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Analysis of E-service Delivery Process Based on Blueprint: A Case Study in CBERS 02B Satellite

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Abstract: Remote sensing satellite data are vast, various, time sensitive and with wide users. How to delivery satellite data and products to users effectively is an important problem facing satellite department. Blueprint has been widely applied in improving service process. It's a useful method to optimize allocation of resources and improve service quality. This article analyzes the service process of CBERS 02B Satellite based on blueprint. Through interview on service receivers and providers, we give some suggestions on how to promote remote sensing satellite data delivery process. This paper can service as theoretical foundation for improving satellite data service quality.

Keywords: service process; blueprint; service encounter; remote sensing satellite

1. INTRODUCTION

As remote sensing technology develops, China has successively launched many satellites concerning resources, environment, ocean and meteorology. Remote sensing satellite (RSS) data have been widely applied in every aspect of national life, such as geographical map, resources management, city plan, agriculture investigation, land planning, hazard forecast, assessment, transportation and geographic information service, etc. Along with increase in satellite number is the sharp rise in satellite data. RSS department has to manage a huge number of data. Therefore, how to manage and deliver them to customer is a serious problem. The popularization of internet and its fast development is a revolution for satellite data delivery, as users have access to satellite products whenever and wherever. Users can even participate in satellite data processing. At present, domestic satellite departments as well as foreign ones are able to provide users one-stop service by virtue of technology.

As more technology merges into service, satellite data delivery is no longer limited to time and space. Users get more choices. Besides, e-service offers customer various kinds of service. Though technology based e-service can bring with users much more convenience, more technology doesn't always mean good. It's also risky. E-service is typical of High tech, Low touch [1]. By receiving service through website, customers and suppliers have little opportunity to contact with each other. Service delivery system is a direct way to connect satellite data users with providers. Consequently, quality of service delivery system is vital for service quality. It can influence RSS data deliver efficiency as well as customer satisfaction. Therefore, it is necessary to study delivery system for RSS data, also a way to improve service quality.

Satellite data service has long been provided in foreign country. Recently, its commercialization extends as satellite technology develops and related technology emerges. RSS service is more comprehensive than ever before. Some satellite providers, like SI in America and SPOT Image Company in French, all have a long history. History of RSS service can be divided into two periods. One is in earlier period, when technology and standardization are emphasized. As customers' requirement on satellite data becomes stricter, and competition between providers becomes more fiercely, what's more important is how to provide customers with better

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solution on education, consultation, etc. [2]

Studies in domestic on remote sensing satellite mainly focus on developing new remote technology and its application. Few have studied satellite from service aspect. Jiansheng Yuan pointed out many problems remaining in RSS industry, and gave suggestions on how to accelerate satellite industrialization and commercialization [3]. WJ Zhang and Xiuhua Fang analyzed determinants of satellite data market and its tendency, and predicted two factors would be fundamental in the future. One was technology, for example, resolution ratio and the ability to processing data. The other was service quality, such as customization and short waiting time [4].

Through literature review, both domestic and foreign RSS service providers focus on satellite technology and industry planning, little has been done on service quality. Service quality is the overall evaluation of customers on service they receive. It is an important factor to retain customers. Particularly, when product categories is rich and storage is enough, competition in RSS data market is very intense, good service quality is of vital important for service providers. Improving service process is a method to improve service quality, reduce unnecessary investment and increase profit. There are 3 commonly used methods in designing service process: Industrialization, Six Sigman and service blueprint. Industrialization was first introduced to service field by Levitt. He recommended to applied technology and management from manufacturing in service industry [5]. This method is appropriate for simple and standardized service where customers have consistent demand. Six Sigman was original a business strategy created by Motorola [6]. Its main function was to reduce variation in manufacture and business process by eliminating defective process [7]. Haik proposed to apply Six Sigman in service process design [8]. Shostack[9], Zeithaml [10]and Parasuraman [11]were earlier scholars studying service blueprint, and they recommended finding critical points by analyzing service process based on service blueprint.

