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An IT System Infrastructure Promoting Interaction with Customers for Manufacturing Servitization: A Case Study of Haier

Yong Nie

School of Knowledge Science

Japan Advanced Institute of Science and Technology

Keywords: servitization; customer self-serving platform; customer self-actualization; value co-creation; information service infrastructure.

This research explores how manufacturers involve their customers to make knowledge and value creation via technological convergence. It aims to clarify the interactive infrastructure of customer interaction for driving servitization in manufacturing in the mobile Internet era.

Servitization, first introduced by Vandermerwe and Rada in 1988, is a competitive strategy for product companies to create a differentiation advantage by adding services to products. Most manufacturers are adopting a servitization strategy to innovate organizational capabilities and processes to better create mutual value through a shift from selling product to selling a product-service system (PSS) (Baines et al., 2007).

However, for many manufacturers, the PSS only brings them a short-term advantage. Soon after, another commodity trap happens in services, just as it occurs in products. The service commodity leads to increased service offerings and higher costs but does not lead to correspondingly higher returns (Gebauer et al., 2010). The weakness of the PSS approach is that services are still regarded as distinct characteristics of products to deliver to customers. The roles of customer engagement caused by the mobile Information technology are not taken into full account. Hence, regardless of how hard it is for a manufacturer to develop its PSS, if its customers cannot be involved in the process of value creation as easily and deeply as they like, these firm-based solutions cannot satisfy customers' tacit needs.

While we focused on thinking about the above issues on servitization research, Haier, the world's biggest home appliance manufacturer, came into our sight. The firm sees customer interaction as the critical strategy of corporate development. It even formulates the creed "No interaction, no Haier". We think these characteristics are pretty suitable to developing the servitization research from the perspective of customer interaction: Haier is well known for the abilities of understanding consumer needs precisely through service innovation; it regards customer interaction as the premise of innovation, otherwise, neither incremental innovation nor disruptive innovation can ensure its customer value; it interacts with one million fans on average per day, committed to changing the situation of 'guessing customer needs' and instead listen to their voices carefully before production.

The research employed the methodology of ground theory to construct and analyze

the data. Grounded theory is an appropriate method for the research because it aims to find the new theories on servitization from the advanced business practices in the mobile Internet era. As Strauss and Corbin and Strauss (1990) defined, Grounded Theory is a research approach by which theory is derived from data, systematically organized and analyzed through the research process. In the method, a researcher does not begin a study with a preconceived theory in mind. Instead, the research begins with an area of study and gets the theory from the data. Data collection, analysis, and the final theory stand in close relationship to one another. The findings are extracted from data to offer insight, enhance understanding, and provide a meaningful guide to action (Mays & Pope, 1995; Strauss, 1987).

In order to make the analysis process proceed logically and clearly, we selected the qualitative analysis tool of MAXQDA software to deal with the data. We utilized it to aid the analysis of the transcribed text. All the text was imported into the software. Data interpretation and evaluation were done by sorting materials into 91 labels, 20 concepts, and 9 categories and using a hierarchical coding system to analyze. The software could define variables, provide tabular overviews and assign colors and weights to text segments. Furthermore, every step of the process was easily tracked, and results could be accessed with just a few clicks. The data was coded repeatedly with trial and error until it logically generated the theories.

Through the analysis of the 9 categories, their association with the 21 concepts and the interactive comparison with the raw context, we found the saturation of theory describing the information system infrastructure of customer interaction as Customer Self-Serving Platform. New customer values are co-created when the interaction is upgraded into customer engagement. We define customer engagement as a process of customer self-actualization, where customers use their enthusiasm and knowledge to do what they are interested in. Customers are attracted to engage timely and deeply in digital, knowledgeable and social ways. The emotional award, which customers get from the self-actualization, also develops the traditional service concept. It activates a positive circle of knowledge and value creation between Haier and its customers. Moreover, customer self-actualization, as a new experience adds to the total customer value. Customer value is far beyond product function and is anything that customers think is useful to them.

We organize the dissertation in six chapters. The general outline of this research is presented in chapter 1. The following chapter is a literature review on service, servitization and the emerging theories in service science. Based on the study of literature, we analyze the dilemma of servitization and the gap in the current research. In chapter 3, we present the design of the research and why we collect data from the case company. The next two chapters, we go deeper in the analysis of the data collected and discuss the new trend of servitization through upgrading customer interaction. In the final, we summarize the major findings by answering research questions, proposing theoretical and practical implications. Research limitations and suggestions for future research are presented.

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Chaper 1 Introduction

1.1 Research background

1.1.1 Servitization as a competitive strategy

Not long ago, most of a product's added value was derived from the production processes that transformed raw materials into products. However, the product is easily caught in a commodity trap, and differentiation is rarely sufficient to reverse this (Chesbrough, 2010; Mont, 2002). Chesbrough (2010) argued it is far more difficult to differentiate companies just analyzing from the fine management, precisely because some management techniques, like Six Sigma, Total Quality Management (TQM), Supply Chain Management (SCM), Customer Relationship Management (CRM), have been widely implemented in both advanced economies and the developing economies. The situation leads directly to commoditization in products and lower price competition in the markets.

Currently, product companies are looking for ways to regain a competitive advantage, by seeking for alternative approaches to value creation. Adding more service sectors in their business is a new competitive strategy for companies to create differentiation advantage in a growing number of industries on a global scale (Oliva and Kallenberg, 2003; Vandermerwe and Rada, 1988). Service industries have grown significantly and have become a dominant concept in the current economy (Baines and Lightfoot, 2013; Vargo and Lusch, 2008). Similarly, services increased their proportion within the manufacturing industry; their role in providing value is ever more important.

Manufacturers expect to hugely benefit from servitization and avoid the homogenisation of competition (Baines and Lightfoot, 2013; Oliva and Kallenberg, 2003). Servitization, introduced by Vandermerewe & Rada (1988), is now widely recognised as the process of creating value by adding services to products. Also as Baines and his colleagues (2007) pointed that servitization is the innovation of an organization capability and processes to better create mutual value through a shift from selling the product to selling the product-service system. With this strategy, products are evolving to play the additional role of integrating a wide-ranging set of services to meet customers' need and create greater value for customers (Alter, 2008). Hence, many manufacturers have begun to adopt servitization to gain a competitive advantage (strategic driver); furthermore, they want to obtain higher profit margins and income stability (financial driver) and promote the sales of more products

(marketing driver) by servitization (Baines et al., 2007).

1.1.2 Services becoming increasingly homogenized in PSS

IBM had kept being a leading example of successful servitization by providing Product-Service System (PSS) for the last decades (Baines et al., 2007; Vandermerwe and Rada, 1988). Indeed, IBM's services including consulting service were superb. Moreover, IBM also had competitive hardware products and software, such as mainframe servers, storage products, and business intelligence software. IBM was able to combine these three core businesses into total solutions, such as smart city and smart planet. This combination sounded very attractive. Moreover, as IBM sold successively its low-profit personal computers and PC servers, it was also seen by the industry as selling the low-value products and implementing the decisive strategy to enhance its servitization (Merli, 2014). Manufacturers' decisions to develop new services when their customers would not need these services become a disaster for the transition. The consulting services from IBM, Accenture, McKinsey, and other companies are similar. As more customers have their computing done cheaply in the cloud, IBM is selling less hardware, which imperils its software and consulting services (Summers, 2014).

Besides the information technology industry, the construction machinery industry is another servitization field deeply studied by scholars. In order to avoid commoditization in products (Figure 1-1) and lower price competition in the markets, the top three leading companies namely Caterpillar, Komatsu and Hitachi taking advantage of information technology to expand their customer services and develop new businesses (Arakawa, 2002; Baines and Lightfoot, 2013; Matsuda and Kosaka, 2016). Undoubtedly, their respective customers are benefiting a lot from the servitization. However, new services based on new IT are becoming as similar as their product functions. The similar description of the services can be found not only from these academic research but also from the official introduction from their website. We take the proactive services as an example:



Figure 1-1: The similar product images of the top three excavator brands

Caterpillar:

“Condition Monitoring provides valuable, proactive information, helping equipment owners set up effective, comprehensive maintenance and repair plans. Analyzing data from a combination of condition monitoring "elements" - including simple inspections and regular fluid analysis to careful tracking of electronic data and analysis of equipment history - helps to accurately assess the health and operating condition of critical equipment.”¹

Komatsu:

“By proactively using information gained from KOMTRAX-equipped machines, Komatsu is making a contribution in respect to after-sale support activities for our customers' machines throughout their lifetime, resulting in enhanced availability and lowered maintenance cost.”²

Hitachi:

“Hitachi’s remote machine monitoring systems give you the power to optimize your operation and maximize your profits. With Hitachi’s ZXLink™ and Global eService, you’ll have access to all the information you need to make informed decisions about your fleet.”³

Their new services based on IoT and GPS are becoming increasingly homogenized, which are monitoring the connected machine, getting and analyzing data from it, providing proactive services and keeping it in healthy condition. In this condition, what is the next servitization strategy to getting differentiated competitiveness?

1.2 Objectives and research questions

This research aims to explore how manufacturers involve their customers to make knowledge and value creation via technological convergence in the mobile Internet era. It is to clarify the interactive infrastructure of customer interaction for driving servitization in a B to C manufacturer.

To achieve the above objectives, the qualitative research aims to find out the answers to the following research questions.

Major Research Question (MRQ):

¹ http://www.cat.com/en_IN/support/maintenance/condition-monitoring.html

² http://www.komatsu.com/CompanyInfo/profile/product_supports/

³ <http://www.hitachiconstruction.com/service-support/>

What new customer interactions did the manufacturer develop to accelerate servitization strategy implementation in the mobile Internet era?

Subsidiary Research Questions (SRQ):

SRQ1: Why did it have to upgrade customer interaction in the mobile Internet era?

SRQ2: How could it upgrade the interaction with customers?

SRQ3: What kinds of service values had been created through these interactions?

1.3 Originality and significance of the study

While servitization is regarded as a hot topic in both academic and practical research, the research continues to contribute toward a deep understanding of servitization from the perspective of knowledge and value creation, as well as insightful focus on the integrative influence of human factor (Customer Engagement) and technology factor (Mobile Internet).

The servitization research has undergone the first phase of focusing on product-related services. In the past two decades, many scholars have moved beyond the first phase to focus on the concept of Product Service System (PSS) and develop the research on servitization. The research of PSS suggested manufacturers should transform from product-oriented business to service-oriented business and provide an integrated solution of products and services, in order to meet customer needs and realize a recyclable society.

The weakness of the PSS approach is that services are still regarded as distinct characteristics of products (such as intangible or unstorable) to deliver to customers. The roles of customer engagement caused by the mobile Information technology are not taken into full account. While servitization strategy is proving increasing popular with policy makers and academics, there are only a few guidelines on macro-level issues such as challenges, drives of servitization and organizational strategy, with almost no tools or models available (Baines et al., 2009).

In order to close the gap, the dissertation integrates the main three influential elements to structure the research: information technology, customer interaction, and knowledge creation. It explores how manufacturers make knowledge creation and involve customers to co-create value via technological convergence in the mobile Internet era.

With the development of servitization, the emerging challenge for manufacturers is to engage customers outside their organizational span. When manufacturers commit themselves to design the services and products that customers truly want, to be

effective, they must involve customers as early as possible in the process. However, in the traditional business practices, although companies could utilize many methods to involve customers, such as interviews and conferences, as well as inviting customers to work at their offices to participate in the early stage of designing a new product or service, the co-created result is narrowed for a small number of customers.

Mobile information technology provides manufacturers with the ability to innovate services together with their customers on an all-purpose open platform. This innovation is an effective means to escape the pressures of commoditization that impact not only many product businesses but also, increasingly, service businesses. More importantly, customers could participate in a manner that they like, at any time and at any place they prefer.

Japan government is also implementing national policy 'ICT Restoration Vision 2.0' to build infrastructure networks to enable firms to create new services through cloud strategy. Application of information technology in manufacturing can be organized in a service-oriented manner. Technological convergence (cloud computing, M2M, Mobility, etc.) contributes to the process of servitization. It creates a brand new opportunity for manufacturers and is emerging as one of the major enablers to transform their business model.

1.4 Research Methodology

The research employed the methodology of ground theory to construct and analyze the data. In order to make the process proceed logically and clearly, we utilized the qualitative analysis tool of MAXQDA software to deal with the data.

Strauss and Corbin (1998) defined Grounded Theory as a research approach by which theory is derived from data, systematically organized and analyzed through the research process. In the method, a researcher does not begin a study with a preconceived theory in mind. Instead, the research begins with an area of study and gets the theory from the data. Data collection, analysis, and the final theory stand in close relationship to one another. The findings are extracted from data to offer insight, enhance understanding, and provide a meaningful guide to action (Mays & Pope, 1995; Strauss, 1987).

Dey (1999) claimed in order to keep sensitive to the data and achieve theoretical sensitivity, the researcher began to analyze data with as few predetermined ideas as possible. Although the concepts and theories in extant literature can also be used to inform the development of categories, the categories should not be forced to fit them. However, it does not mean the research should start with an empty head, instead,

holding an open mind. The literature can be used to make the difference and enrich the analysis.

We selected qualitative data analysis software MAXQDA as the data analysis tool to analyze the transcribed text. First, all the text was imported into the software. Then, data interpretation and evaluation were done by sorting materials into labels, concepts, and categories and using a hierarchical coding system. It could define variables, provide tabular overviews and assign colors and weights to text segments. Furthermore, every step of the process was easily tracked, and results could be accessed with just a few clicks. The data was coded repeatedly with trial and error until it presented a concise and logic theory.

1.5 Definition of terms

- IoT: Data coming from these devices and sensors provide business insights that were previously out of reach. The invaluable insights enabled by harnessing and analyzing the data from these connected devices are what the Internet of Things is all about.
- Application programming interface (API): Software programs comprising of protocols and tools to build interoperability across programs running in the same environment.
- Social: Social is the people working with, selling to, buying from, and living with- all gathered in various cooperative and collaborative groups.
- Mobile: Mobile means connected access to everyone and all of our businesses via key tools such as the smartphone.
- Cloud computing: It is computing as a utility-infrastructure 'somewhere' that enables us to do everything, including Software-as-a Service and Infrastructure-as-a-Service.
- Big data: The use of large and broad data sets along with analytics to understand events, trends and activities in much deeper and effective ways.
- Connected devices: various equipment and devices that connect to one another through the Internet.
- Global positioning system (GPS): A system that uses satellites in space to pinpoint the location of objects on the earth.
- Industrial Internet: A term coined by GE to describe the use of connected equipment, software and wireless technology to communicate among machines and humans.

- Machine-to-Machine (M2M): Computing devices and other machines exchange information and perform actions using software without the involvement of humans.
- Smartphone: A mobile phone with sophisticated sensor and digital computing capabilities, including a camera, GPS and electronic data exchange.
- Traditional medias: Traditional medias include newspaper, broadcast, television and magazine. The definition was made with the contrast of ‘New media’, which refers to the medias running based on the Internet.
- Six Sigma: Six Sigma is a quality-control program created by Motorola in 1986 that emphasizes cycle-time improvement and the reduction of manufacturing defects to a level of no more than 3.4 per million.
- Maker: A maker in the context is a person who loves to create things rather than only do what others ask.
- Micro-enterprise: Micro-enterprise refers to a small business that employs a small number of employees. In the case studied, it refers to a start-up company inside the corporate.

1.6 Research Structure

We organize the dissertation in five chapters. The general outline of this research is presented in chapter 1. The following chapter is a literature review on service, servitization and the emerging theories in service science. Based on the study of literature, we analyze the dilemma of servitization and the gap in the current research. In chapter 3, we present the design of the research and why we collect data from the case company. The next chapter, we go deeper in the analysis of the data collected and discuss the new trend of servitization through upgrading customer interaction. In the final, we summarize the major findings by answering research questions, proposing theoretical and practical implications. Research limitations and suggestions for future research are presented.

Chapter 2 Literature Review

The chapter is a literature review of previous studies regarding servitization and the related theories in service science. Through the review, we aim to find the meaningful issues existing in the current servitization research.

2.1 What are service and servitization?

To catch the essence of servitization, it is indispensable to interpret the meaning of service.

2.1.1 What is service?

Service is the application of one party's competencies for the benefit of another (Vargo and Lusch 2004). Maglio and Spohrer (2008) defined service systems as value-co-creation configurations of people, technology, value propositions and shared information. Service science is the study of service systems, aiming to create a basis for systematic service innovation.

Since it was introduced by Vandermerwe and Rada (1988), servitization has been studied by a range of scholars (Baines et al., 2007; Oliva and Kallenberg, 2003). Service is a comprehensive term and has different characteristics from one manufacturer to another. Each organization understands the meanings of service in different perspectives owing to its different development strategy and industry field (Table 2-1).

Table 2-1: The definition of service

Author	Definition of service
Goedkoop et al. (1999)	An activity done for others with an economic value and often done on a commercial basis.
Kotler et al. (1999)	Any activity or benefit that one party can offer to another which is essentially intangible and does not result in the ownership of anything
Kameoka, 2008	A supporting activity to help an individual or organization to achieve its objective
Vargo et al. (2008)	The application of competences such as knowledge and skills by one party for the benefit of another
Lovelock et al. (2009)	Anything that brings benefits without ownership

Source: Own preparation.

To catch the essence of servitization, it is indispensable to interpret the meaning of service. We summarize service from the following three perspectives.

1) *Service as an intangible product*

The intuitive understanding of service is to compare the word *product*. Products are physical entities that are manufactured from raw materials. Services are non-physical entities that are the applications of knowledge and skills for the benefit of a party (Vargo and Lusch, 2008b). The most famous characteristics of services that distinguish them from products are *intangibility*, *heterogeneity*, *inseparability* and *perishability*, now known as the IHIPs (Gummesson, 2007). This understanding is also consistent with the definition of servitization that was originally coined. Servitization is now widely recognised as a shift from selling products to selling an integrated system by adding services to products.

There are a variety of forms of servitization in the current research. Baines et al. (2007) claimed that the concept of a PSS is a specific case of servitization. A PSS embraces the service-led competitive strategy rather than simply offers lower priced products. Product firms achieve differentiation through adding services in their offerings because services are more difficult to imitate (Gebauer and Fleisch, 2007; Oliva and Kallenberg, 2003; Vandermerwe and Rada, 1988).

In these discussions, services are viewed as intangible products although they have now been claimed to be obviously distinctive, tangible products. Views are primarily focused on the internal environment of manufacturers and on how to produce additional services to complement the products offered. Tukker (2004) argued that this research has predominantly explored ‘function-oriented business models’ in which services and products are integrated to meet specific customer needs.

2) *Service as a contextual experience*

As goods and services become commoditised, the customer experiences that companies create will matter most (Pine and Gilmore, 1998). The researchers claimed an experience occurs when a company utilises services as the stage and products as props to involve customers in a manner that creates a memorable event. Grove and Fisk (1992) applied the sociological concepts of dramaturgy to services and introduced the model of service experience as theatre. Customers’ evolving expectations and continuous interactions provide firms with the needed information to guide their behaviour toward a desired outcome. Schmitt (1999) introduced the similar concept of experiential marketing. He argued that customers could not be viewed solely as rational decision-makers who care about functional features and

benefits. Moreover, as emotional beings, customers are concerned with achieving pleasurable experiences. Kosaka (2012) argued the role of the service field to service value is consistent with that of the electromagnetic field in physics. The service field model can be specified as $(\text{Service value}) = (\text{Service}) \times (\text{Service field})$. The identical service may generate very different value as the service field changes. The value of the service a provider delivers depends on the context such as customer knowledge, needs, place, and time. A high service value for the customer is generated when the services are provided in the high potential service field.

