data Development Strategy of Telecom Operators. *Information and Communications Technologies*, 6: 5-12.
- [17] Dai, S. P. (2006) Research on Anti-monopoly Issues in China's Telecom Industry. MA. Thesis, Shandong University.
- [18] Lv, W. (2007) Precision Marketing in the Telecom Industry: Analysis and Action. Posts & Telecom Press, Beijing.
- [19] Peng, Q. Z. (2008) The Refined Marketing of Telecommunication Operator Based on Data Mining. MA. Thesis, Beijing University of Posts and Telecommunications.
- [20] China Telecom Corporation Limited. (2002-2019) Financial Reports.  
<https://www.chinatelecom-h.com/sc/global/home.php>