CBERS 02B Satellite was launched in September 2007, one of high resolution resource satellites [12]. CBERS 02B data are mainly delivered through website, and it has been applied in many areas: territorial resources, urban planning, environmental monitoring, disaster reduction and prevention, agriculture, forestry and water conservation. 02B has a large number of users from both home and abroad. For its representativeness, we chose 02B as our object. Using blueprint as our main research instrument, this article is based on a systematic view to analyze service delivery system of RSS data. This article gives several suggestions on improving service process, as well as promoting service quality.

2. THEORY

2.1 Service blueprint theory

Blueprint is a famous design tool originated from the service industry, first introduced by Shostack [9]. It's a tool to describe service system by mapping service process, service site, customers' role and employees' role and all the visible elements in the service [13]. Blueprint is defined as "a picture or map that accurately portrays the service system so that different people involved in can understand and deal with it objectively regardless of their roles or their individual point of view"[14]. Blueprint maps every service process, forming a flow chart. Three horizontal lines are included in blueprint: line of interaction, line of visibility and line of internal interaction. As shown in Figure1.

Line of interaction separates customer action from frontline employee action, representing interaction between customers and service providers. When a vertical axis stretches across interaction line, it means customers interact with providers. Line of visibility separates visible service from invisible service. Therefore, axis that across line of visibility shows us how much and what kind of visible service and invisible service have been offered by provider. Line of internal interaction distinguishes between backstage and support processes.

Axis across line of internal interaction indicates interaction between back office and support section happens. Three horizontal lines divide service blueprint into four parts: customer action, frontline action, back stage action and support behavior.

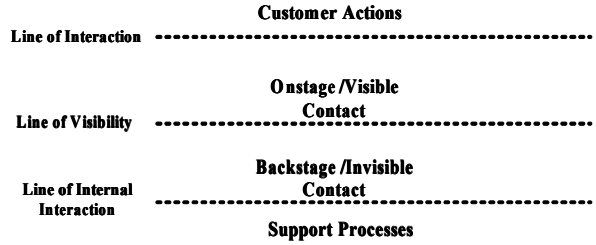

Figure1. The structure of service blueprint

The top section is customer actions, including actions such like choosing products and interaction with employees, consume and evaluation process. Next is onstage action. Here, service employees directly interact with customers. Work in back stage is invisible for customers. Activities in back office are centered on how to support work in frontline and customer, and how to coordinate with support section. The last part is supporting process, including support for frontline, back office and internal interaction. Service blueprint provides with an overall view for enterprises. People know every step in the service process, so they can better predict possible incidents and prepare in advance. Line of interaction can show what service customers receive in which part. Line of visibility differentiates between visible and invisible actions to the customer. Line of internal interaction distinguishes between back office and support section. Three horizontal lines serve as reference for service managers to design service process. The relationships between service blueprint and service process design are as follows: first, it can help enterprise build complete service procedure, make clear of duty in each link, thus to train employees accordingly. Second, service blueprint can help each department know its duty and role in service. Different department can coordinate smoothly when they know each one's task explicitly. Third, through service blueprint, we can distinguish critical points, weak points and failure in service process. All these are useful in making a concrete proposal to improve service quality.

Using blueprint method, Chuang and Pao-Tiao analyze service process in supermarket, and recognized failure in frontline and back office. Through analysis, they found critical points, and causes for failure[15]. Baohua Liu employed blueprint in constructing evaluation index system for electric customer satisfaction. Combined with entropy weight, Baohua Liu built a customer satisfaction evaluation model[16]. Combining product and service, Geum Young jung proposed a product-service blueprint innovatively, describing service flow in service system and illustrating relation between product and service [17].

2.2 Service encounter and self-service

Service encounters traditionally refer to customer interaction with frontline employees [18]. In traditional service blueprint, line of interaction indicates customer service encounter with onstage employee. Since technology infuses into service, service encounter has been greatly changed. Nowadays, service encounters are largely interaction between customers and technology facilities [19].

Self-service can be defined as "customers produce service for themselves through technology facilities such as internet, telephone, without assistance from firm employees" [19]. Meuter, Curran, Dabholkar et al. investigated the role of self-service technology in improving service quality and reasons affecting adoption and rejection of self-service technology [20-22]. Technology that facilitates self-service is called self-service technology. Self-service facilities refer to carriers of technology such as automatic teller machines, internet

transactions and self-service payment kiosks. Self-service technology alters the dynamic of the service encounter [23].