These discussions extend the focus from product companies' capabilities for adding service offering to the concern with customers' experience, feelings and knowledge. Although customers are involved, sensory, emotional, cognitive, behavioural and relational values replace functional value (Gouillart, 2011; Schmitt, 1999).

3) Service as a value co-creating process

A service can be defined as a knowledge creation process for customers' value; knowledge creation for new service value is essential for service innovation. With the proposal of service-dominant logic, Vargo and Lusch (2008b) provided a new perspective to observe the economic phenomenon. Two propositions become prominent: first, the fundamental source of competitive advantage is not operand resources (e.g., materials and equipment) but operant resources (knowledge and skills); second, the customer becomes a co-creator of value who determines the value of service.

Prahalad and Ramaswamy (2000) explained that customers could be a source of competence. Companies must find the means to process what they learn from customers so they can encourage dialogue and actively involve customers. Involving customers instead of treating them as passive consumers generates meaningful experiences that will satisfy their ideas and that they are willing to reward. In the process, customers contribute their knowledge, particularly tacit knowledge that is difficult to convey and difficult for others to know (Chesbrough, 2010; Gebauer and Fleisch, 2007; Kotler et al., 2010; Payne et al., 2008).

Product-oriented companies implement a function-oriented business model and regard customers as consumers at the end of the value chain. These companies manufacture their products or deliver their services based on their research, in which it is assumed they know their customer well. However, much of the knowledge involved in the service field is tacit, which customers gain from experience. The best means forward for open service innovators is to become integrators of both internal and external

knowledge. Co-creation can provide greater value to customers and a greater competitive advantage for the manufacturer (Chesbrough, 2010). The company that can attract the most numbers of co-creators would be king in a service business industry.

2.1.2 What is servitization?

Manufacturers add services to their products, a process widely recognized as servitization (Vandermerwe and Rada, 1988). Based on the various understanding of service, servitization is studied in the corresponding manners. Similarly with service, servitization has various definitions owing to the different views and focuses of the researchers (Table 2-2). Manufacturing companies are increasingly being pressured to change their business from a technology-based one to one based on both technology and service (Shirahada et al., 2015). Servitization in manufacturing is a key issue for obtaining a competitive advantage, and service value creation is indispensable for customers in the 21st century. It is developed based on core competencies to provide extended services for customers throughout the entire product lifecycle (Gebauer et al., 2010; Oliva and Kallenberg, 2003; Vandermerwe and Rada, 1988). Some manufacturers regard services as the basis of their competitive strategy (Baines and Lightfoot, 2013). Li (2011) claimed that manufacturers with well-developed service operations could develop a strong relationship with customers based on loyalty and commitment. Owing to its specific industry, organizational capacity, and developmental strategy, each manufacturer has a different interpretation of service when it implements a servitization strategy.

Table 2-2: The definition of servitization

Scholars	Definition of manufacturing industry servitization
Vandermerwe (1989)	Modern manufacturing enterprises provide customer-centered and integrated bundles instead of pure products. This bundle can be made up of tangible products, services, supports, self-providing services and knowledge
Tellus Institute (1999)	The emerging of product-based services made it difficult to separate manufacturing industry from traditional service industry
Verstrepen and Van Den Berg (1999)	To add service components to core products
White et al. (1999)	It's a dynamic changing process that manufacturers change

	from product provider to service provider
Desmet et al. (2003)	It's a trend where manufacturing companies provide more and more services
Szalavetz (2003)	The definition is double layered: first is that internal service efficiency becomes increasingly important to company competency; second is that customer attaches higher importance on product related services. Product-service covers purchasing, financing, transportation, installation, system integration and technique support as well as maintenance and repairing
Lewis et al. (2004)	The strategy for product function transition while entering the market
Ward and Graves (2005)	Manufacturers increase scope of service
Ren and Gregory (2007)	Aiming at meeting customer demands, increasing competency and sales, the changing process where manufacturing companies become service oriented or develop more and better services.
Baines (2007)	The change from selling products to products and service systems, by which to create multi-value organization competency and business process
Liu et al. (2008)	From connotation, it means the change of value chain from manufacturing centered to service centered in order to gain competitive advantage; from denotation, it includes input servitization and output servitization
Zhou (2010)	Manufacturing industry servitization is an economic trend in which service element takes an increasing proportion in the input/output activities in manufacturing industry; on micro-level, it is the managing strategy to meet market demands, realize differentiation and win the competition; on meso-level, it is an upgrade strategy to realize industry transition and extension to both ends of the value chain; on macro-level, it is the result from development of knowledge economy, representing new trends of economy growth

Source: Wang, Kosaka & Xing, 2016.

2.1.3 The drivers of servitization

Manufacturers stand at a critical point. As technology and economic climate shift, manufacturers must innovate their service while making product innovation, in order to face various challenges. They may need a good grasp of current business models. They may be experiencing a gradual decline in traditional revenue streams or margin erosion due to commoditization. There are new competitors emerging from unexpected places or adjacent industries. Cheaper digital substitutes for their products or services are making inroads in markets (Westerman et al, 2014).

Commonly, the literature suggests three sets of factors that drive companies to implement a servitization strategy: financial, marketing and strategic. Yet, some researchers add the reduction of environmental impact as the driver of servitization. The drivers of servitization are summarized in table 2-3.

Table 2-3: The drivers of servitization

Driver	Description
Financial	<ol style="list-style-type: none"> 1. Higher profit margin 2. Stability of income (Baines et al., 2007; Gebauer and Fleisch, 2007)
Marketing	<ol style="list-style-type: none"> 1. The use of services to sell more products 2. Improvement of product performance 3. Improvement of customer relationship (Gebauer and Fleisch, 2007; Mont, 2002)
Strategic	<ol style="list-style-type: none"> 1. A customized strategy to overcome the homogeneity of a product 2. A differentiating strategy difficult to imitate (Oliva and Kallenberg, 2003; Gebauer and Fleisch, 2007)
Environmental	Reduction of environmental impact (Mont, 2002)

Source: Own preparation.

2.1.4 The phases of servitization development

The evolution of servitization is catalogued as the two distinct phases according to the content of services as well as the extent of customized needs.

Table 2-4: The definition of after-sales services

Author	Definition
Ehinlanwo & Zairi (1996)	All activities geared towards maintaining the quality and reliability of the car carried out after the customer has taken delivery with the goal of ensuring customer satisfaction.”
Asugman et al. (1997)	Those activities in which a firm engages after purchase of its product that minimize potential problems related to product use, and maximize the value of the consumption experience.”
Urbaniak (2001)	Customer service can be defined as those activities that enhance or facilitate the role and use of the product
Johansson & Olhager (2004)	The supply of after-sales services, including tangibles such as spare parts and consumables, related to the maintenance of industrial goods.
Morschett (2006)	If services are provided post product purchase, they are called AS [after-sales service]. Included are warranty services, maintenance, repairs, user training etc. In most instances, these are services which enhance the productivity and efficiency of the good being sold.”
Cavaliere et al. (2007)	Traditionally confined temporally as taking up those activities occurring after the purchase of the product and devoted to supporting the customer in the usage and disposal of the goods.
Saccani et al. (2007)	After-sales services for manufactured goods encompass the set of activities taking place after the purchase of the product, devoted to supporting customers in the usage and disposal of goods.
Rigopoulou et al. (2008)	To describe services that are provided to the customer after the products have been delivered.”

Source: Jönke, 2012.

1) Product-related services

To enhance the productivity and efficiency of products and avoid the commoditization of products, most manufacturers provide various services to their customers. Frambach et al. (1997) classified these services into three different categories according to their sequence with the purchase decision. ‘Pre-sale product

services' are used to stimulate the purchase decision and to reduce the perceived risk of adopting the product (such as demonstrating and offering trial use of the product. 'Sale product services' are those that will help the customer utilize the product (such as installation and training). Finally, 'post-sale product services' are designed to garner customer satisfaction (such as repair and maintenance). In this phase, most manufacturers focus on the development of after-sale service to differentiate their competitiveness from opponents. The definitions of after-sale services are shown in Table 2-4.

These services are devoted to minimizing the potential problems that are related to product use and maximizing the value of the customer experience. The proposed benefits for manufacturers include extra revenue outside product sales, steadier cash flows from maintenance and training revenues, and better profitability from the highly profitable spare part (Rigopoulou et al., 2008).

In this phase, services are recognized as intangible revenue-generating products and as a differentiation strategy of winning customer satisfaction in the commoditization era.

2) *Product-service systems (PSS)*

With the implementation of servitization, manufacturers have the capacity and desire to pursue more from their customers' business, such as providing business advisory and a total solution around their products. A PSS is an integrated combination of tangible products and intangible services that is designed to fulfill specific customer needs (Tukker, 2004). The term has been defined as "a marketable set of products and services capable of jointly meeting a user's need, or a system of products, services, supporting networks and infrastructure that is competitive and satisfies customer needs" (Mont, 2002).

Tukker (2004) compiled a seminal typology and identified three categories for PSS. Product-oriented services systems are based on conventional transactions, selling products and offering services. User-oriented services mean leasing, renting, sharing and pooling products. In this case, the customer uses the product and pays for its use; the product does not shift in ownership. The third category, result-oriented services, is the most advanced service system. Compared with the second category, the customer no longer pays for the use of the product; instead, it pays for the results it demands.

The PSS logic is utilized to take advantage of the specialized knowledge of customers to both increase value as an output and decrease physical resources as an input to a system. Product and service components are designed in an integrated manner to

provide the proper functionality of PSS (Baines et al., 2007; Claude and Horne, 1992; Morelli, 2003). PSS values asset performance or utilization rather than ownership. Manufacturers integrate products and services to concentrate on the usage value for their customers.

Table 2-5: The definition of Product Service-System

Author	Definition of Product Service-System
Goedkoop et al. (1999)	A product service-system is a system of products, services, networks of “players” and supporting infrastructure that continuously strives to be competitive, satisfy customer needs and have a lower environmental impact than traditional business models.
Mont (2001)	A system of products, services, supporting networks and infrastructure that is designed to be: competitive, satisfy customer needs and have a lower environmental impact than traditional business models.
Manzini (2003)	An innovation strategy, shifting the business focus from designing (and selling) physical products only, to designing (and selling) a system of products and services which are jointly capable of fulfilling specific client demands.
Brandsotter (2003)	A PSS consists of tangible products and intangible services, designed and combined so that they are jointly capable of fulfilling specific customer needs. Additionally PSS tries to reach the goals of sustainable development.
Wong (2004)	Product Service-Systems (PSS) may be defined as a solution offered for sale that involves both a product and a service element, to deliver the required functionality.
ELIMA (2005)	A product service-system is defined as a system of products, services, supporting networks and infrastructure that is designed to [be]: Competitive, Satisfy customer needs, & Have a lower environmental impact than traditional business models.
Baines et al. (2007)	A PSS is an integrated product and service offering that delivers value in use.

Source: Baines et al. (2007) and own preparation.

Undoubtedly, compared with solely providing product-related services around

products, PSS is a more competitive strategy if manufacturers can implement it successfully. For the customer, PSS is expected to provide value through more customization and higher quality; for conventional manufacturers, PSS is claimed to provide strategic market opportunities and to enhance competitive edge (Baines et al., 2007).

However, as with the first phase of servitization, in this phase, the manufacturer continues to focus on its internal capacity, which is also been concluded from the definition of PSS by the scholars collated in table 2-5. Customers are external to the value creation process. Manufacturers design a PSS based on their own research and assume it will fulfill their customers' needs. The design of services is significantly different from the design of products because services have fuzzy characteristics, high cost and low standardization. Furthermore, customers may not be enthusiastic about services that manufacturers deliver. PSS remains a manufacturer-based solution from the customer perspective.

2.2 Emerging theories and perspectives in service science

According to Oliva and Kallenberg (2003), customer-oriented servitization consists of two kinds of transformation: transforming the service offering from product-oriented services to the end-user's process-oriented services, and transforming the nature of customer interaction from transaction-based to relationship-based. We review the related theories emerging in service science to understand the direction of customer-oriented servitization.

2.2.1 Service-dominant logic

Vargo and his colleagues (2008a) defined service as "*the application of competences such as knowledge and skills by one party for the benefit of another*" (p.145) and service system as "*an arrangement of resources (including people, technology, information etc.) connected to other systems by value propositions*" (p.149).

With the proposal of service-dominant logic (Vargo and Lusch, 2004) provided a new perspective to observe the economic phenomenon. It gave a distinct answer to the unsolved problems in the goods-dominant logic. They originally provided eight foundational premises (FP) that underpin their case for the S-D logic. After substantial concurrence, debate, dialog and inquiry, Vargo and Lusch (2008b, p. 7) modified and extended the original FPs into ten, as described below.

FP1: Service is the fundamental basis of exchange.

FP2: Indirect exchange masks the fundamental basis of exchange.

FP3: Goods are a distribution mechanism for service provision.

FP4: Operant resources are the fundamental source of competitive advantage.

FP5: All economies are service economies.

FP6: The customer is always a co-creator of value.

FP7: The enterprise cannot deliver value, but only offer value propositions

FP8: A service-centered view is inherently customer oriented and relational

FP9: All social and economic actors are resource integrators.

FP10: Value is always uniquely and phenomenologically determined by the beneficiary.

Based on the above foundational premises, two propositions become prominent: first, the fundamental source of competitive advantage is not operand resources but operant resources, which are mostly stored in the employees' brains; second, the customer becomes a co-creator of value who determines the value of service and whose satisfaction and loyalty are mostly affected by the employees of the service provider. In service dominant logic, the customer is always buying a service flow rather than a tangible product. We contrast the key distinctions between good-dominant logic and service-dominant logic in the table 2-6. The foundational proposition of S-D logic is that organizations, markets, and society are fundamentally concerned with exchange of service—the applications of competences (knowledge and skills) for the benefit of a party. S-D logic embraces concepts of the value-in-use and co-creation of value rather than the value-in-exchange and embedded-value concepts of G-D logic.

Table 2-6: The roles of customer in two kinds of logic

Dominant logic	Goods-dominant Logic (GDL)	Service-dominant Logic (SDL)
<i>Role of customer</i>	The customer is the recipient of goods	The customer is a co-producer of service
<i>Determination and meaning of value</i>	Value is determined by the producer	Value is perceived and determined by the consumer on the basis of “value-in-use”
<i>Interaction</i>	Customers are acted on to create transactions with resources	Customers are active participants

2.2.2 Service field

Kosaka (2012) argued that the service value a provider delivers depends on the situation such as customer knowledge, needs, place, time and the like. The identical service might generate very different value as the service field changes. The role of service field to service value is consistent with that of the electromagnetic field in physics. The service field model can be specified as (Service value) = (Service) × (Service field). The concept of the service field is shown in Figure 2-1.

This new proposal to create and improve service values is based on service fields and service systems, and it can be applied to various services where providers and receivers co-create service values. This means that the service system and the concept of service fields are applicable to modeling service value creation.

A high service value for the customer is generated when the services are provided in the high potential service field. A high potential means that the requirement for the provided service is high. The provider should pay more attention to identifying the context among them and customers. Any of both sides play a vital role in the service value. The fact that service value depends on service field requires service providers to learn more from customers and local culture. It is indispensable for service providers to design the service with customers from the beginning and conduct the service activities together in the process. The service value is different even though provided service is the same, because it depends on service field (e.g., customer's needs, knowledge, characteristics, time, place, condition, situation.)。

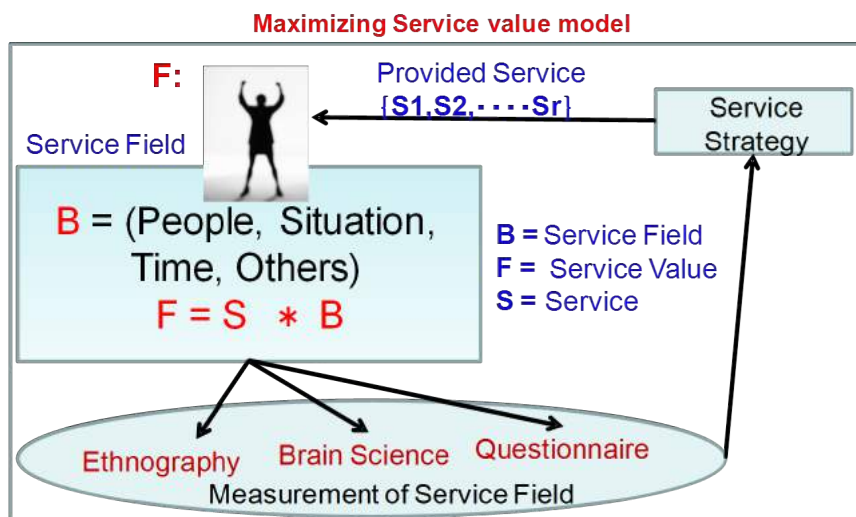


Figure 2-1: Identification of service fields

(Source: Kosaka, 2012)

The firm identifies the service field before it determines what kind of service is most valuable for the specific customer. Service value depends on the interaction between the service and service field. Kosaka defined four steps to maximum the service value. The first step is to define the service system. Stakeholders participating hold the same understanding and objectives of the service system. Step two is identification of the service field. Next step is creation of new service ideas. New knowledge is created for the expected service based on the identification of service field. The final step is to implement the new knowledge created.

2.2.3 Customer value-driven Marketing 3.0

Kolter and his colleagues (2010) defined the new model for marketing-*marketing 3.0*. In today's mobile Internet era, the old rules of product-based and consumer-based marketing will not satisfy the knowledgeable and informed customers (Figure 2-2). It sees customers not as the final consuming end but as the multi-dimensional human beings. Customers make self-expression and collaboration with other customers. Marketing has shifted to inviting customers to participate in the process of value co-creation. Hence, the marketing is creating services and corporate culture that are consistent with the values of target customers. As the example given in the book, Apple's Steve Jobs engage with customers' emotions through the compelling stories around his ideas. Providers used to listen to the customers' voice to understand their minds and capture market insights. The firm used to make a product with minimal customer testing in the beginning or extensive customer input and testing later, but now it shifts to provide ideas and co-create with customers.

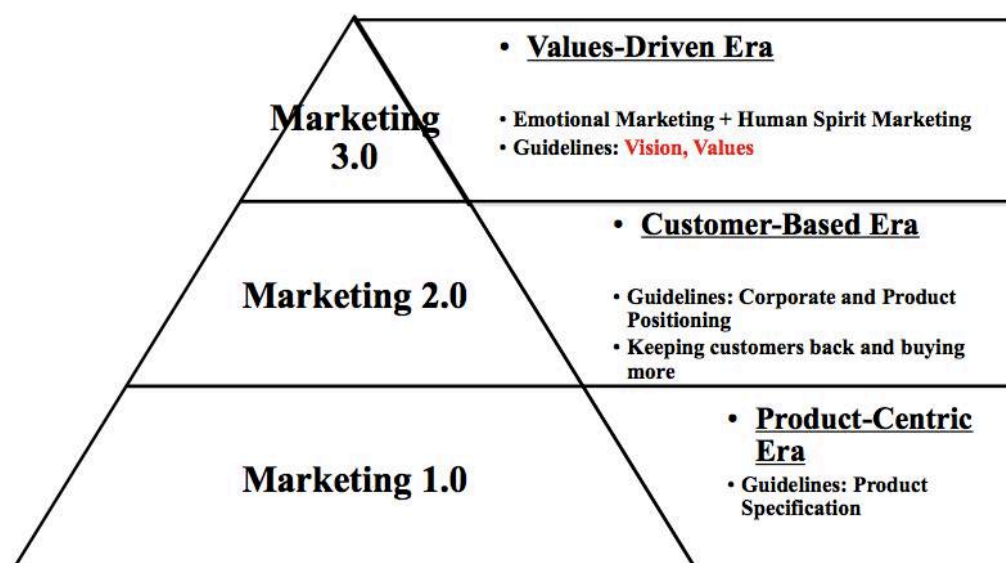


Figure 2-2: Value-driven Marketing 3.0

(Source: Kotler et al., 2010)

Now customers play the key role of creating the value through co-creation of product and services. The new ways of creating product and services are realized through collaboration of companies, customers, supplier, and other partners connected by the mobile Internet in a global network. Like Amazon and eBay, they leverage the power of consumer networks by the platform of consumer communications.

While *marketing 3.0* emphasizes the human spirits and emotional marketing to embrace outside customers, Appelo's management 3.0 (2010) provides the similar perspectives on inside employees. The latter recognizes that the firm is living, networked systems, where management is primarily about people and relationships. Employees are the most important parts of a firm and managers must do all they can to keep employees active, creative and motivated. Leaders cannot inspire employees' creativity with the management system based on the industrial production and division of labor.

2.2.4 Customer knowledge, customer value and value co-creation

In the value creation process, manufacturers tend to emphasize how many functions their products chartered, how many intelligent employees they have and the market share of their products. These factors are used to persuade manufacturers and external stakeholders that their products are powerful and competitive. However, when manufacturers focus on themselves, the important power of customers is often ignored. Prahalad and Ramaswamy (2000) claimed that companies can no longer operate their business autonomously with minimal interference from customers.

▪ **Customer value**

Customer value is the benefit that customers enjoy or experience from the receipt of products and service (Gale, 1994). When customers purchase a product or service, they form desires for certain attributes based on achieving the desired consequential experiences. Customers also learn to desire certain consequences based on the ability to help them satisfy their goals and purposes (Woodruff, 1997). Sweeney and Soutar (2001) discussed that costumers evaluate products, not just in functional terms of expected performance, value for money and versatility; but also in terms of the enjoyment or pleasure derived from the product and the social consequences of what the product communicates to others. Anderson and her colleagues (2013) claimed services could affect consumer well-being owing to their pervasiveness in the consumer environment. MacKay (1999) discussed that a product's or a service's appeal is an amalgam of rational and emotional factors. The emotions play a part in

every purchase decision. Both theoretical and practical knowledge about customer value have been broadened and deepened, as reflected by the definitions of customer value concept collated in Table 2-7.

Table 2-7: The definition of customer value

Author	The definition of customer value
ZeithamI (1988)	Value is the consumer's overall assessment of the utility of a product based on perceptions of what is received and what is given
Gale and wood (1994)	Customer value is market perceived quality adjusted for the relative price of your product
Butz and Goodstein (1997)	The emotional bond established between a customer and a producer after the customer has used a salient product or service produced by that supplier and found the product to provide an added value
Woodruff (1997).	A customer's perceived preference for and evaluation of those product attributes, attribute performances, and consequences arising from use that facilitate (or block) achieving the customer's goals and purposes in use situations
Sweeney and Soutar (2001)	Functional value, social value, emotional value
Kameoka (2007)	Customer value =Product value + Service Value + Customer added value

Source: Own preparation

The target of service is all the processes that lead to customer satisfaction; for that purpose, many physical products are used. Figure 2-3 illustrates the concept of the customers' total value, as defined by Kameoka (2007). The customers' total value consists of product value, service value provided by service providers, and customers' added value. Product value is offered by the product functions. Service is added to product value and to promote the customer experience. Customers can add an important component to the total value. A value added service can be created by a product provider, new service provider, and user through collaboration; this activity leads to service innovation.

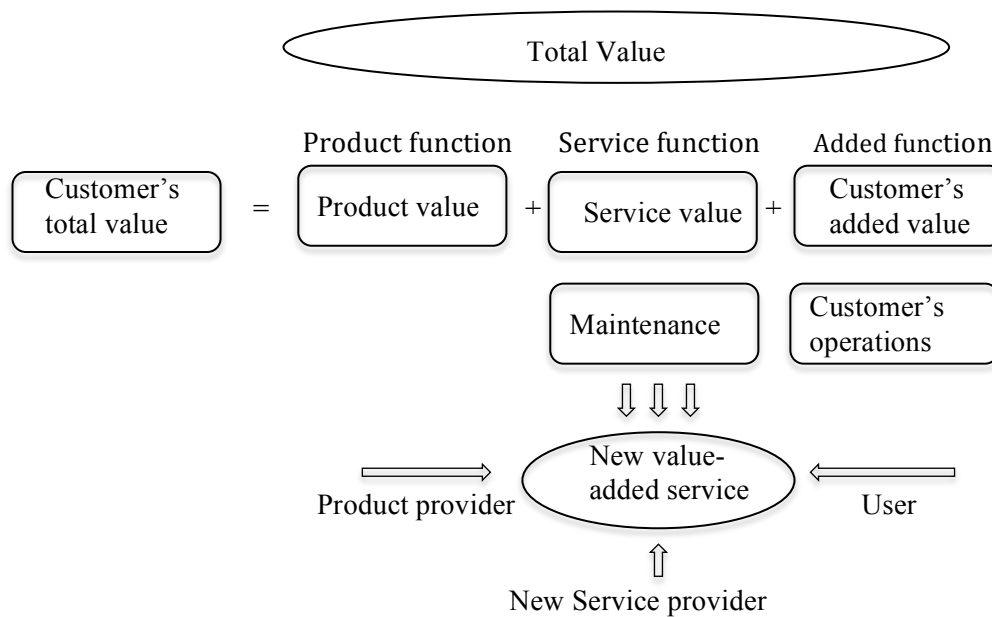


Figure 2-3: Customers' Total Value defined by Kameoka

Advanced management of technology moves its focus to the higher value added services innovations by integrating more sophisticated service functions to the conventional products and systems (Kameoka, 2008). The percentage of service value is gradually increasing, and product value is decreasing because IT technology and many new participants are expected to enter the high value-added service field (Kosaka, 2012). A pair of shoes does not only belong to dressing, it can now also allow users to interact via a social network, measure performance, and play with friends. A new challenge for the manufacturing industry is to employ information technology to integrate the service function, which leads to the incorporation of customer satisfaction into products; furthermore, it connects products to service innovation (Shelton, 2013).

▪ Value co-creation with customers

Companies can do more to involve customers in their innovation process than simply watch them. Prahalad and Ramaswamy (2000) explained that customers can be a source of competence. Companies have to find ways to process what they learn from customers so they can encourage the dialogue forward and make customers actively involved. It is essential to mobilizing customers' community and manages customer diversity in the Internet era. Solutions can be seen as ' on-gonging relational processes of defining, meeting, and supporting customer's evolving needs' (Tuli et al., 2007). Another way for services companies to focus on customers is to create a

personalized experience for customers. In services, customers' perceptions of their experiences are as important as the design and delivery of the service.

Chesbrough (2010) explained that the customers are willing to pay for tailored service solutions that address their unique needs. Customers' involvement instead of treating customers as passive consumer generates meaningful experiences that will satisfy their ideas and they are willing to reward. In the process, customers contribute their knowledge, especially tacit knowledge that is hard to convey and know by others. Co-creation can bring greater value to customers and greater competitive advantage for the firm. The firm conducts three key processes for co-creation. First, the firm creates a platform to attract and support the collaboration of its stakeholders. Then customers customize the platform to meet their own unique needs. At the third step, the firm further enriches the platform by incorporating all the customization efforts with customer feedback (Kotler et al., 2010).

Armed with new connective tools and dissatisfied with available choices, customers now seek to exercise their influence in every part of the business. Chesbrough (2010) argued some companies have had great success in letting customers create designs that they would like. Also like in music industry, a more customers-driven view would invite customers to be co-creators of their producer. Co-creators are active, engaged seekers of new music, not passive recipients. Friesen (2001) used the example of eBay to elucidate the co-creation process, in which eBay's contribution is the software and process, and the seller's contribution is the specific content. Likewise, security is co-created by both buyers and sellers through the enforcement of a rating system that serves as a control mechanism during co-creation. Note that there is involvement at both ends in creating the experience environment, with customers playing an active role in the process. The ability to manage tacit knowledge from knowledge can create a competitive advantage for companies. The mobile Internet can further enhance the explicit knowledge move faster, but it cannot play the same important role of transfer tacit knowledge. In some sense, tacit knowledge cannot share by the Internet so that it becomes increasingly valuable. Companies have the unique advantage to get such valuable knowledge from their customers if they have corresponding policies to encourage their employees to do so.

The roles of customers are becoming increasingly important. That means, customers can not defined only as those who have money to buy a product or service, but consider customers are human, they have emotional needs, that cannot be met by the traditional offerings, how to satisfy the emotional needs is critical for

manufactures to build new type of relationship with customers. Moreover, customers have knowledge and skills that firms do not have, how to harness the competence is critical for manufactures to gain a new competitiveness.

▪ **Enhancing value co-creation through harnessing customer knowledge**

Customer knowledge creates value when companies incorporate it into planning and operating activities (Lesser et al. 2000). As Prahalad and Ramaswamy (2000) discussed, harnessing the knowledge and skills of customers is not an easy task. Especially, it is complicated enough for a large firm. They claimed four realities for firms to grip with in harnessing customer competence.

(1) They have to engage their customers in an active, explicit and ongoing dialogue

The Internet has empowered the customer to be an interlocutor. Firms have to realize that their dialogue is equal and firms no longer have a monopoly on or even an advantage in information access. In the process, firms are going to try to process what they learn from customers timely in order to keep customers interested and bring the dialogue forward.

(2) They have to mobilize communities of customer

Thanks to the Internet, customers currently are easier to join or form their own, self-selecting, and quite tightly knit virtual communities. These communities are increasingly exercising a powerful influence on the market. “Viral marketing” of word of mouth from the customer’s collective personalized experience is replacing the traditional management of brands that was operated through advertising, packaging and the like. Furthermore, smart firms are finding ways to mobilize communities and invite customers to contribute their knowledge to the maximum customer value.

(3) They have to manage customer diversity

Firms are becoming more vulnerable to customer diversity. Especially for firms of technology-intensive products, they are sensitive to variations in customers’ sophistication. The sophistication includes their skills as users, their sensitiveness on privacy and security, and so on. Besides technology, globalization in the marketplace also heightens the diversity in customer sophistication.

(4) They have to co-create personalized experience with customers

Harnessing the knowledge and skills of customers involves more than just conducting a dialogue. They are pursuing the total experiences around a product rather being interested in purchasing it. Moreover, customers

increasingly want to shape those experiences themselves rather than accept experiences fabricated by firms.

Personalization differs from customization. The latter requires the manufacturer to design a product to meet a customer's needs. Personalization, on the other hand, is about the customer becoming a co-creator of the content of their experiences. In the process, firms are also expected to provide a platform for customers discussing their ideas with in-house experts and other customers.

Gouillart (2011) further argued how the company go about transforming inert touch points into live interactions that co-evolve with customer processes. He suggested the company should design engagement platforms-the physical and virtual places through which customers could interact with the company and other stakeholders in order to design their own personalized experiences. The company can make the four types of interaction into such engagement platforms through its products, its people, the physical places it does business, and the digital sites it possesses.

In sum, the relationship with customers can promote the total value received by the customer as value is created and delivered over times as the relationship develops (Arnould and Thompson 2005; Payne et al., 2008; Vargo and Lusch, 2004;) discussed). Product-oriented companies regard customers as consumers at the end of the value chain. They manufacture their products based on their research, where it is assumed they know their customers' want and customers are willing to pay for the products. But, much of the knowledge involved in service field is tacit that customers gain from experience. Tacit knowledge interferes with the ability of providers and customers to communicate with one another. If providers cannot conduct deep interaction with customers, it becomes impossible to understand what a customer really wants and make use of customer knowledge to maximize the total value.

2.3 Servitization research with the focus on information technology

Can Information Technology (IT) be the enable for servitization? Can IT change the interaction with customers making it more effective and more efficient? With these questions, we made review on the current development of IT and the research of servitization focusing on the factor of IT.

2.3.1 Digital transformation: Social, Mobile and Cloud Computing

New information technologies such as IoTs, mobility and social media are empowering firms to get closer to their customers, connect customers in engaging ways and fuel customer-driven innovation (Westerman et al., 2014). Shelton (2013)

claimed the new technology is reducing the two largest components in the cost of doing business: communication and coordination. He defined the new IT as Social, Mobile and Cloud. Social is not just online parties for personally chatting and posting; social is also the business communities in every industry and the mechanisms that people use to work with one another, which is impacting the supply chain, employee behaviors, customers behaviors and competitors. It is transforming many firms from hierarchical organizations and command and control business processes to peer networks and collaborative business processes. Mobile is how people get to work and the work gets to people. It means everywhere and on the move. It connects access to everyone and all of our businesses via key tools such as the smartphone. The mobile ability has been embedded into products. The cloud is where the office is, the new place people work. It is computing as a utility-infrastructure always existing 'somewhere' that enables us to do everything.

Social gives people the network to engage with others, but mobile makes it possible to engage whenever and wherever or seen as everywhere and all the time in practice. Social and mobile working together break down barriers to productivity and promote peer communication. Social networks and cloud computing are building blocks for systems that can change the way people create value-sometimes called social production, or more commonly co-creation.

Westerman and his colleagues (2014) suggested the four digital interventions for firms to change the customer value equation. First, they figure out customer behaviors and enhance the customer experience digitally. Second, they provide user-friendly mobile apps and develop rewarding social experiences. Third, they regard customer data as the lifeblood for designing compelling customer experiences. Data helps firms move from guesswork to inspired predictions and continuous hypotheses testing. They use scientific ways to inform the changes, proactively offer personalized deals and design predictive marketing campaigns. Finally, they work to seamlessly combine the physical and digital experiences.

An engaging customer experience creates value for both customers and manufacturers. But delivering a compelling customer experience is a challenging task. First, customer expectations have increased. Second, integrating new digital channels into current operations is organizationally challenging. Third, these digital interactions require a transformation in corporate culture (Westerman et al., 2014)

2.3.2 Knowledge management architecture for IoT

At the core of the Internet of Things is the Industrial Internet, providing the underlying infrastructure that supports connected machines and sensors. The term, generally attributed to manufacturing giant GE, means the integration of machines with sensors, software, and communication systems that enable the Internet of Things. The connected business world is generally regarded as Industry 4.0, which is fostering the fourth wave of disruptive industrial innovation (Greengard, 2015).

Greengard (2015) discussed in his book the total number of mobile devices is now exceeding 2.5 billion. The ability to tag physical objects and transform anyone carrying a smart device into a potential data point has remarkable and far-reaching implications. Various chips and sensors as well as human input from a smartphone or mobile device generate vast amounts of data. Smart phones, cloud computing, Radio Frequency Identification (RFID) technology, sensors, and miniaturization are converging to make a new generation of embedded and immersive technology, which unavoidably generates an era of Big Data.

Laney (2001) pointed out exploded big data management challenges in e-commerce era in three dimensions: volume, velocity and variety (Figure 2-4). Volume refers to the amount and the depth of data, increased by a transaction or any point of interaction; velocity refers to the speed at which data are generated and put to use. And variety refers to the breadth of data that now exist in incompatible data formats, non-aligned data structures, and inconsistent data semantics.

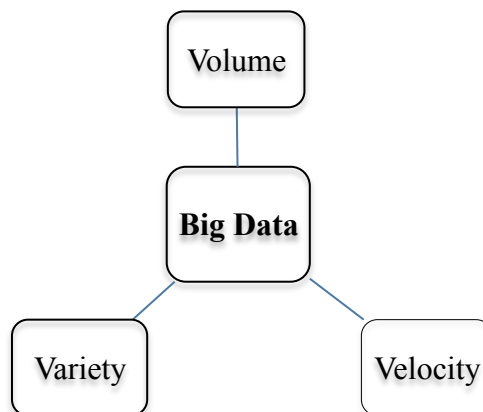


Figure 2-4: Three components of big data

Source: Laneny, 2001.

Within the context of IT systems, the term ‘knowledge’ is closely related to the two other concepts: data and information. The most common paradigm of knowledge in the literature is the knowledge hierarchy illustrated in Figure 2-5 (Davenport and Prusak, 1998). It depicts the conventional knowledge transformation, where data is transformed into information, and information is transformed into knowledge. Data means unstructured facts and figures that have the least impact on the typical managers; Information is data that has been contextualized, categorized, calculated, and condensed to provide relevance and purpose for the decision-makers in question (Holler et al., 2014). From another different perspective, Nonaka and his colleagues (2008) defined knowledge as a dynamic human process of justifying personal belief toward the truth. They claimed tacit knowledge and explicit knowledge as the two main types of human knowledge. Explicit knowledge is defined as objective and rational knowledge that can be represented in words, numbers, or diagrams. Such as theoretical approach, manuals, books, database, know-what knowledge. Tacit Knowledge is subjective and experimental knowledge that cannot be presented in words, numbers, or diagram. It includes cognitive skills such as belief, image and mental model, and technical skills such as craft and know-how knowledge. The key to knowledge creation lies in the interaction between tacit knowledge and explicit knowledge.

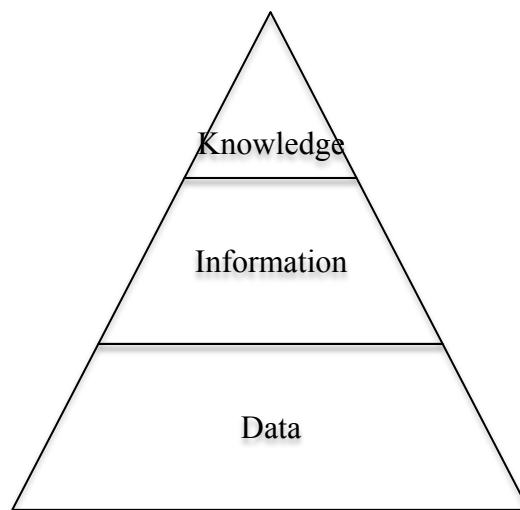


Figure 2-5: Data, information, and knowledge

Holler and his colleagues (2014) claimed that data-driven knowledge discovery is an important emerging paradigm for IoT and cloud computing. With sensor data and similar types, it is critical to understand how to organize data effectively in order to

extract knowledge from it, depicted in figure 2-6. The are three levels: data sources, data integration, and knowledge discovery and information access.