3. METHOD FOR E-SERVICE DELIVERY PROCESS ANALYSIS

CBERS 02B Satellite came into use in 2007. It has played an important part in many areas. Main users of CBERS-02B include Ministry of Land and Resources, Ministry of Water Resources and Ministry of Housing. Users download or purchase data service mainly through internet.

Internet is the main way for users to get 02B satellite data. Though a small number of users adopt traditional ways like copying data in service center, or through mail, number of such customer is very few comparatively. Moreover, as technology develops and demand for satellite data increases, website will be the dominate carrier for satellite data service. Due to this, this article studies internet service process of RSS, mainly through interview.

In the study, we frequently experienced web service of 02B satellite, from registration and login to product select and final purchase, to deeply understand service process of 02B satellite. Interview is an commonly used method for management problems, also an important way to gather firsthand statistics. Through interview, we can not only know customers' past experience, also capture what customers like or dislike and their expectation. This article chose interview as a main method for our research. Before interview, we listed interview outline. We added, deleted or revised items in the outline during group discussion, getting a final outline. Purpose of the interview was to know the service process for 02B satellite, customers' experience, and customers' suggestion on process. In addition, two open questions were designed to collect questions ignored in the outline.

4. CBERS 02B SATELLITE: A CASE STUDY

4.1 Service process analysis

By analyzing interview statistics, we extracted useful sentences from the interview. Based on blueprint principle, we mapped a service blueprint for 02B satellite data delivery. Graph 2 depicts service blueprint of 02B satellite.

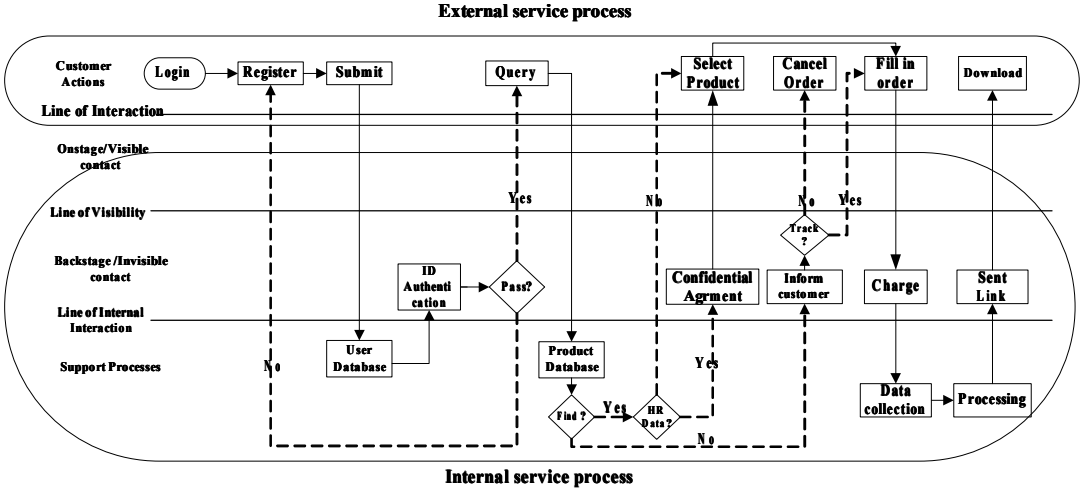

Figure2. Service blueprint of 02B satellite

We divided the activities in the blueprint into external activity and internal activity based on whether customers directly participate in it. Internal service refers to activities within internal employees, without customers' direct participation, including frontline action, back office action, supporting behaviors and

interaction between back office and supporting process. External service includes service directly participated by customers: customer action, customer interaction with frontline.

4.1.1 External service process

①Customer action

As graph 2 shows, behavior above the line of interaction is customer actions. This part centers on the process of customers' direct behaviors in acquiring service from registration to download. Customer actions include: user register and submit → user logins in the internet→ user query information→ user fills in product order→ user downloads products.