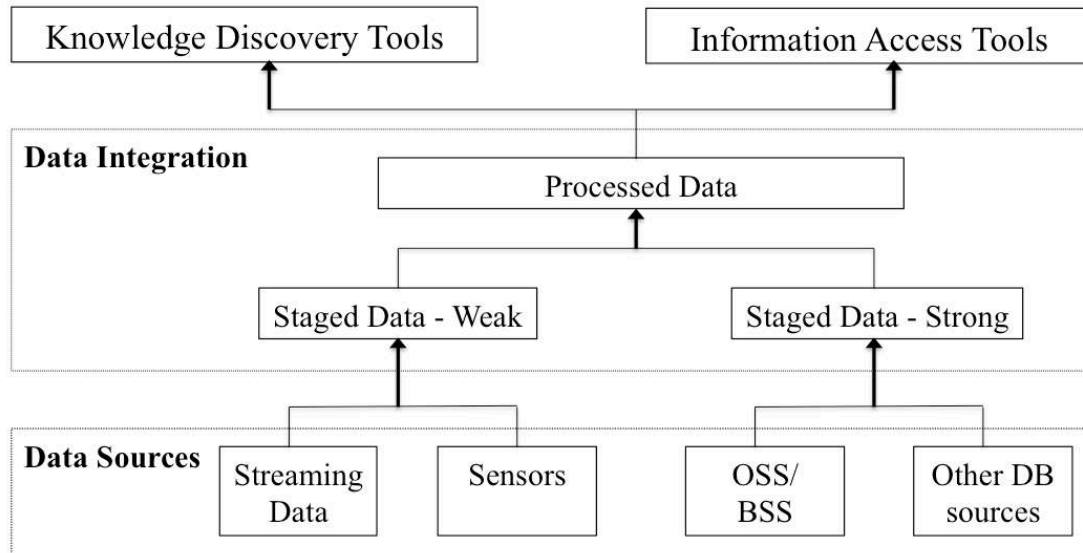


Figure 2-6: Knowledge reference architecture for IoT

Data sources refer to the broad variety of data that is available to build enterprise solutions, which may come from sensors, Operational Support System (OSS), Business Support System (BSS) or other Data Base (DB) sources. The data integration layer transforms data from different formats into a manner that can be used by the information access and knowledge discovery tools. Strong staged data refers to data stored in traditional database formats that often have the analysis defined beforehand. Weak staged data is data that is not well structured according to traditional database techniques, such as streaming data for data from sensors. Once data has been collated and processed, it can be used to develop insights from the data via retrieval. Information access essentially means displaying the data in a form that is easily understandable and readable by users. Knowledge discovery means that decisions may be able to be taken on the outputs.

2.3.3 ICTs architecture for servitization

Data coming from the sensors embedded in product provide business insights that were previously out of reach. While we have had incredible access to information from our desks for a decade, only in the last several years has that information been in a mobile way, available as an immediate extension of our memory (Shelton, 2013).

The invaluable insights enabled by harnessing and analyzing the data from these connected products are critical to service innovation. Remote product sensing and

cloud computing are critically important to the successful delivery of advanced services. Currently, manufacturers can monitor the condition of their products and capture the relevant information about location, use, performance, consumption and the like. Based on the case companies they analyzed, Baines and Lightfoot (2013) formulated the common architecture for information and communication technologies (ICTs) on servitization of manufacturing (Figure 2-7). ICTs largely focus on providing the manufacturer with visibility of their product or asset as it is used by the customer.

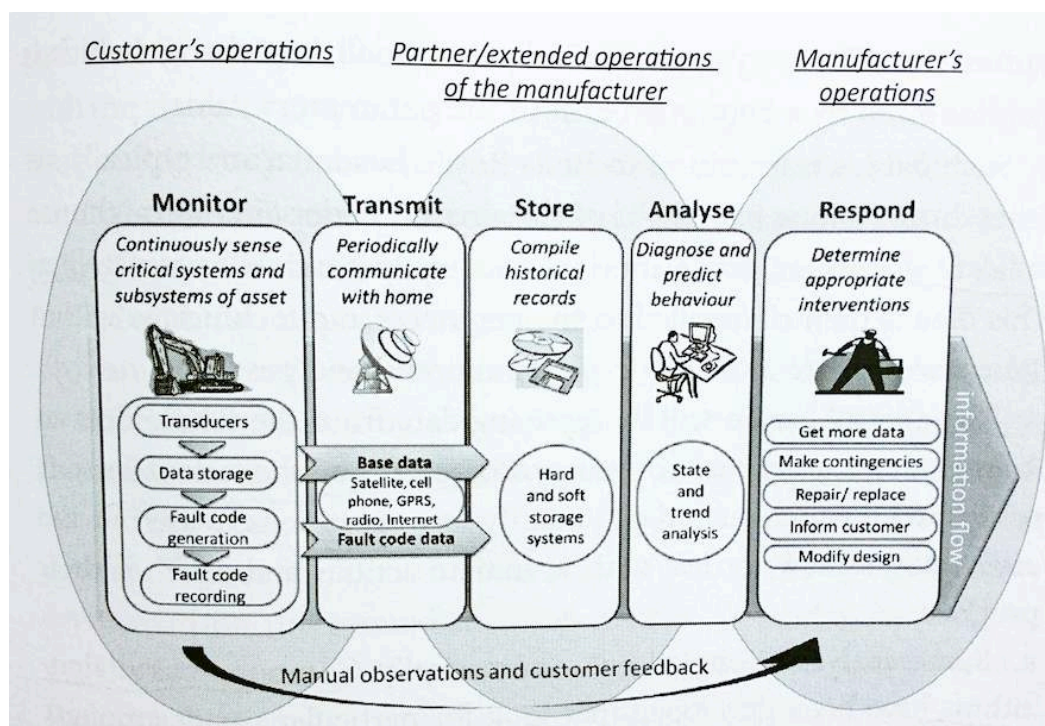


Figure 2-7: Common architecture for ICT

Source: Baines and Lightfoot, 2013, p.171.

The architecture is grouped into five functions.

(1) *Monitor*

Monitoring is fundamentally related with the sensing of critical systems of the products and capturing data from transducers located in it. Advanced services frequently require a wide portfolio of additional data, so other equipment like GPS is important to supplement the data. The data captured is commonly fed into a localized microprocessor to generate and store fault codes.

(2) *Transmit*

In the stage, two forms of data are transmitted: raw base data and fault code data generated by the on-board microprocessor.

(3) *Store*

Store is related with maintaining records of the transmitted data in hard and soft storage systems.

(4) *Analyze*

Analysis is processed in terms of diagnostics and prognostics, identifying the current and likely future condition of a product. It deals with translating various data into valuable information. Some analysis is carried out automatically. Computer-based algorithms can analyze particular trends among the data and compare it with symptoms of failure. Signals of alert are sent as matches occur.

(5) *Respond*

Based on the analysis information, the manufacturer can deliver advanced services on product performance, availability and reliability to the customer, such as optimizing advice, proactive maintenance and replacement of components.

The above ICTs capabilities involve the operations of the manufacturer, customer and other partners. Data capture takes place within the operations of the customers; the manufacturer usually processes in-depth data analysis; the transmission and the techniques for in-depth analysis may be provided by partners of the manufacturer.

2.4 Summary: The dilemma of servitization and the gap in research

In this section, we will summarize our findings from the literature reviewed. As the literature argues, the servitization of manufacturing is a competitive differentiation strategy, which is developed based on core competencies to provide extended services for customers throughout the entire product lifecycle. However, a servitization for manufacturers' dilemmas exists.

First, service is a must. All manufacturers offer various services for their customers (Baines and Lightfoot, 2013).

Second, service is high cost. This statement applies not only to manufacturers but exists for all service businesses. For example, if one eats a bowl of noodles at a five-star hotel, one must pay much more than the cost of the noodles itself because of the special service. In fact, for the manufacturers, the material cost of products represents only a small portion of all expenses. The remainder is used to organise all kinds of services, which range from production-related activities, such as research, product

design, logistics, planning, and maintenance, to the back office support services that exist at all companies such as accounting, financing, and personnel functions (Mont, 2002). Neely and his colleagues (2011) claimed the comparative data highlights the servitization paradox. More combined manufacturing and services firms went bankrupt than pure manufacturing firms while some servitized firms are extremely successful both in terms of profitability and market valuation. The finding helps manufacturers think what changes are fundamental. Moreover, the servitization of manufacturing is clearly influenced by local economic circumstances, which forms of services can be categories in terms of installation and implementation services, consulting services, financial services, outsourcing and operating services, and the like (Neely, 2007). The manufacturers may be concerned with pricing, absorbing risks, and organisational transformation, which require time and money to facilitate (Baines et al., 2007).

Third, although service is expensive, when manufacturers provide the expensive service to customers, in many cases, their customers do not like it at all. Baines et al. (2009) argued that there is a huge difference between product and service design. “Most product manufacturers were confronted with the following phenomenon: extended service business leads to increased service offerings and higher costs but not to correspondingly higher returns” [Gebauer et al., (2005), p.24]. Abstract demands are often difficult to translate into concrete (quality performance) indicators, which makes it difficult for the providers to determine what they must supply and difficult for the customers to know whether they have obtained what they requested (Tukker, 2004). What is riskier is that services do not last, cannot be stored and disappear instantly, as opposed to products (Edvardsson et al., 2005). Manufacturers’ decisions to develop new services when their customers would not need these services become a disaster for the transition. IBM’s consulting service, for instance, is superb. Moreover, IBM also has competitive hardware products and software, such as mainframe servers, storage products and business intelligence software. IBM is able to combine these three core businesses into total solutions, such as smart city and smart planet. This combination sounds very attractive; however, IBM is increasingly complying with their customers’ demand for mobile applications, in addition to selling its personal computers and PC servers. As more customers have their computing done cheaply in the cloud, IBM is selling less hardware, which imperils its software and consulting services (Summers, 2014).

Some academic research has argued the use of value co-creation to solve the above problem. However, two crucial questions are easily ignored. Are customers willing to

accept the invitation from manufacturers to co-create value? Additionally, if so, how can these customers participate in the process? First, customers are external to companies, and the value-added interaction is very limited. Although companies could utilize many methods to involve customers, such as interviews and conferences, as well as inviting customers to work at their offices to participate in the early stage of designing a new product or service, the co-created result is narrowed for a small number of customers. The second adverse factor is that customers' creativity and inspiration are discounted when the so-called value co-creation is gathered in a specific place and during a limited time span.

Table 2-8: Research issues arising from literature review

Features	The Phases of Servitization		
	1st Phase	2nd Phase	Next Phase
	Product-Related services	Product Service-System	
Role of Product	Full offering	Key offering	?
Value	Product function	Manufacturer-based solution	
Value Creator	Manufacturer		
Core Capacity	Product function, cost and brand	Expert in the field of customer business	
Risk	Commodity trap	Service cost-effectiveness	
Limitations & Opportunities	1.Human Factor: Customers are out of value creation;		
	2.Technology Factor: The research on the effect of new IT (IoTs, M2M etc.) mainly focuses on the interaction with machines customers buy, little on the interaction with customers.		
			(New opportunities emerge through overcoming the limitations)

Undoubtedly, compared with solely providing product-related services around products, PSS is a more competitive strategy if manufacturers can implement it

successfully. For the customer, PSS is expected to provide value through more customization and higher quality (Baines et al., 2007). However, as with the first phase of servitization, customers are still out of the value creation process. Manufacturers design a PSS based on their own research and assume it will fulfill their customers' needs. PSS remains a manufacturer-based solution from the customer perspective. The contrast is depicted in table 2-8.

Prahalad and Ramaswamy (2000) asserted that customers are not willing to accept experiences that are fabricated by manufacturers. Increasingly, customers want to shape these experiences themselves or in tandem with other customers. To design effective services, early involvement with the customer is essential for manufacturers; this enables them to achieve a solution that responds to customer wants and needs (Baines et al., 2009). Customer orientation, acknowledged as a key success factor in servitization, is an increasing trend among industrial business; it results in the transformation of manufacturers' service offering and customer interaction (Baines and Lightfoot, 2013; Oliva and Kallenberg, 2013). However, the servitization literature lacks empirical insight into value co-creation that would enhance servitization of an industrial company.

Mobile information technology brings a promising solution to the dilemma of servitization and value co-creation. As Shelton (2013) discussed, social gives people the network to engage with; mobile makes it possible to engage whenever and wherever-which in practice means everywhere and all the time. Social media and social networks are building platforms that can change the way we create-sometimes called social production, or more commonly co-creation. It is when you add a purpose, an objective, to social interactions that a real transformation results.

The external environment has changed. The business model has been transformed from division to distribution, the manufacturing model is from mass manufacture to mass customization, and consumption pattern has been disrupted from product economy to experience economy.

Hence, we start our journey to explore how the leading manufacturer integrates the emerging concepts "value co-creation", "customer knowledge" and "mobile information technology" with its business operation, and opens a brand new avenue for servitization research.

Chaper 3 Research Methodology and Implementation

The chapter focuses on the design of qualitative research and its implementation. Qualitative research is comprised of three major components: data collected from various sources, procedures to interpret and organize the data, and written or verbal report of finding (Strauss and Corbin, 1998). The research collects data through interviews and employs the grounded theory method to code and analyze the data for the findings.

3.1 Research Design

The aim of the research is to clarify the interactive infrastructure with customers for turning information technology into service value to drive servitization of manufacturing. The research aims to solve two critical issues. First, most research focuses on how manufacturers conduct corporate transformation and business process re-engineering to adapt the service design and delivery distinction. However, once manufacturers complete the transformation, their added services remain firm-based solutions. Customers primarily await the delivery of the offerings; in addition, their tacit needs are difficult to satisfy. Second, certain scholars have claimed that utilizing value co-creation can solve the above problem. However, are customers willing to accept the invitation to create value in combination with manufacturers? How can customers participate in the process?

As Marshall and Rossman (2014) claimed, research is a process of trying to gain a better understanding of human interactions in social or applied fields. Through systematic means, the researcher gathers information about actions and interactions, reflects on their meaning, arrives at and evaluates conclusions, and eventually puts forward an interpretation (p.15). Researchers working in the field of social science and interested in studying human behavior found increasing difficulty when trying to explain human behavior in quantifiable, measurable terms (Hancock et al., 1998; Williamson, 2002). Qualitative research focuses on how people or groups of people can have (somewhat) different ways of looking at reality (Hancock et al, 1998). Qualitative research interviews aim to elicit participants' views on their experience and feelings and address questions concerned with developing an understanding of the meaning and experience dimensions of social world (Fossey et al, 2002; Williamson, 2002).

Grounded theory, introduced by (Glaser and Strauss, 1967), is a method of deriving theory from data, systematically collected and analyzed through the logic research progress. The procedures of grounded theory are designed to develop a well-

integrated set of concepts that provide a thorough theoretical explanation of social phenomena under study (Corbin & Strauss, 1990). In this method, data collection, analysis, and eventual theory stand in close relationship to one another. Strauss and Corbin (1998) pointed out the following characteristics contributed are very helpful to understand the method.

- (a) The need to get out into the field to discover what is really going on;
- (b) The relevance of theory, grounded in data, to the development of a discipline and as a basis for social action;
- (c) The complexity and variability of phenomena and of human action;
- (d) The belief that persons are actors who take an active role in responding to problematic situations;
- (e) The realization that persons act on the basis of meaning;
- (f) The understanding that meaning is defined and redefined through interaction;
- (g) A sensitivity to the evolving and unfolding nature of events;
- (h) An awareness of the interrelationships among conditions, action and consequences (p. 9-10).

The research aims to build the infrastructure model of customer interaction for turning information technology into service value to drive servitization of manufacturing. We conduct the research with a combinative qualitative methodology, collecting data through interviews and following the procedures of grounded theory method to analyze data.

We combine the qualitative research flow and the procedures of grounded theory, respectively defined by Williamson in 2002 and Glaser & Strauss in 1967, to form the research flow employed in the paper (figure 3-1).

3.1.1 Grounded Theory

Strauss and Corbin (1998) define Grounded Theory as a research approach by which theory is derived from data, systematically organized and analyzed through the research process. In the method, a researcher does not begin a study with a preconceived theory in mind. Instead, the research begins with an area of study and gets the theory from the data. Data collection, analysis, and the final theory stand in close relationship to one another. The findings are extracted from data to offer insight, enhance understanding, and provide a meaningful guide to action (Mays & Pope, 1995; Strauss, 1987).

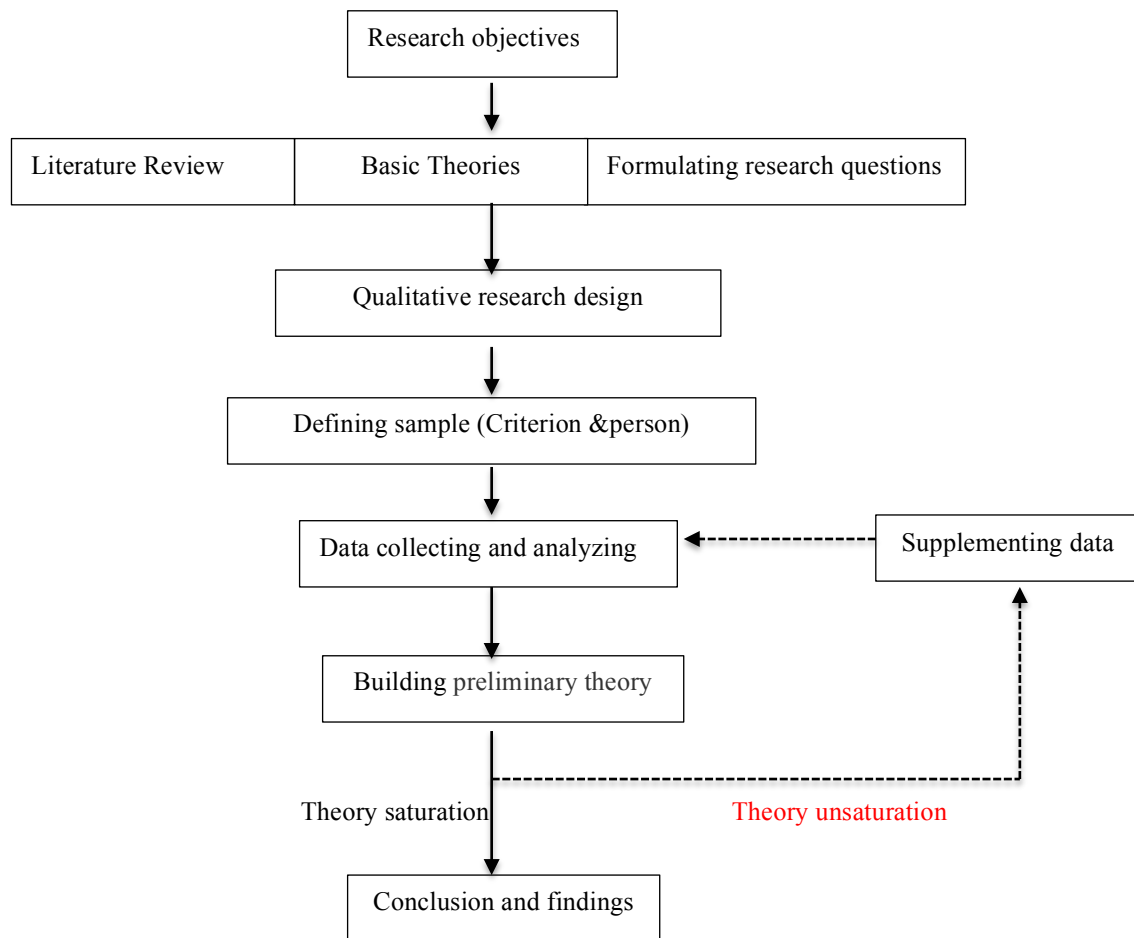


Figure 3-1: Combinative research flow chart

Strauss and Corbin (1990) conceived data “are inductively derived from the study of the phenomenon it represented and are verified through systematic data collection and analysis of the data” (p. 23). The main feature is the development of new theory through the collection and analysis of data about a topic. It is phenomenological but it goes beyond phenomenology because the explanations around the topic are used to develop new theories. One characteristic of grounded theory is the reciprocal relationship between data collection and data analysis. Data analysis do not be started only if data collection is completed, but the two jobs are supposed to go on at the same time, which means collection leading to analysis and analysis leading to further data collection.

The constant comparative process, which is seen as the essence of grounded theory, presents this reciprocal relationship between data collection and analysis (Glaser & Strauss, 1967; Strauss, 1987). Strauss and Corbin (1990) emphasized a researcher

who employs grounded theory does not begin with a theory and then prove it. Rather, it is a procedure for analyzing data and a means for generating theory. In the process, concepts, categories, and propositions—three basic elements are used to build a rigorous and logic structure.

- **Concepts**

Corbin and Strauss (1990, p. 7) describe “conceptualization of data” as follows:

Theories can’t be built with actual incidents or activities as observed or reported; that is, from “raw data”. The incidents, events, happenings are taken as, or analyzed as, potential indicators of phenomena, which are thereby given conceptual labels. If a respondent says to the researcher, “Each day I spread my activities over the morning, resting between shaving and bathing,” then the researcher might label this phenomenon as “pacing.” As the researcher encounters other incidents, and when after comparison to the first, they appear, to resemble the same phenomena, then these, too, can be labeled as “pacing.” Only by comparing incidents and naming like phenomena with the same term can the theorist accumulate the basic units for theory.

- **Categories**

Corbin and Strauss (1990, p. 7) describe “categories” as follows:

Categories are higher in level and more abstract than the concepts they represent. They are generated through the same analytic process of making comparisons to highlight similarities and differences that are used to produce lower level concepts. Categories are the “cornerstones” of developing theory. They provide the means by which the theory can be integrated. We can show how the grouping of concepts forms categories by continuing with the example presented above. In addition to the concept of “pacing,” the analyst might generate the concepts of “self-medicating,” “resting,” and “watching one’s diet.” While coding, the analyst may note that, although these concepts are different in form, they seem to represent activities directed toward a similar process: keeping an illness under control. They could be grouped under a more abstract heading, the category: “Self Strategies for Controlling Illness”.

- **Propositions**

Propositions indicate generalized relationships between a category and its concepts and between different categories (Pandit, 1996).

3.1.2 Interview

Corbin and Strauss (1990) suggested the data for a grounded theory can come from various sources as in other qualitative approaches. The data collection procedures

involve interviews and observations as well as such other sources as public documents, videotapes, newspapers, and books--anything that may shed light on questions under study.

Bogdan & Biklen (1992) claimed that an interview is a purposeful communication used to produce rich, descriptive data about how interviewees interpret the phenomena in their context and reveal the meanings that they have for things and people. Interviews are particularly useful for getting the story behind an interviewee's experiences. The interviewer can dig in-depth information around the topic. Interviews may be useful as follow-up to certain respondents to further investigate their responses (McNamara,1999). Qualitative researchers usually employ "semi-structured" interviews to collect data. Semi-structured interviews are used to facilitate in-depth exploration around a specific topic, using an interview guide. Interview guides usually contain a list of questions designed to guide the interview in a focused, yet flexible manner (Fossey et al., 2002).

The interview is conducted with a number of open-ended questions around the topic areas that the researcher focuses on. The open-ended nature of the questions defines the topic under interview but provides opportunities for both interviewer and interviewee to make discussion go smoothly and seek for more detail information. If the interviewee has difficulty answering a question or provides only a little information, the interviewer can use the contextual information to encourage the interviewee to consider the question further (Hancock et al., 1998; Mays and Pope, 1995). Fossey and his colleagues (2002) argued this approach to data collection is advantageous in ensuring sensitivity to interviewees' language and privileging their knowledge.

▪ **Preparation for Interview**

McNamara (2009) applies eight principles to preparing for an interviewing which includes the following ingredients:

- (1) Choose a setting with little distraction;
- (2) Explain the purpose of the interview;
- (3) Address terms of confidentiality;
- (4) Explain the format of the interview;
- (5) Indicate how long the interview usually takes;
- (6) Tell them how to get in touch with you later if they want to;

(7) Ask them if they have any questions before you get started with the interview;

(8) Don't count on your memory to recall their answers.

Following the above suggestions, we conducted a successful interview at Haier group.

First, the interview was held in a quiet meeting room of Haier headquarters without any disturbance. At the beginning of interview, we explained our purpose carefully but tried not to give any hint about what kinds of answer we wanted and not to lead the conversation.

Then we promise the confidentiality in written form and get their approval: "Data getting from the interview are only for use in journal papers and writing dissertation. Personal information (name, address, email address etc.) will never appear on any of public websites or journals. We sincerely appreciate your real ideas for these questions."

In order to avoid ignoring any detail, we got the permission from them and recorded all the interviews.

▪ **Procedure of the Interview**

Valenzuela and Shrivastava (2002) suggested the following points conducting an interview smoothly.

- (1) Occasionally verify the tape recorder is working;
- (2) Ask one question at a time;
- (3) Attempt to remain as neutral as possible;
- (4) Encourage responses;
- (5) Be careful about the appearance when note taking;
- (6) Provide transition between major topics;
- (7) Don't lose control of the interview;

3.2 Attributes of data sources

Owing to its business model of interactive innovation with customers, the research data is mainly collected from Haier Group (Haier), the world's largest home appliance manufacturers.

Besides the primary data getting from the interview, we also collect a great amount of secondary data from media coverage, books, and third-party data to verify the self-consistency of primary data.

3.2.1 Why selecting Haier as the case company?

While we focused on thinking about the above issues on servitization research, Haier, the world's biggest home appliance manufacturer, came into our sight. The firm sees customer interaction as the critical strategy of corporate development. It even formulates the creed "No interaction, no Haier". We think these characteristics are pretty suitable to developing the servitization research from the perspective of customer interaction: Haier is well known for the abilities of understanding consumer needs precisely and innovating rapidly to meet these needs; it regards customer interaction as the premise of innovation, otherwise, neither incremental innovation nor disruptive innovation can ensure its customer value; it interacts with one million fans on average per day, committed to change the situation of 'guessing customer needs' and instead listen to their voices carefully before production.

Haier has achieved a periodical success in driving innovation to create more value through encouraging entrepreneurial spirit to focus on customer interaction. In 2015, Haier achieved a global turnover of 188.7 billion yuan with a compound growth rate of 6% over the past decade, and a total profit of 18 billion yuan with a 20% year-on-year growth rate and 30% compound growth rate over the past decade, 5 times that in revenue. Haier is well known for the abilities of understanding consumer needs precisely and innovating rapidly to meet these needs. In 2015, Haier interacts with one million fans on average per day. It comes up with over 200 originalities. Many products, such as "Jhukna Mat" refrigerator in India, Adiabatic icebox without power more than 100 hours in Pakistan, and Handheld washing machine "Coton", came from the interaction with customers. By the end of 2015, Haier's platforms have attracted over 4,700 first-rate external resources, 3 billion yuan of VC fund, 1,330 VC institutions and 103 incubators, setting the stage for 1,160 projects. Over 3,800 node microenterprises and nearly one million microstores on Haier's platforms are socializing their capital and human resources. More than 100 microenterprises boast annual revenue of over 100 million yuan, and 24 have introduced VC, and 12 are valued at over 100 million yuan. Due to Haier's transformation through decentralization, disintermediation and removing the "insulated wall", the employees have decreased 45% from the highest, but Haier's platforms have offered over 1.3

million jobs for the whole society⁴.

Haier's business model shows the value of a person and gets respected in return. As a result, it is warmly received by staff members from Japan, America and Europe and recognized by the famous scholars in the world (Appendix 13).

Don Tapscott – Economist and business strategy master, “the father of digital economy”

“Haier will transform from a manufacturer of the old industrial age to a leader of new business model because Haier is lucky to have a great leader. Mr. Zhang Ruimin is one of the greatest leaders of our age.”

Bill Fischer – Professor of innovation management, IMD

“The innovation advanced by Haier focuses more on the challenge of people, which is quite unconventional. In a conventional organization the employee does what the manager orders without any excitement; while in the innovative organization of Haier the employee is constantly challenged, feeling continuous excitement.”

Marshall W. Meyer – Professor of Wharton School, University of Pennsylvania

“Haier's management model is very innovative. It has surpassed the traditional management theories and is creating the theories of management for the next generation.”

Andrew H. Van de Ven- Professor of Carlson School of Management, University of Minnesota

“I fully support and highly praise Haier's management practices on its way of creating innovative organizations. Haier has become an international role model in terms of encouraging organizational innovation and expressing entrepreneurial spirit.”

3.2.2 The profile of Haier Group

Haier group was founded in 1984 in Qingdao, China. It focuses on home appliances and consumer electronics brands worldwide. In 2015, Haier achieved a global turnover of 188.7 billion yuan with a compound growth rate of 6% over the past decade, and a total profit of 18 billion yuan with a 20% year-on-year growth rate and 30% compound growth rate over the past decade, 5 times that in revenue. Haier dedicates on designing smart, user-friendly home products for the company vision.

⁴ Hair's corporate strategy - The authorization document gotten from Haier (similarly hereinafter).

Based on the insight of growing IoT market, Haier is one of the earliest Chinese companies to get in the Smart Home industry with its original niche background.

(1) The world’s number one Major Appliances Brand

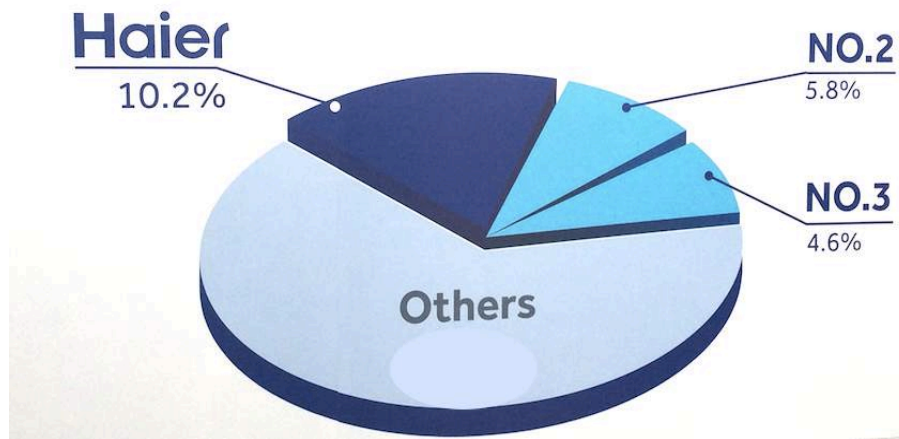


Figure 3-2: The world’s number one Major Appliances Brand⁵

Haier is the world’s number one Major Appliances Brand for sixth consecutive years (Figure 4-1). Its global headquarters are based in the Chinese city of Qingdao and regional headquarters in both Paris and New York to serve its clients in Europe and America. Haier has 5 R&D centers in the United States, Europe, Japan, Australia and China, 66 trading companies and 21 industrial parks worldwide.

(2) Haier’s Core Values: Customers always right

Haier’s Vision: Supplier of better life solution in the Internet Age

Haier’s Mission: Through its perseverant pursuit of innovation and the creative win-win model of individual-goal combination, Haier commits to becoming a leader in the global household appliance industry, a leader in integrating end-to-end user experience driven by virtual-physical networks and build a world-class brand of the Internet Age.

Haier’s Core Values:

On right and wrong: The customer is always right and we should always be self-critical (Haier’s motivation to create more customers)

On growth: Entrepreneurship and innovation (Haier’s cultural DNA)

On rewards: Individual-Goal combination (Haier’s cornerstone of sustainable operation)

⁵ Euromonitor International Limited; retail volume sales in units based on 2014 data.

(3) Home products and brands

Haier provides products including air conditioners, mobile phones, computers, microwave ovens, washing machines, refrigerators, and televisions etc. It has the following product brands.

Haier

Looking at the world as an interconnected whole where value increasingly comes from integrated solutions, rather than individual products or services. The principle of “360°” thinking, understanding the consumer drivers, decisions and uses of products and services through their entire life-cycle, rather than just at the point-of-sale.



GE APPLIANCES From self-cleaning ranges to ice and water dispensers, to speedcook ovens and refrigerators that make coffee, GE Appliances has electrified and modernized life for more than 125 years. In June 2016, GE Appliances officially became one family member of Haier.

AQUA

In 2006 AQUA was born. Carrying world’s first unique technologies and functions AQUA emerged at the right moment with the principle of “washing machines that cherish water source”. As exemplified by the electrolyzed water cleaning in 2001 and ozone cleaning in 2006, unique technologies were used while the principle of environmental protection remains the same. March 2012, AQUA officially became one family member of Haier.

Casarte

卡萨帝

Casarte is an international premium brand fashioned after Italian elegance, and its core product lines include artistic consumer electric appliances and integrated kitchenware. The line-up of Casarte products cover the following 9 main product types, spanning 39 series and over 380 types of products: refrigerators, cabinets for drinks, air conditioners, washing machines, water heaters, electric kitchenware (exhaust fans, cooking utensils, sterilizing cabinets, baking ovens, steamers, microwave ovens, and dishwashers, etc.), small scale electrical household appliances (coffee machines, toasters, blenders/juicers/hand-mixers, cup warmers and

electric water heaters, etc.), televisions and integrated kitchen cabinets, etc. Products from Casarte have already entered nearly one million high-end households.



As a brand for household appliances of Haier Group, the Leader brand provides tailor-made household appliances in the Internet age. Consumers are designers for Leader products, the ones manufactured completely based on consumers' demands.



Fisher & Paykel has been designing cooking products since 1934 and has grown into a global company operating in 50 countries and manufacturing in New Zealand, China, Thailand, Mexico, and Italy. In January 2016, Fisher & Paykel officially became one family member of Haier.

3.2.3 Attributes of interviewees

Among the seven interviewees, five of them are in charge of customer interaction in different divisions; one of the rest is responsible for the development of entrepreneurs projects which start from the customer interaction, another is the coordinator from the enterprise culture center of Haier group who gave us a big picture of Haier's business. All names of interviews have been coded in order to respect and protect privacy. The detailed information of interviewees is listed in table 3-1.

Table 3-1: The information of interviewees

No.	Code of Interviewees	Position of Interviewees	Main Responsibility
1	A.LX	The cofounder of Haier's ThundeRobot laptop company	As one of the three cofounders, he is mainly responsible for conducting high-quality interaction with customers
2	B.SR	User interaction director	In charge of user interaction in the refrigerator field
3	C.KW	User interaction director	In charge of user interaction in the air conditioner field
4	D.CG	Interactive director of operation	Interactive director of operation
5	E.PY	Creative director	In charge of user interaction at innovation resource center
6	F.LD	Minister of youth	Supporting the development of young entrepreneurs
7	G.TP	Coordinator	Research coordinator at enterprise culture center of Haier group

In order to catch the ideas directly from customer, we additionally interviewed two active users with screen names of“枕海听涛”and “sobershell” on Haier’s “zhongchuanghui” platform, which is a user interactive customization platform as the front end of Hair interconnected factories.

3.3 Data Collection

3.3.1 The types of primary data

We collected the data from Haier by interview, memos, annual internal meeting reports and documents (Confidential-content-cut version), management files, pictures, videos and annual reports.

3.3.2 The implementation of Interview

We conduct the interview on Haier Group with in-depth interviews through the following four steps (Table 3-2).

Step 1: Preparations for interview

Haier is a big multinational corporate group. The managers are willing to discuss with us carefully while they are busy with business work. Hence, before the formal interview, we make enough communication for a compact interview.

We connected with the coordinator supporting industry-research cooperation and got the authorization to employ Haier as a case-study company and its non-confidential business data. Especially, I asked the coordinator for arranging the ideal interviewees I expected to interview. After that, we made the interview plan together and I sent the interview questions to them in advance.

Table 3-2: The steps of data collection at Haier Group

No.	Steps	Date	Main Purposes	Tools of Communication
Step 1	Preparations for interview	11/7/2015 ~ 2/27/2016	1. Getting the authorization 2. Asking for arranging the ideal interviewees 3. Sending semi-structured questions and making a feasible plan together	E-Mail Telephone Wechat ⁶
Step 2	Formal interview	2/29/2016 ~ 3/3/2016	1. Face to face interview for vivid non-public data 2. Building good personal friendship and keeping connection for further discussion	Interview
Step3	On-site data collection	3/3/2016	1. Asking for authorized document 2. Visiting headquarters offices of Haier Group 3. Visiting the development museum of Haier Group	Discussion Visit
Step 4	Repeatedly discussing during writing the dissertation	3/5/2016 ~	1. Discussing on unclear questions 2. Supplementing more data for theory saturation	Wechat

Step 2: On site interviews

We conducted formal interviews at the meeting room of Haier headquarter. Each interview lasted for two hours or so. Under the approval of interviewees, the content of interview was all recorded.

Besides the formal interviews at office, the author was welcomed and treated by them in Haier's headquarters restaurant. It was also a valuable opportunity to learn interesting information in a casual atmosphere, such as the episodes when they held parties with fans.

⁶ Wechat: the most popular SNS tool in China, like Facebook. It also has the payment function, which can be used even in many departments in the world, including Japan.

The formal interviews and informal get-together meal ensured integral and vivid information about the strategy and activities of customer interaction. It also brought us the opportunity to build personal friendship with them, so we can keep connection with them and ask for information when we need.

Step 3: On-site data collection

When completing the formal interviews, at the last day we asked for the authorized official documents about Haier, such as Haier strategy, corporate culture, organizational structure, strategy and stories of user interaction.

With the special introduction, we visited its headquarter and museum. At its headquarter, we felt its determination and direction of customer interaction based reform through the slogan hung in the building. At Haier museum, we saw the precious materials in the development history of Haier, such as the management rule in 1984 that regulated it was not permitted to pee at workshop (Its picture was illustrated in appendix 2). The two visiting activities enriched our cognition about Haier's current reform. We were allowed to take pictures (130⁺) in the process, some of which are illustrated in the appendix.

Step 4: Repeatedly discussing during writing the dissertation

Facing confusing questions when writing the dissertation, we discussed repeatedly with A.LX, B.SR, E.PY and F.LD via SNS Wechat to get supplementary data for our findings.

Additionally, in the final phase of writing the dissertation, in order to understand the motivation of customer engagement, we made audio interviews with two active users on Haier's platform, respectively on December 16th and 22th, 2016.

3.4 Data Analysis

3.4.1 The principle of analysis

As Cho and Lee (2014) suggested, data collection and analysis are parallel in grounded theory, and the procedure is neither linear nor sequential. The researcher begins to analyze data with as few predetermined ideas as possible. Although the concepts and theories in extant literature, and prior knowledge and experience of the researcher, can also be used to inform the development of categories, the categories should not be forced to fit them. The amount of data for analysis is based not on availability but on saturation.

According to Strauss and Corbin (1998), the defining characteristics of grounded theory include critical analysis, conceptual abstraction, openness to emerging ideas,

and reliance on empirical. “Sometimes, one has to use common sense and not get caught up in worrying about what is the right or wrong way. The important thing is to trust oneself and the process. Students should stay within the general guidelines ... and use the procedures and techniques flexibly according to their abilities and the realities of their studies.” (P.295)

Charmaz (2006) argued the coding process with different ways, which could help us to understand and employ the method. In coding process, initial coding is similar to open coding, during which the researcher develops categories of information. Focused coding is a process designed to narrow initial codes down to frequent and important codes. Theoretical coding, a process used to find relationships between codes and categories, has the potential to result in a theory.

The main feature of grounded theory is getting grounding theory from data, but creativity of research also is an essential ingredient. Qualitative evaluation inquiry has the characteristics of both the science and the art, drawing on both critical and creative thinking (Patton, 1990; Sandelowski, 1995; Strauss and Corbin, 1998). Patton (1990) suggested a list of useful behaviors for promoting creative thinking in qualitative research (pp.434-435):

- (1) Being open to multiple possibilities;
- (2) Generating a list of options;
- (3) Exploring various possibilities before choosing any one;
- (4) Making use of multiple avenues of expression such as art, music, and metaphors to stimulate thinking;
- (5) Using nonlinear forms of thinking such as going back and forth and circumventing around a subject to get a fresh perspective;
- (6) Diverging from one’s usual ways of thinking and working, again to get a fresh perspective;
- (7) Trusting the process and not holding back;
- (8) Not taking shortcuts but rather putting energy and effort into the work;
- (9) Having fun while doing it.