②External interaction

External interaction in 02B satellite data service is customers' interaction with self-service facilities. RSS industry is a typical High-tech, Low touch industry. In the case of 02B data service, customer mainly gets service through electronic interface. Meuter et al. found technology infusion could improve customer satisfaction [19]. Mick and Fournier studied the relationship between technology application and customer thinking, customer experience. The result showed technology infusion brought negative emotions for customers, even resistance [24]. Given that self-service technology alters service encounter, its impact on service encounter is still unclear.

4.1.2 Internal service process

①Frontline employee action

02B satellite service process is different from traditional service. Users obtain service by means of technology and no contact with frontline employees. This is determined by the technology characteristics in RSS industry. Consequently, it's necessary to conduct research on influence of related technology on RSS data service.

②Backstage employee action

Employees in back office are responsible for user credentials and feedback, signing confidentiality agreement with customers, customer order tracking and charge for certain product.

③Supporting behaviors

Supporting process is a very important part for RSS service. It's an interface to cooperate with upstream service chain, such as assist in conducting requirements certification. Its main responsibility includes: user database maintenance, RSS database management, data collection, data processing and policy making. In RSS product service, data quality is the core of service quality. Hence, data processing ability determines service quality customer receives.

④Internal interaction

Internal interaction refers to communication between back stage and supporting section. Internal interaction is an important part of internal quality, while internal quality relates closely with service quality. In satellite data industry, work of supporting section covers basic database maintenance, decision making, while back stage implement the decisions. Information flow between two parts is vast and frequent. Interaction quality between back stage and supporting section largely determines the service quality customers perceive.

4.2 Analysis of 02B satellite service process

Through analysis on interview and service blueprint, we found several problems in 02B service process. First, system integration is incomplete. Some links in 02B website is invalid. CBERS 01/02 system has been integrated with CBERS 02B, while many users find they have to login independently if they want to browse products of the other satellite.

Besides, internal interaction quality is poor. Many users complain about long waiting time after they register. They are forced to wait until satellite center issues identity authentication. User data in the database

couldn't be dealt with timely, leading to customers' long waiting time.

Service capability of 02B satellite system is very limited. Limited linking numbers, customers can download only one image in a time; limited bandwidth (150KB/S); products would be deleted from customers' account 3 days later. Actually, the download speed is so slow that often the data download couldn't be finished in 3 days.

From the perspective of service blueprint, different parts of service process should interconnect with each other, forming an organic integrity. Customer behavior, self-service technology, back office action and supporting action need to interrelate with each other and support each other, if an effective integrity is to be formed. Many problems existing in 02B satellite service process such as poor service encounter and tedious back office procedure. The whole service process is separated, and service integrity is absence. This leads to low efficiency in employee work and unsatisfied service quality.

5. SUGGESTIONS TO IMPROVE SERVICE PROCESS

Based on current situation of RSS data service in China, we propose to improve service process quality from the following aspects:

First, design service process from a systematic point of view. Systematics maintains that system is not a simple collection of each element. Instead, each part relates to others, influences others and depends on others. Therefore, different part in service process of RSS shouldn't be treated independently. User's action is decided by service encounter in the previous phrase. Thus, service design should consider customers' requirements, to link customer operation in a smooth chain. Take as an example, after user submits registration information, they receive no respond from service center, then service process delays. This is an example of process design divorcing from customer action. To solve this problem, satellite service center should integrate the system to minimize waiting time. On the whole, satellite center should make clear of factors influencing customer satisfaction, and take into consideration of such factor when designing service process. An ideal service process is overall optimal, and can bring better customer experience, convenience and efficiency.

Second, design process with functional coupling. Customer action, frontline action, back office supporting process and interaction between them form an organic integrity in the blueprint. Composition coupling is just one part in the service process; what's more important is functional coupling. As shown in figure 2, before obtaining final products, customers are possibly experience three delays. (1) Registration. As discussed above, customers are forced to endless wait due to low efficiency in identity authentication. (2) Authority to order. After users are authenticated, they are still not qualified to download image. Customers need to be authorized by service employees, or they can only browse the internet. (3) Download link. After users finally succeed in ordering products, they still need to wait for a link showing where to download the product. Many users reflect it cost too much time for service center to send a link. The key to solve service delays is to coupling function of each process. Particularly, functional coupling in the supporting process is the fundamental for smooth process.

Third, the use of self-service technology. Customers obtain service on visual website. Website is the self-service facility. Many scholars have studied the quality dimensions of website in certain industry or a particular website. However, there is still a void in literature regarding website quality measurement of satellite. What's the factor most influence customer experience? What improves customer satisfaction? These are questions for future research.

6. CONCLUSION

This article employs blueprint method to investigate in service process of CBERS 02B Satellite. By analyzing service blueprint, we discuss problems in the service process. Further, based on the view of

systematics, we propose three ways to improve quality of service process, by exploring from process integrity, functional coupling and self-service facility. This can serve as reference for management department to design service process for remote sensing satellite products.

REFERENCE

[1] Bitner M J, Brown S W, Meuter M L.(2000). Technology infusion in service encounters. Journal of the Academy of marketing Science. 28(1): 138-149.

[2] Shengli Zhou T P.(2003) The U.S. Government's Use of Commercial Remote Sensing Data. Space International.

[3] Yuan J. A.(2006). Discussion on The Development of China's Satellite Remote Sensing. Ocean Technology. 19-24.

[4] Wenjing Zhang X F.(2005). The Trend of Commercial Remote Sensing Market. Space International. 16-22.

[5] Levitt T.(1972). Production-line approach to service. Harvard business review. 50(5): 41-52.

[6] Wikipedia. [Z]. http://zh.wikipedia.org/wiki/%E5%85%AD%E8%A5%BF%E6%A0%BC%E7%8E%9B

[7] Antony J.(2004).Some pros and cons of Six Sigma: an academic perspective. The TQM Magazine. 16(4): 303-306.

[8] Haik B E R D M.(2005). Service design for Six Sigma: A road map for excellence. New Jersey: Wiley Interscience, 32-33.

[9] L S.(1984). Designing services that deliver. Havard Business Review. 73-78.

[10] Zeithaml V A B M J.(1995). Service marketing. New York:MeGraw-hill, 277-286.

[11] Parasuraman A, Zeithaml V A, Berry L L.(1985). A conceptual model of service quality and its implications for future research. The Journal of Marketing. 41-50.

[12] China Centre for Resources Satellite Data and Application.(2009). Introduction to CBERS02B Satellite. http://www.cresda.com/n16/n1145/n60717/index.html

[13] Fitzsimmons J A, Fitzsimmons M J.(1994). Service management for competitive advantage. McGraw-Hill.

[14] Fließ S, Kleinaltenkamp M.(2004). Blueprinting the service company: Managing service processes efficiently. Journal of Business Research. 57(4): 392-404.

[15] Chuang P T.(2007). Combining service blueprint and FMEA for service design. The Service Industries Journal. 27(2): 91-104.

[16] Bao-Hua L, Ting Z, Wen-Yu Z, et al.(2007). Research of electricity customer satisfaction evaluation based on service blueprint. IEEE.

[17] Geum Y, Park Y.(2011).Designing the sustainable product-service integration: a product-service blueprint approach. Journal of Cleaner Production. 19(14): 1601-1614.

[18] Bitner M J.(1990). Evaluating service encounters: the effects of physical surroundings and employee responses. The Journal of Marketing. 69-82.

[19] Meuter M L, Ostrom A L, Roundtree R I, et al.(2000). Self-service technologies: understanding customer satisfaction with technology-based service encounters. the Journal of Marketing. 50-64.

[20] Curran J M, Meuter M L, Surprenant C F.(2003). Intentions to use self-service technologies: a confluence of multiple attitudes. Journal of Service Research. 5(3): 209-224.

[21] Dabholkar P A, Bagozzi R P.(2002).An attitudinal model of technology-based self-service: moderating effects of consumer traits and situational factors. Journal of the Academy of Marketing Science. 30(3): 184-201.

[22] Bitner M J, Brown S W, Meuter M L.(2000). Technology infusion in service encounters. Journal of the Academy of marketing Science. 28(1): 138-149.

[23] Beatson D A, Lee D N, Coote D L V.(2007). Self-service technology and the service encounter. The Service Industries Journal. 27(1): 75-89.

[24] Mick D G, Fournier S.(1998). Paradoxes of technology: Consumer cognizance, emotions, and coping strategies. Journal of Consumer Research. 25(2): 123-143.