In this research, we employ the combinative approach of programmatic ground theory and constructivist ground theory. That means, we understand the significance of the logic procedures defined by Strauss and Corbin (1998), but in the meantime, we take advantage of co-constructive approach suggested by constructivist grounded theory.

3.4.2 The assistive tools for data analysis

In order to make the analysis process proceed logically and clearly, we utilize the qualitative analysis tool of MAXQDA software to deal with the data. We select qualitative data analysis software MAXQDA as the data analysis tool to analyze the transcribed text. All the text will be imported into the software. Data interpretation and evaluation are done by sorting materials into labels, concepts, and categories and using a hierarchical coding system to analyze. It defines variables, provide tabular overviews and assign colors and weights to text segments. Furthermore, every step of the process is easily tracked, and results are accessed with just a few clicks. The data is coded repeatedly with trial and error until it logically presents the saturation theories.

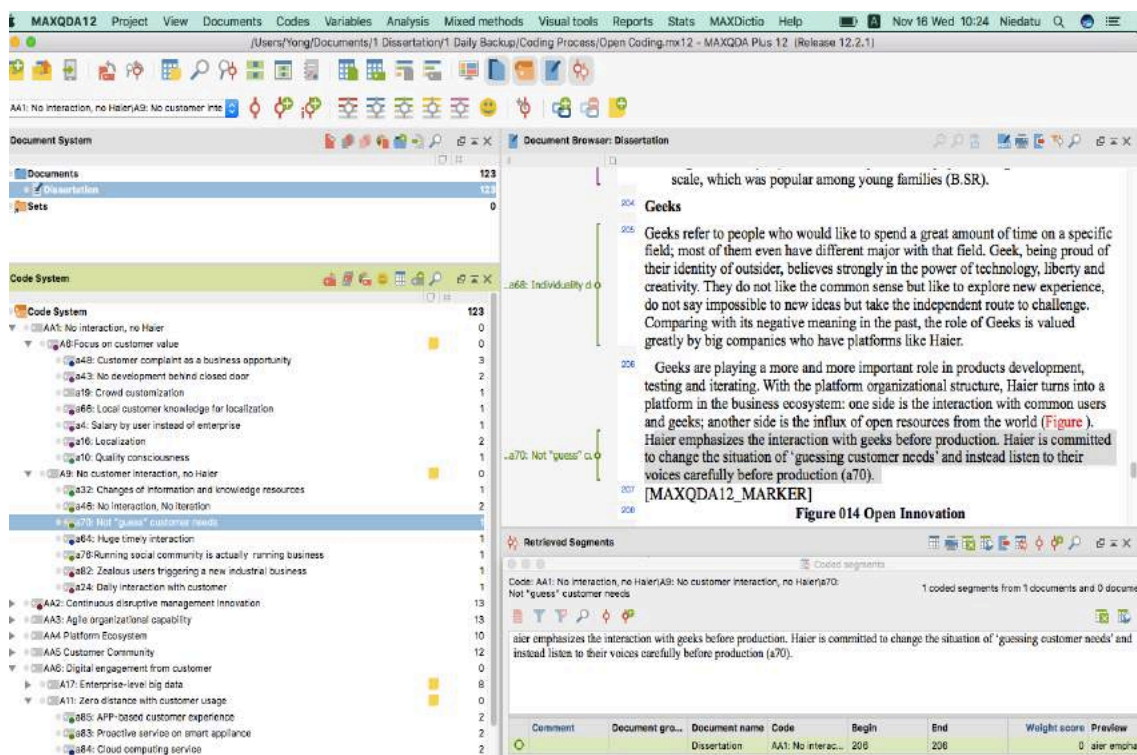


Figure 3-3: The integration of label, concept, and category with data in MAXQDA

Chaper 4 Narrative Analysis and Discussion

4.1 Introduction

In this chapter, narrative analysis and findings of the study are present. The empirical findings of the current investigation are based on interviews at Haier Group. Any data related to customer interaction is collected until the data with similar meaning repeatedly appears to show the related data is saturated. We present how the corporate accelerates its servitization strategy by upgrading customer engagement.

4.2 Building an agile organization for upgrading customer interaction

Start with openness and willingness to be wrong, which helps firms learn from failure timely rather than being afraid to fail (Shetlon, 2013). Haier states the same belief in its core values, the customer is always right and Haier should always be self-critical. It is the basic motivation for Haier to create more customers (a1)⁷.

4.2.1 Why a manufacturer transformed to a platform of incubating entrepreneurs

When it decided to make the latest innovation in corporate strategy in 2012, Haier had retained its place as the world's No.1 Major Appliances brand with an 8.6% retail volume share⁸. Even holding such a big strength in the marketing, Haier still decides to disrupt itself again because they thought Haier would be full of the below risks soon if no innovative strategy were adopted (a2).

- **Slow-moving and cumbersome response to customer needs in mass manufacturing**

The process of traditional manufacturing includes market research, solution verification, prototype design, new product introduction and mass manufacturing etc. The whole process is irreversible. Facing the diverse needs in the Internet era, this manufacturing model becomes cumbersome. With the power of big data and strong interaction between people, it becomes possible to realize the timely integration between demand and supply. Manufacturing in the Internet era is iterative. All stakeholders can get together to make changes and improvements continuously.

Haier still has many advantages such as technology innovation and corporate brand. But the most valuable one is the different view on customer value. We have been considering how to know customers' ideas timely and meet their

⁷ (a1) and the subsequent (a2), (a3).....(a91), are the labels of data, labeling for the next chapter of data coding.

⁸ Euromonitor International Limited; retail volume sales in units based on 2012 data.

diverse and easily changing needs quickly (a3) (F.LD).

- **The enthusiasm and passion of employees in large enterprise**

In the traditional large organization, the terrible things were that employees worked responsibly for their boss and no one considered for their customers⁹.

To inspire employees, Haier is transforming its staff from employees and passive performers to entrepreneurs and dynamic partners. Any employee who has the ability to meet customers' unsatisfied needs, can organize a team or even a registered company with the support of Haier's platform. With the transformation, employees are active to meet the individualized needs of users by means of community featuring ecosystems with the best experience. In its compensation mechanism, "pay by users" has superseded "pay by the enterprise" (a4), driving employees to become entrepreneurs who create value for users while realizing their own value.

- **IoT era**

Innovation-driven enterprise always prepares well for catching the new development chance from a new information technology. Haier, as the world leading home appliance company in the world, has hundreds million of users in over 100 countries. Haier thinks over the relationship with users and is committed to filling the gap existing in the situation. Haier could not meet its customers, so did among the customers, because in the past it just sold its products to customers through one-way transaction (a5). Now it has the ability to change the situation. It can know their customers timely by smart products with sensors and intelligent chips. Moreover, customers can take part in the product design as early as they are willing. Haier endeavors to realize zero distance with its customer and involves them in the whole process of production from product design to interconnected manufacturing.

We think each user exists in a unique way. We can find the new chance and the new knowledge from users by focusing on their timely experience (C.KW).

- **China has not advantage on manufacturing factors**

The CEO of Haier thought there is no obvious advantage to the manufacturing in China from the comparative business data (a6). When Haier built the first factory in South Carolina of America in 1999, the salary of a worker there was 20 times as much as that in China, but now the multiple has declined to 4 times. Meanwhile, the fuel cost in China is twice that in America, and toll fee is 18 times. Facing the Industry 4.0 in Germany and the Advanced Manufacturing in America, Haier has to find the

⁹ The interview on CEO of Haier by Xinhuanet on May 28 2015

innovative way for competitiveness¹⁰.

4.2.2 Developing corporate strategy towards a closer relationship with customers

Haier is transforming from an enterprise that manufactures household appliances to a platform that incubates entrepreneurs for the whole society. In the Internet age, Haier aims to become a Networked Enterprise that can overturn its self-contained enclosed system and can connect various resources. In the past, leaders of enterprise and departments made all the decisions, but now Haier pursues each of its employees has to think of these basic questions: who are Haier's customers? Where are they? What do they demand? If there is not a platform to support the work, it is difficult to find the answers. So Haier advocates the belief of "no platform, no Haier". It builds platform structure to support employees to interact with users effectively.

"There are no successful enterprises, only enterprises that adapt to the pace of times" is a sentence often referred by Chairman and CEO of Haier Group, and has become a landmark for leading innovation and development of Haier (a7). There should be a team inside a company with the mission to destroy the company (Shetlon, 2013). The only immutability of Haier is constantly changing to stamp on the correct era beat. Until now, Haier has gone through the following four development stages (Figure 4-2). The greater thing is that Haier innovated its management system in each stage in order to achieve its strategic objectives. These innovative management theories and tools are still being studied and utilized by many other Chinese companies. Harvard University and European famous universities have adopted some of them as teaching cases.

¹⁰ Hair's News (2015) - The authorization document gotten from Haier (similarly hereinafter).

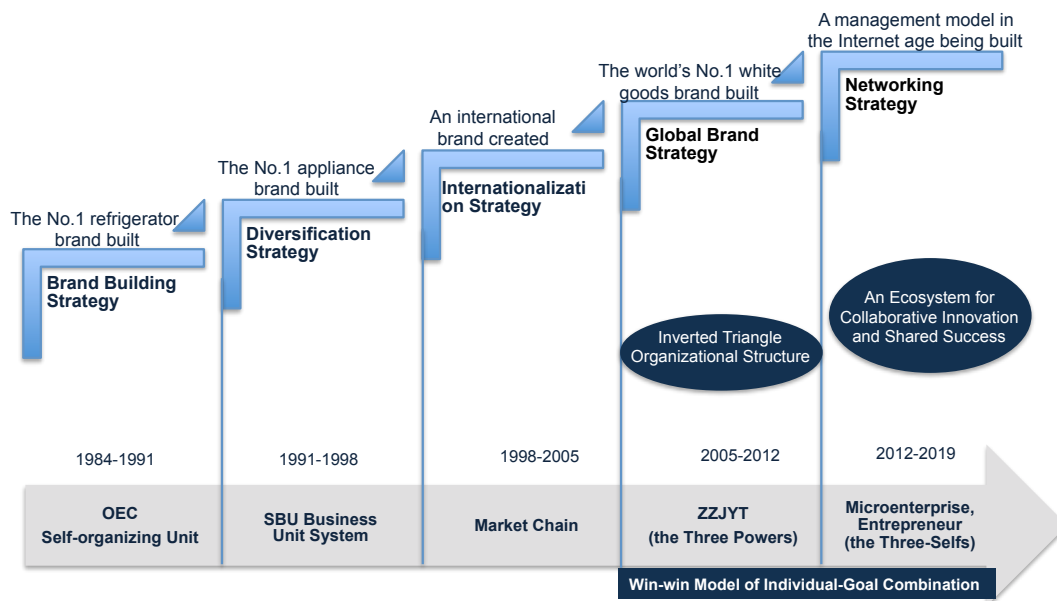


Figure 4-1: Haier Five Development Stages¹¹

▪ **Brand building strategy (1984-1991)**

Haier started with the virtually bankrupt (a8). When CEO Zhang Ruimin took over the Qingdao Factory from government in 1984, Haier had total assets of \$300,000, a net loss of \$178,000 (a huge sum at that time), sales revenues of \$421,000, and 800 workers¹².

At that time, Haier had poor resources and management. The factory was very old, the doors and windows of which were broken and the machinery of which were out of date. Employees took down the wooden window frames and doors to make fires to warm themselves in winter. More badly, some employees peed on the workshop floor.

The management situation was changed gradually by from formatting the unimaginably basic rules example listed as follows (the full version of the first management rules illustrated in Appendix 2)

- ✓ DO NOT pee on the workshop floor (the 10th Management Rule);
- ✓ DO NOT burn cotton yarn or diesel for warmth (the 12th Management Rule);

¹¹ The Post on Haier Headquarters

¹² Hair's History

Besides the above necessary rules, Haier started to innovate its management philosophy from that time. At this stage, it created the famous management method named “OEC” management and control system (Overall; Everyday/Everyone/Everything; Control and Clearance). O stands for Overall; E stands for Everyone, Everyday and Everything; C stands for Control and Clear. OEC means that every employee has to finish on his or her job plan every day before calling it a day and improve on what’s accomplished the previous day (a9).

Even in such an operational difficulty, Haier made quality a priority with a comprehensive quality management system to implement Brand Building Strategy. At that time of China, household appliances were in short supply, which led to many companies striving to expand their scale at the expense of quality. Instead of following this trend blindly, Haier focused on producing high-quality products with “Zero Tolerance of Error ” in mind. Regarding the quality mindset, there happened a famous story that is widely spread even after 30 years. Soon after Zhang Ruimin took the role of general manager, he received a complaint letter about a defective product from a customer. He realized there was no future if there were no high-quality products. He called staff of quality control department down to the warehouse and inspected all the 400 refrigerators in the warehouse one by one (a10). If there was any problem with a product, they pulled it out and labeled the responsible employee’s name. They total found 76 defective refrigerators. In order to change the perception of product quality and improve to the level of “zero tolerance of error”, its CEO lined up those 76 defective refrigerators in the street outside the factory. He picked up a sledgehammer and passed it to the corresponding responsible employee to smash his/her defective refrigerator. The episode expressed a clear strategy: products should be the first rate without defective. Today, the sledgehammer has been collected by China’s National Museum in Beijing. The picture of its copy one kept in Haier Museum is illustrated in Appendix 3.

When finally there was an oversupply in the household appliance market, Haier was already well positioned to win with its differentiated quality and the number one refrigerator brand in Chinese market.

▪ **Diversification strategy (1991-1998)**

After becoming the number one refrigerator brand in China, Haier started to implement diversification strategy and over time acquired altogether eighteen domestic companies at the stage. Haier succeeds in revitalizing these acquired companies by implanting Haier’s corporate culture. The case was defined as "Haier Culture Activating Stunned Fish" by Harvard University and selected into its case

library (a11).

With the extension in scale and business field, Haier continued to innovate its management system. Haier introduced the management approach-Strategic Business Unit (SBU). SBU was one business unit in terms of total organizational goals. Haier had many functional SBUSs such as research and development SBU, marketing SBU and Manufacturing SBU. Each SBU created its revenue by providing the best service to the SBU in the next step downstream. Haier designed a unique financial statement – “SBU Operating Results Checking Statement”. The revenue of each SBU equaled “the price of labor” minus “loss” and plus “the commission of added value”. If a statement showed positive, it meant the SBU did a good job; otherwise, it meant the SBU made a loss and could not get any reward despite the finished results. It pushed each employee to be an independent profit center with the responsibility to make profit. The SBU goal was to transmit the marketing pressure to each employee, instead of limited only to front marketing staff in the past (a12). The working output of each employee is evaluated by his or her internal customers.

Through implement the diversity strategy and management innovation, Haier became the number one home appliance brand in China.

- **Internationalization strategy (1998-2005)**

While China acceded into the WTO at the end of the 1990s, Haier decided to go abroad to build its brand in the world. Hair came up with the “three-step strategy” of “going out, going in and going up” (a13). That was, first made into the niche market of the traditional major household appliance markets like Europe, USA and Japan. Next, entered into the main channels of local markets with localized products to meet local user needs, and ultimately became the market leader of high-end and innovative products.

In order to implement internationalization strategy and improve the efficiency of resources allocation to international market, Haier restructured its organization, shifting from a traditional function structure to a flat and order-centered market-chain structure. Haier created a unique transaction system of market chain between two activities inside the organization (a14). The system was operated on the three rules: claim reward, claim compensation, and switch (Trip). Claim Reward meant each unit got revenue from the following procedure unit. Claim Compensation meant a unit should get compensation from its upper procedure unit if the unit did not perform well. Switch meant if there was neither Reward nor Compensation in a collaborative process (a15). The information system would switch or trip the process automatically

and the situation had to be analyzed to find the business problems.

Haier integrated past functional management departments into three innovative order's support divisions, which are known as 3R processes (R&D, HR and CR), and three basic supportive processes for common orders, which are known as 3T processes (Total budget management, Total facility management, Total quality management). 3T and 3R were all registered as independently working service companies under the control of Haier.

- **Global brand strategy (2005-2012)**

After it got success in internationalization strategy, Haier started again to innovate its development strategy to build global brand. Haier thought internationalization and globalization had different meanings to itself and its customers. "Internationalization" meant creating international brands with an enterprise's own resources, while "globalization" referred to making use of global resources to create localized mainstream brands, the core of which was localization. Thus, the vast majority of Haier's management and employees in any foreign country were local people, because they better understood the local culture and customer desire and they could design and deliver quality products to meet consumer demand (a16). With the strategy, Haier finished the acquisition of the refrigerator, washing machine and other consumer electric appliance businesses of Japan's SANYO in March 2012, New Zealand's Fisher & Paykel Appliances Holdings In November 2012, and GE Appliances in January 2016.

In its organizational structure, Haier transformed from the pyramid to an inverted triangle. The executives were at the bottom and employees at the top of the triangle (a17). Managers provided employees support instead of giving orders. Employees were empowered with greater decision-making authority and freedom of action. It was designed to create a self-managing, agile and fast-reacting organization to serve customer needs with zero distance in the age of Internet. Employees were given the power to make their own decisions, hire their own employees, and distribute their own profits (a18).

- **Networking strategy (2012 ~ now)**

In the Internet era, Haier is empowering employees with passion and creativity through the Win-win Model of Individual-Goal Combination. Going through the previous development stages, its organizational structure has been transformed fundamentally from a traditional pyramid into an "inverted triangle". In the stage, its structure is being further flattened into a platform for co-creation and winning

together, where employees are encouraged to become entrepreneurs to provide personalized user experience.

Now we have a very flexible mechanism. In order to meet customer needs, the manager of each unit is authorized to make their own decisions on how to use the resources inside and outside (F.LD).

4.2.3 Innovating organizational behaviors to effectively interact with customers

The external environment has changed. First, customer satisfaction is changing with age. In Internet age, it is defined as the satisfaction of the experience on whole business processes. It leads to the disruption of development, production and marketing inside organization (Arnould, and Thompson, 2005). In the process of development, Haier advocates the world is its R&D. When several employees wanted to provide new products to meet the needs of some pregnant ladies lying in bed to watch TV, they looked for solution openly online and attracted the world high-class resources including from Silicon Valley and Wuhan Guanggu. The new products came into markets soon. For manufacturing, production and sell are integrated. Like Platinum air conditioner, it was developed and produced by crowd-customization. Users had reserved all the manufacturing products. The model did not bring any inventory. In marketing, Haier is committed to the user ecosystem and build the socialnomics with new user experience. It forms a positive circulation: users provide ideas and needs; micro-enterprises develop and manufacture; users give feedback timely; micro-enterprises upgrade and iterate products quickly (a19).

Second, The classic theories of management are summarized into two categories: assembly line production and bureaucracy management (Appelo, 2010). They defined the management rules from the top down and the feedback system from the bottom up. The main functions were coordination and consistency. The business model has been transformed from division to distribution, the manufacturing model is from mass manufacture to mass customization, and consumption pattern has been disrupted from product economy to experience economy. Corporate brand was closely connected to market share, but it is being determined by the competitiveness of platform. Haier is committed to realizing ‘a platform-based enterprise, entrepreneurial maker employees, and customized user experience’. “Platform-based enterprise” corresponds to the Internet thinking of enterprises, or boundless enterprises. “Entrepreneurial maker employees” corresponds to the value embodiment of staffs, which means staffs become interactive entrepreneurs and innovators. “Customized user experience” corresponds to the Internet tenet of enterprises, or the creation of end-to-end best user experience.

- **From inverted triangle to platform structure**

Its organizational structure has been transformed fundamentally from a “triangle” into an “inverted triangle” in 2009, and been further flattened into platform structure (Figure 4-3). The whole organization is driven by customers rather than leaders and meets customer demands through internal and external resources. The innovation model has been recognized by world-famous business schools and management experts, and is considered to be likely to solve the existing management problems in big manufacturers. Although platform structure enables Haier to overcome the internal constraints in product and service innovation, Haier needs managerial capabilities to manage the innovation process and the necessary absorptive capacity to benefit from it.

In order to connect employees more closely with customers, Haier made the first disruptive transformation on organizational structure in 2009, from a traditional hierarchy structure to an inverted triangle structure. 80,000 employees were re-organized into 2000 self-managing business units (a20). From the foundation, Haier has been keeping both customer-centered and fast to act, but in traditional triangle organization, employees mostly followed the intention of their managers and lack of creativity and entrepreneurship. Haier decided to re-organize the company to inverted triangle structure. The employees in Units were at the top, the supporting departments in the middle (the traditional middle managers) to support the front employees with resources, and the executives in the bottom to format its strategy.

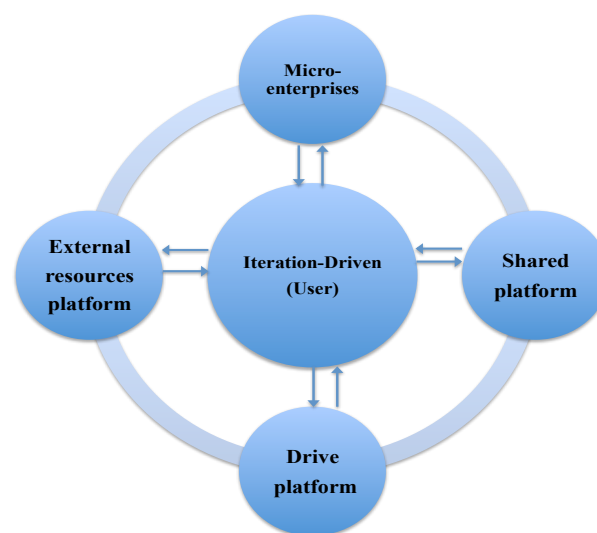


Figure 4-2: Haier Platform Organization Ecosystem Structure¹³

¹³ Drawn according to the authorization documents gotten from Haier

Each unit was independent and collaborated with other units based on the specified contracts. Taking manufacturing unit as an example, each production line was a unit with an average number of twenty employees. There were more than 100 such units. When a production order was presented, it was set to take auction. Each unit can bid to get the order according to its performance indicators such as the quality and the delivery date. The profit by formulated by its rules was retained and shared by its team members. Self-managing unit strategy was designed to pull employees to focus on efficiency and creativity to create their own profits (a21). With the bottom-up organization structure, Haier aimed to build a fast executing company that could involve each employee to self-manage and work with the competitive market rules while providing employees with their due wages based on their output performance.

Now we are in platform structure. It is totally different from the previous structures, but I think each time the motivation to change our organizational structure is same. That is to connect with our customers as closely as we can. If there were no continuous changes before, now we would not have enough confidence to make such a disruptive re-organization. From my view, if the change is toward connecting with customer more closely, today's employees of Haier believe we can realize the vision (E.PY) (a22).

Haier did realize flatter structure and promote customer consciousness of the whole company via the inverted organizational transformation, but Haier did not stop disruptive innovation and continued to think over the emerging limitations in the new structure. The good execution that led to the previous success became the obstacle of fostering the entrepreneur culture. The elaborate and linear management including over 200 flows became the obstacle of getting rid of decentralization and disintermediation. Because there still existed a big group of middle management, it was a big obstacle in the way for the most effective allocation of resources. Functional departments work to provide their supporting functions. It was difficult to align them with the customers.

Hence, Haier determined to get rid of 10,000 middle managers and transform the functional departments into driving forces (a23). Haier turns the functional departments into two platforms: a platform for sharing, a platform for driving. The platform for sharing is to support the business flexibly and orderly, and the platform for driving aims to plan and prepare to win in advance. Taking finance platform as an example, while the volume of business transaction process has increased ten times, the number of employees served by one financial professional has risen from 50 to 350. The platform for sharing is transmitted to make full use of information

technology, the efficiency of which is improved with no Chaos. The disruptive point of Drive Platform over traditional departments is to turn thermometer into thermostat. The metaphor means the responsibility of traditional departments only focused on reading the temperature (dealt with the past numbers). Past numbers cannot contribute much to the future numbers. Now they are transformed to be a Thermostat, which is able to change status quo to the expected temperature. Through decentralization and disintermediation, the employees have decreased from the highest 110,000 to less than 60,000.

Haier innovates iterative value-added process. The traditional development process of products in most of multinational manufacturers is like a waterfall, going from conceptualization, to survey, design, research and development, production and sell (Figure 4-4). The cascade process involves many complicated procedures and steps, but it does not involve the customer, and still company-centered process. Only after products were released on markets, could manufacturers know whether products met the majority of customers. If products were not recognized by customers, all the investment would turn into sunk costs, add the pressure of inventory and reduce the efficiency of operation. Haier innovates an iterative research and development process, which starts from creating value for the user. To create more value for the customers, Haier does not rely on merely its own resources. It builds an interconnected process to integrate external resources, based on a win-win model. Shetlon (2013) suggested it is time to turn the business into a social enterprise, where every function and every process are transformed by people working more effectively together. Every move occurs simultaneously; customers and partners are involved in making changes and improvement continuously (Figure 4-5).



Figure 4-3: Traditional Cascade R&D

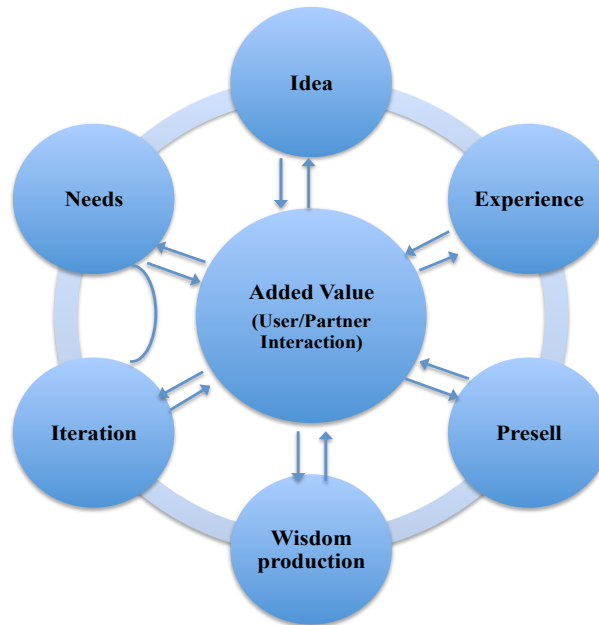


Figure 4-4: Haier Iteration R&D¹⁴

Under the structure, Haier is turning customers of one-time transaction into users of timely best experience. Haier attracts and allows users to participate deeply in comments, product design and development. For example, the product of water purifier device was co-created with users. The team used to develop the product in the company by themselves, but now they keep timely interaction with users to tailor the product, which leads to a rapid iteration and triple market. Another example is the Thunderobot game laptop, which was not developed or upgraded from Haier’s existing products; instead, it came from customer interaction (a24). One of its co-founders spoke the following story in the interview.

Based on the analysis of over 30,000 bad ratings and complaints on game laptop from social network systems, we interacted deeply with advanced users by QQ community¹⁵ and concluded with the main problems on game laptop. Users did not only contribute their ideas in the early stage, even after the first 50 laptops of trial production was made (a25), it was these users that tested the laptops and

¹⁴ Rendanheyi 2.0

¹⁵ The most popular and earliest chat tool in China

gave their professional comments to improve the function before the mass manufacturing (A.LX).

- **From Position to Node**

Haier aims to disrupt its self-contained enclosed system to become a Networked Enterprise. It can connect various resources as an open Internet node, establish a user-centered ecosystem for value co-creation and winning together, and integrate them to add value for all stakeholders. Users and partners can make collaboration with Haier to deliver disruptive user experience through directive interaction with each other. Haier is achieving the transformation through decentralization, disintermediation and removing the “insulated wall” inside its organization. Haier has got rid of 10,000 middle-level manager and the employees also have decreased from the highest 110,000 to less than 60,000.

With the transformation to platform organization, regarding the roles of a unit or employee in the new structure, Haier emphasizes the orientation of Node instead of Position. Position is empowered by the organization or direct supervisors, but the existence of node is based on a business contract or order, which means an objective. At Haier, a node may be a self-managing unit or just an individual employee. But no matter however it is, each node has its specific customers, and holds the clear objective of turning customers needs into orders. The revenue of the unit or employee salary is decided by the completion status of the orders.

Nodes equally exist in the networking organization, driven by customers rather than leaders and meets customer demands through open connection with external resources (a26). Every employee may be a center to keep zero distance with customers. The motivation model has been studied and recognized by world-famous business schools and management experts, and is considered to be likely to solve the management problems in the Internet era. After the case of "Haier culture activating stunned fish" is studied by Harvard Business School, the case of "Haier's cross-culture integration featuring individual-goal combination" has been listed in the case library of European IESE Business School.

- **From Employee to Entrepreneur**

After eliminating the hierarchy in organizational structure, Haier is now transforming into a networked platform, which accumulated more than 3,800 nodes of Microenterprise. Haier is moving consistently toward participative management, decentralized decision-making, and autonomous but responsible work teams. Haier wants to unleash the employees' creativity that was bounded in the bureaucratic

organization, and transform them from passive performers to active entrepreneurs. Haier starts the initiative to connect staff much closely with customers by reorganizing internal structure into numerous independent, self-managing teams. Employees could start their businesses on the platform, interacting directly with users and creating values. The whole company is transforming into a node of Internet, which could connect with all different resources in the world.

With the chances Haier's platform creates, an employee could become a real entrepreneur. The employee may choose the internal venture capital to expand new business (a27), or get funding from the society to organize a registered company. The direct influence of this transformation is that "pay by the enterprise" has been replaced "pay by users" in the compensation mechanism to drive employees to become entrepreneurs.

The core of platform organization is "everyone is a maker". Everyone is expected to create a new business on Haier's platform, or not using the brand of Haier. The transformation sounds very exciting, but we concerned about the difficulty to realizing it in such a big organization. One of interviewees explained as follows.

As the company makes transformation, employees must take actions actively to transform themselves. No one can think in the way that I cannot get used to the new role and ask the company to give it up. As our CEO said, it is impossible to turn every employee to be an entrepreneur, but it is possible to attract entrepreneurs to be our employees. We must challenge, otherwise looking for the familiar job in other traditional companies. In fact, with the consciousness of entrepreneur, most of employees could create much more value than they expected themselves before (D.CG).

Another important issue on the transformation is if an employee could be turned into an entrepreneur, why does he or she choose to start a business on Haier's platform? Is it better to leave Haier? One of interviewees explained it as follows.

If we three left Haier from the beginning and started the business by ourselves, we could not succeed. I just tell a very little case as an example. After survey and design, we wanted to make a trial production of only 50 laptops, which were used to test its performance by our fans. At that time, we were just a very small company. Not speaking of 50, even about 50,000 laptops, no factory would like to customize the game laptops with specific designs. However, because our micro-enterprise is from Haier and the partner manufacturer would like to believe Haier, they accepted the customization order of 50 laptops (a28). Hence, we can

run our business at a low cost. Like that, we get a lot of resources from Haier platform (A.LX).

- **From Closed to Open**

Haier is changing the traditional closed model of innovation, by which investment and talents were invested into R&D departments to innovate new solutions and technologies. The activities usually were tightly protected as company secrets. Instead, Haier insists it is prerequisite to become a truly Internet-Based company open to the world, which overturns its self-contained enclosed system and fits into the Internet as a node. The staff could bring in their own ideas and recourses to develop new products and services for customers, with a view to building post-e-commerce ecosystems based on user value interaction for co-creation and winning together to add value for all stakeholders. “The world is my R&D department”, which is the core idea of the Haier Open Partnership Ecosystem (HOPE) platform, launched in October 2013. The platform is comprised of three platforms: user interaction platform, technology platform and creative community. User interaction platform focuses on finding customer demand such as pain points, daily life applications, future trends identifications. Technology platform focuses on technology match such as O2O technology transfer. Creative community focuses on screening out high-quality opinion leaders and appropriate resources to make professional community discussions (Figure 4-6).

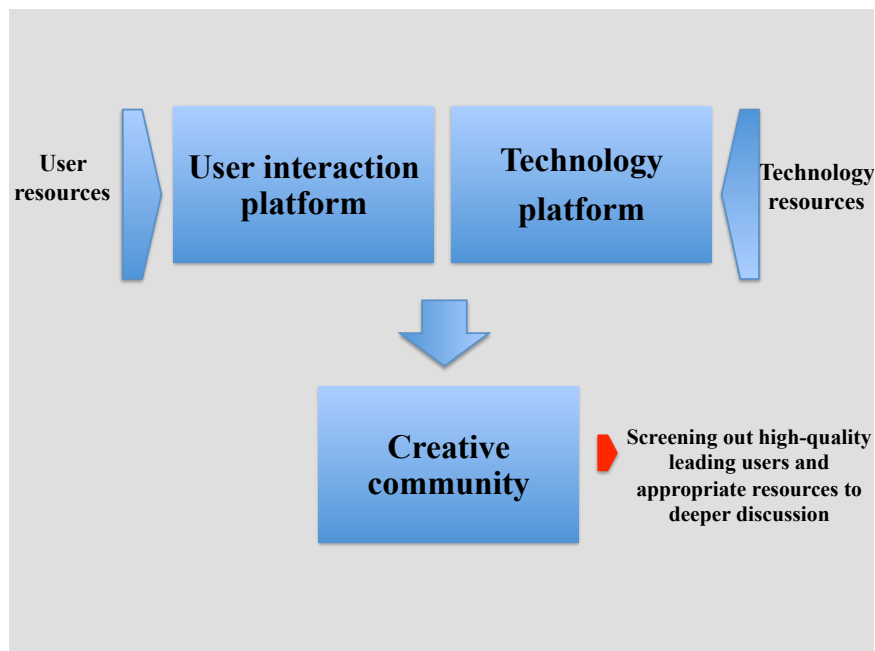


Figure 4-5: Infrastructure of HOPE platform

In the traditional business, a manufacturer existed between customers and provider.

Interactive behaviors between customers and providers were few and realized via the manufacturer. Haier builds the open innovation platform to crack down the separation barrier. All the stakeholders, even some of which do not belong to Haier group, can utilize the platform with frictionless entry and interact with each other to add value (a29). The customers in the world can interact and aggregate freely with partners to have the rapid conversion and incubate the innovative project. Crowd storming, crowdsourcing and co-creation are all facets of a new capacity for firms to empower their employees, break through organizational walls and connect with business partners and customers for solving problems (Shetlon, 2013). Haier states the same belief in its core values, the customer is always right and Haier should always be self-critical. It is the basic motivation for Haier to create more customers

Now, more than 500 ideas are being created each month and 200 innovation projects being incubated on the platform each year ¹⁶.

From the first one, all of Thunderobot game laptops are manufactured by Haier's partners. In the past, we cannot do like this way, because Haier has its own manufacturing lines. If we did so, we must have been asked: why you let other manufacturers make money rather than Haier's own factory. Now, Haier's employees have not thought of business like that. Our own factories are not the best one to manufacture game laptop, why we choose them? Moreover, our factories can accept other orders they are better at, why they must accept ours? All the processes are open to competitive resources. To anyone at Haier, you have to make yourself, your unit, become competitive. Otherwise, you are replaced freely by others or outside resources (a30). It is much, much better than you must follow an imperfect solution (A.LX).

By the end of 2015, Haier's platforms had attracted over 4,700 first-class external resources, 3 billion yuan of venture capital fund, 1,330 venture capital institutions and 103 incubators, setting the stage for 1,160 projects. Over 3,800 node microenterprises and nearly one million micro-stores on Haier's platforms are socializing their capital and human resources. More than 100 microenterprises boast annual revenue of over 100 million yuan, and 22 have introduced VC, and 12 are valued at over 100 million yuan (a31). Haier's platforms have offered over 1 million jobs for the whole society¹⁷.

4.3 Upgrading customer interaction to drive innovation

The creed "No customer interaction, no Haier" is written in Haier's development

¹⁶ The statistics released in the end of 2015 in Haier Hope Platform

¹⁷ Haier Profile

strategy. Haier is well known for the abilities of understanding consumer needs precisely and innovating rapidly to meet these needs. Currently, Haier regards customer interaction as the premise of innovation. In the next sections, we analyze the intrinsic and extrinsic factors one by one to explore how Haier views and carry out the creed.

4.3.1 Being smart: from Home Appliance to Internet Appliance

In the IOT era, information resources are changed. The physical world itself is becoming a type of information system. In the past, information was gathered mainly from internal information systems (ERP, MES etc.) and external sources (public sources, information suppliers etc.). Exclusive information was stored in databases and analyzed to form various reports, which were shared through the management chain. IoT is built on networks of sensors embedded in products, which are mobile, virtual, and instantaneous connection through wired and wireless networks. When products can both sense the environment and interact, they become tools for understanding the personalized condition of users and responding to it swiftly. The technology brings up the real value through the intersection of gathering data and leveraging data. It also promises to create new business models, improve business processes, and reduce costs and risks.

With the application of machine to machine (M2M) and Internet of things (IoT) technology, Haier updates its home appliances to Internet appliances. Internet appliances are playing an important role in happy life solutions in the Internet age. Haier has launched a variety of Internet appliances in each of seven smart ecosystems: food, air, cleaning, water, security, entertainment and education. These products are interconnected to be the entry for smart life. Haier has seen the data collected from Internet appliances as the top-drawer data asset in future. These products bring the timely interaction among machine, human and environment, and collects the data from temperature, to energy cost, using time, using place, using habit, air quality and the like. The knowledge getting from big data informs the creation of new service offerings and the design of future products (a32).

Internet appliance brings the innovative transition from big data to technology and to products and services. Data about products and services, user preferences and intent can be captured and analyzed. Internet appliances are being the bridges to creating new customer value and building an open smart ecosystem of big data. Haier is building business ecosystems through making more appliances interconnected. Home appliances, not like cell phone, do not have operation system. Haier cannot develop an ecosystem like Apple and acts in a different way. Internet appliances are

becoming part of service platform, turning selling number into user resources. More importantly, it can attract external partners to create new service value. Taking Haier's smart oven as an example, 40% of its total revenue comes from third party partners. Haier organizes business partners like recipe services and organic ingredient companies together, to update customer experience.

In the air conditioner field, tens of millions of data on user behaviors and air conditioners is uploaded per day and over 40 trillion data entries have been accumulated. The related data on this open air conditioner platform has covered nearly 30 countries and regions globally (a33). The data is used to create new services with regards to air quality, malfunction, parts conditions and the like. Haier makes use of these data to form the national chromatographic of air quality in China, which supports the building of smart city. Moreover, Haier clarifies customer needs on health, comfort and energy efficiency through data mining. It helps Haier's five global R&D centers to develop the unique machine-human interactive technology to realize automated cleaning, smart interconnection, intelligent voice, and the like. Even on elaborate aspects, Internet appliances are playing a more important role. Based on the analysis of indexes such as electricity usage and customers' cooling temperature, Haier recommended its customers to set the cooling temperature at 26°C, which made people feel the most comfortable while reducing the usage of electricity power (a34).

In the refrigerator field, Haier XingChu refrigerator has connected with the Internet, foods and third-party services to form a food interactive ecosystem. Users can listen to music or watch video, refer to recommended cooking recipes or learn from their mothers by video while cooking. As it is integrated with third party e-commerce, it is convenient to directly supplement other foods online when checking the food inventory and avoiding repeat buying. When putting food into the refrigerator, it has voice interface to manage the shelf time of foods. It is bound with its APP in smartphone and users can control it or check the foods remotely.

Through making Internet appliances, Haier is producing a major engine for creating new services. Shelton (2013) argued increasingly the product is merely a component in the total customer experience. The real goal for the firm is to create this total experience. Haier is learning how to do this with each of its products. Taking the above case as an example, there is a life circle of engagement with eating fresh foods that include buying a refrigerator as a small component. Haier maximizes the rest of the experience. Listening music when cooking, watching the recipe video by experts online or video chatting with a master according to the contents inside, buying the

lacking foods immediately, and so on (a35).

In Internet era, it is no doubt user data turns into a crucial resource to the firm, because when it is accumulated to a scale, a new business model will be created through data mining. Data-driven strategy is becoming a crucial way for leading Haier to outperform its rivals. Now, more and more products have been embedded sensors monitoring and tracking all sorts of data. With interconnected network and cloud-based apps, cloud computing is translating these data into useful information or transmitting it to products and services with real-time responses.

4.3.2 Interacting effectively with customer through social big data

Haier has accumulated the data of 200 million families in China in its Social Customer Relationship Management data platform, among which active members has exceeded 30 million. It is estimated there are 430 million families in China, so nearly half of Chinese families are using Haier's products¹⁸. Besides the real name customer data, the platform still includes 1,900¹⁹ million anonymous data. With the power of information technology, the stage of customers paying for their buying, which used to be the end of transaction, now turns into a new stage of interaction. Besides the data of registration, products selling and after-sales, the platform adds the dynamic data of customer interactive activities on social communities, so the platform is called Social CRM (SCRM). It includes all the data related to the relationship between Haier and its customers (Figure 4-7), and the data is not isolated but interconnected (a36).

¹⁸ The data is the latest statistic number by April 20, 2016, got from Haier website: http://www.haier.net/cn/about_haier/news/jtxx/201604/t20160427_306202.shtml

¹⁹ The strategy of Big data from Haier

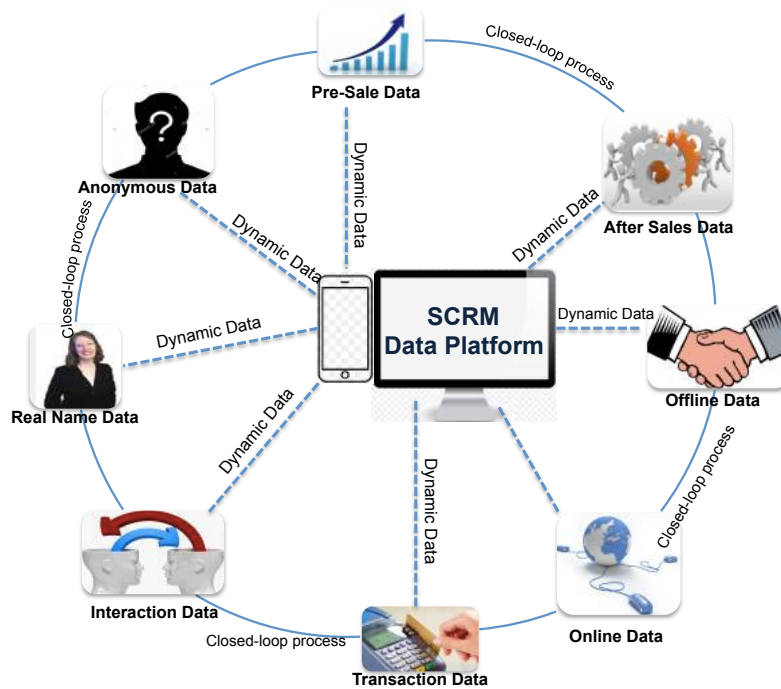


Figure 4-6: Social CRM Platform

The big data has three key values: providing proactive services, accurate marketing and interactive innovation. The data, getting from the smart appliances and the prediction according to product lifecycle, provides proactive services to avoid causing inconvenience. Data mining also helps Haier know which customers will buy new home appliances soon and conduct useful services by accurate marketing. Moreover, through data analysis, Haier can discern the active customers to make interaction, which leads to interactive innovation,

Data is turned into valuable information only after it is interconnected. Each business unit has its own information system in large organizations, which is liable to build isolative islands of information. In order to build the enterprise-level customer database, Haier integrates business operation data, social behavior data, interactive data and the data from smart products, among which customer data is seen as the core. The close integration is to form a complete image of customers in all directions and hold an accurate insight into user demand. SCRM integrates the data from different systems. Through data cleaning, Haier discerns each user: name, telephone, age, address, email, products and the like. Moreover, in order to wholly know users, SCRM gets the data of user social behavior online. All the integrative data can describe the characteristic, likes and life habits of each Haier user. The data is coded

with tags, which have 7 levels, nearly 150 dimensions and more than 5000 nodes (a37).

Excellent enterprise is to meet the needs while the great enterprise is to create needs. The core of data mining is to make prediction about the future consumption behaviors and further needs beyond the existing products and services. Haier utilizes the technology of data fusion and user identification and has built 10 data models in 3 categories, which define well the priority of user potential needs . Meanwhile, the application of data is to meet the requirement of different scenarios (a38). The data platform analyzes how to use data mining to solve the problems business divisions face in the process of business development. After the scenarios of business application are sorted out, it becomes necessary to develop the corresponding product of data to deal with each scenario. For example, from one perspective, the scenario can be defined as online scenario and offline scenario. The online scenario includes Internet surfing, electronic shopping, and social online; offline scenario has home life, shopping and telephone communication. Whichever scenario users exist at, the platform is able to provide the suitable products or services.

Through two cases (Data product for marketing and data product for customer interaction), we explain how Haier utilizes data products to support accurate marketing and interactive innovation in the next paragraphs.

Haier has conducted an inter-organization and inter-platform accurate marketing, which was the cooperation among Haier, Weibo²⁰ and an e-commerce platform. The general strategy was matching anonymously between the encrypted user data of Haier SCRM and the encrypted data of Weibo. The match was conducted in the same secure and safe data port of third party. When the matched users showed up at Weibo, they were instructed to another e-commerce platform to purchase the products or services of Haier. Based on the data model of demand forecasting, SCRM predicted accurately that over 30 million users had the needs of upgrading and cross purchasing. Over 5 million of them also had their information at Weibo, who were the overlap potential users in the activity. The marketing solution, designed by Haier and the e-commerce, was pushed specially to those customers. During the promotion, 1.2 million users of the 5 million overlap users logged in Weibo. The effectiveness was 3 times better than the ordinary marketing.

Data product for interactive innovation is made to help developers understand user pain points, the characteristics of popular products, the distribution of user interests

²⁰ Weibo is the most popular microblog in China, like Facebook.

and the active customers for interaction. In order to make research and development, developer used questionnaires to analyze customer needs, but it was difficult to ensure the precision of data gotten from questionnaires and it was easily mixed with garbage data. Now, it is possible to discern users precisely with the data of 200 million users. The platform has four applications for developer: radar of active users, radar of user pain points, radar of user interests and user life circle.

Radar of active users, whose base is the data model of user activeness, can tell developer which users would like to interact with Haier. For example, if some developers are going to organize a face-to-face offline meeting to discuss the using experience with users. It was difficult to find those users who would like to attend such activities. Now, with radar of active users, it is easy to find adequate user candidates who meet the requirements of buying products, living region and activeness. The meeting information, including the topic of interaction, time and content, is sent automatically to the cell phones of the corresponding users. In the process, no one can see the private data of users, because all the data is sent by the system interface.

Radar of user pain points is the result of data mining on the accumulative data, which increases over one million data per day. Developers can get visual information: what complaints users have, which products and which function; experience pain points, and which experience should be optimized. If developers want to know the feedback of a certain air conditioner, and its strength and weakness comparing with other popular air conditioners, the system provides the feedback collected from various channels. All information is categorized according to product series and product model. The feedback, such as noise of product or difficult to clean, can be presented in more detailed level. It helps employees to upgrade and iterate product quickly and correctly.

Radar of user interests is gotten from the analysis of more than 50 millions selling products per year. Each product has its tag, which may mean healthy, energy-efficient or technological. The type of products users would like to spend money reflects the extent they are interested in. It becomes possible to judge current customers' interest by purchasing behaviors. When developers know the information timely, they can maximize a certain interest point to the biggest selling point. Haier is committed to building a business ecosystem by knowing customers' more needs except for home appliance. User Life Circle provides the multi-dimensions information of users' living condition. It uses big data mining to analyze the topics Haier users are discussing, which users are opinion leaders and their likes.

4.3.3 Discerning customer knowledge in online communities

Haier has been valuing the interaction with users since it was founded, which is regarded one of key factors for which Haier succeeds in being a market leader and being able to keep sustainable innovation (Yip & McKern, 2016). We held big questions before the case study: would customers really like to interaction with Haier? Who are they? How are they motivated? Is their contribution so useful to a manufacturer? When we asked seven interviewees about these questions, each of them answered in a free and relaxed intonation. It could be seen as a normal situation that they had got used to. Their answers indeed verified they valued customer knowledge and were able to interact with different users.

In Haier's perspective, the industry 4.0 is not just to replace the human labor with intelligent machine. The revolution needs not only high efficiency but also high accuracy, which refer to an issue of producing for whom. In the Internet era, user's demands have become the main driving force for service innovation. In order to satisfy personalized needs of customers, Haier realizes zero-distance interaction with global customers by building a community of global innovation through knowledge and resource sharing. It has established various online user group communities to collect ideas about the most desired product features and improvements. It uses the customer knowledge and global resources to iterate the innovative services and products. Haier is good at discerning, mobilizing and utilizing each level of customer knowledge, which exists in different context.

The economy is changing from economy of scale to socialnomics. The multinational manufacturer usually implemented brand strategy to induce customers. It was propaganda-oriented and firm-centered. The traditional economy was economy of scale: the bigger scale led to the lower cost; the bigger market share led to the stronger brand. In the current socialnomics, it is necessary to make interaction effectively with customers and turn the interaction into the process of value creation.

Haier discern customer knowledge mainly through the following three aspects.

- **Scenario information**

Many customers would like to communicate and speak out their ideas if they like the way and feel the fun there. It is no doubt that most people do not like to talk about the products, their functions. These topics are boring to people. So in Haier's online community, there is no such a special topic to talk about their products. Instead, there are almost the topics closely related to the living scenarios, such as 'Super Mamas' Domination' and 'Super Foods Street'. It is easier to attract more regular customers to

immerse themselves in these interesting topics and speak out what they are thinking (a39).

We use scenario show instead of functional discussion. In fact, customers do not like talking about product, and would more like to discuss and join in interesting topics. The more important thing is they talk much more in this way than they are asked to answer questions. We find a lot of unmet needs in their posts. The Internet refrigerator is a good example. When customers chat on cooking, some said they wanted to search for menu when cooking, some young mothers further expressed they wanted to chat by video with their mothers for delicious cooking methods (a40). Around this topic, there was other similar information, like wanting to listen to crosstalk or music when cooking, the reminder of foods' expiration date or directly making orders to e-commerce shops after lacking foods. Based on the information, we formulized it to customer potential needs and design the Internet refrigerator (a41). Besides the functions from the above needs, it also recommends recipes according to the foods available inside and reminds users of what they need to buy when going shopping (B.SR).

Traditional business model on a product was to look for its customers, but in the Internet age, it is changed to seek the solution or products for users based on their needs. Customers used to accept a product by its mass advertisement. However, today there are too many products customers can select. Beyond that, what customers are mostly impressed is the whole process of experience. Since January 2014, Haier has decided not to invest any advertisement on the traditional medias²¹ (a42). Haier used the tactics to push itself to develop Internet mindset. Now most of its products, the interaction with customers start from the designing stage. Developers not interacting with customers are seen to using a laggard way-closing the door and designing inside the firm by themselves. In this case, certainly they have to rely on the advertisement to promote these products. At Haier, it is becoming a rule that if you need advertisement, it means your products or services still exist a far distance with your customers (a43).

Knowledge is not created by experts only, instead, everyone can share great ideas and be an expert in his/her specific field. People may think the messages Internet users send are just for show or fun, but there is much useful information and knowledge among them. The ideas of Haier newly launched products, like Tianzun air conditioner and Thunderobot game laptops, came from customer social information (C.KW).

²¹ Haier Profile- The authorization documents gotten from Haier.

Haier values the comments from customers, no matter wherever they are, on its own website or other social networks. From the release of its advanced household heater and air conditioner with air purifier, named Tianzun, we can see how Haier used big data of customer comments to innovate their products and services. Take the development process of an air conditioner as an example. In QZone²², Weibo²³, and other social media networks, there are more than 67,000 users joined in the online discussion around such a simple question: “what kind of air conditioner do you want?” It produced 30 million responses, the most recognized view of which was the concept of ‘cool, but no cold’. Many Asian users do not like the refrigeration effect of the traditional air conditioner, which made people feel cold. They prefer the feeling of cool but not cold, which is more beyond temperature from the view of industrial technology. Haier got customers involved in developing the advanced product from the very beginning. Moreover, the concept of ‘cool but not cold’, got from users’ responses, became the tagline for the product in Chinese promotion. The concept was the insight from customers, as opposed to a catchword imagined by marketing professionals (a44).

Moreover, for the traditional Call Center, Haier has turned it to a User Experience Exchange Center. Haier initially had only one telephone communication center. But now, it has eight channels, like online chatting, interactive platform and social medias, to provide zero distance service to its customers and create faster and more direct interaction with its customers (a45). Haier is getting rid of the distance and making interaction with customers as soon as it wants to design a new product or service.

There is no iteration if no interaction with customers. In the experience economy, it is crucial to transforming customers into participating users. From that, Haier is creating various interactive communities for value creation. All users like to go to talk about things that interest them. For example, Haier smart oven is a good case. The ultimate goal for this product is to create baking ecosystem. It means the focus is on the baked foods and how to bake them better, instead of on the oven itself. Users spread the words about their experience of baking, which apparently are not about the product of oven itself. Based on the interaction, there is a continuous iteration on the oven (a46). In the process, Haier has also integrated baking ingredients into a baking ecosystem.

The reason why I often join the community lies in two factors. First, there are so many smart and humor netizens here. Their posts are interesting and useful.

²² Qzone is the biggest social network in China, developed by Tencent Holdings Limited.

²³ Weibo is the most popular microblog in China, like Facebook.

Second, there is a new identity for me in the community. Because of my posts, many users like me very much. (Customer “枕海听涛”)

Certainly, it is a big issue to attract more customers engaged in the process of corporate innovative experience. Haier has accumulated many successful methods to interacting with customers. The principle is creating fun for customers, not asking them to do what they feel reluctant. Customers just do what they like at the time when they want. Then, Haier takes full use of the information and knowledge customers contribute in the process.

In order to attract customers to come to our interactive platforms, we have also recruited many new employees who can create fun, such as movie directors, attractive persons, or joke tellers, to interact with customers. Actually, some opinion leaders in customers also have such characteristics. In some cases, it actually makes the interaction more smoothly and creates more original posts (E.PY).

▪ **Complaint information**

In the description of corporate core value, Haier explains its ‘Rights and Wrongs’: “Users are always right while we need to constantly improve ourselves.” In Internet age, there are thousands of forums, social networks and e-commerce platforms for customers to vent their dissatisfactions and complaints. While it values users’ knowledge and strengthens the interaction, Haier also regards users’ complaint as one of the best sources of customer data it can have. To complaints against Haier, besides dealing with them well first, Haier regards them as opportunities to fix its internal processes (a47). To complaints against products or services of other companies, Haier also sees them as business opportunities. The internal entrepreneurial project came from it, and the project was developed into a registered company named Thunderobot Electrical Technology Limited (Haier has 72% of its total shares).

The new product series of game laptop is a good example for explaining how complaint information could be turned into a great business opportunity. Three young people started Thunderobot. They found a popular demand for premium game laptops in the market and no products to meet this demand. Based on the user comments in Jingdong e-commerce platform, they developed a new series of game laptops with high-class hardware and performance, which quickly reached the top in the market segment.

In 2013, the common laptop was entering a hard time. Our department was under a huge pressure and we were thinking what was the new opportunity for us. I

with two colleagues analyzed closely over 30,000 items of customer comments on the game laptop at JD.com (a48). We found customers' needs were not satisfied by the existing product yet. Customers even complained about one very expensive laptop running down when used to drawing. Most of them had the problem of heat dissipation. We realized it would be our opportunity to re-design it with big memory and big graphics chip and improve the performance of heat dissipation (A.LX).

▪ Skillful knowledge

Taking one of Haier's the most popular air conditioners named Tianbo as an example, we study how common customers participate in the process of designing. The creativity of this round air conditioner came from an Internet user-a common designer (a49). The designer was going to design a new air conditioner. He wanted to make the cool air more comfortable, and change the traditional image of air conditioners. After proposing the creativity on Haier's platform, the designer together with the effectively engaged customers, came up with the very creative air conditioner.

July 2016: Creative interaction and iteration

In order to verify whether the idea was acceptable and understand users better, he made the interaction with users on the "ZhongChuangHui" interactive customization platform.

More than 30 enthusiasts joined in the designing process and over 1,700 users gave a quick feedback about the ideas (a50).

Examples of interaction on the desired shape are shown in figure 4-8, which is getting from Haier's online community (hereinafter inclusive):

lazarus | 发表于 2014-07-09 16:17:42

先想到以下：

1. 设计的超薄，贴墙面。
2. 体积尽可能小，方形或圆形均可。
3. 外壳套外面，外壳有多种图案和造型，用户喜欢什么图案就买什么壳。你们不止在制造空调，是为用户创造艺术品，改善用户的享受体验。

最终用户的体验是：

空调可以是一幅画，可以是一件挂墙钟表，用户能想到的墙饰都可以拥有.....

现在的空调就是一堆技术工程材料，没有任何人性的美化，没有与人沟通.....

hbsztw | 发表于 2014-07-09 14:30:30

我喜欢圆形挂机，可以作为家庭装饰品。

但是我担心，一般家庭装饰品都是安装在家庭墙面中间部位，空调冷媒管和排水管在墙上大影响美观

[回复](#)

忘记密码的藤子 | 发表于 2014-07-09 14:35:42

圆形就不错啊，面板上可以有一些中国风的图案，不过，出风口在哪里呢？圆的边上吗？那应该挺好玩的

Figure 4-7: Examples of customer engagement

The above Chinese posts are translated into English as follows.

User ‘lazarus’:

“First I have the following ideas:

1. Slim design, running along the wall;
2. Make size as small as possible, square or circular is OK.
3. Design integral enclosure with various patterns and shapes. Users can select their likes according to its pattern.

You are not only manufacturing air conditioner but also creating an art for users, changing the user experience (a51).

The ultimate goal of user experience is:

An air conditioner may be a painting, may be a wall clock. That means it can be anything users can imagine as wall ornaments (a52).

Today’s air conditioners are a heap of engineering materials, no any human beautification, no communication with people...”

User ‘hbsztw’:

“I like the round hanging machine, which can also be seen as a home decoration. But I am afraid of the location. Because home decorations are usually set in the middle part of the wall, if the condition installed there, its pipes affects the esthetic appearance.” (a53)

User ‘忘记密码的藤子’:

“The round shape is nice! There should some Chinese-style pattern on its panel. But, where should the outlet be considered? Is it on the rim? That is very funny!”

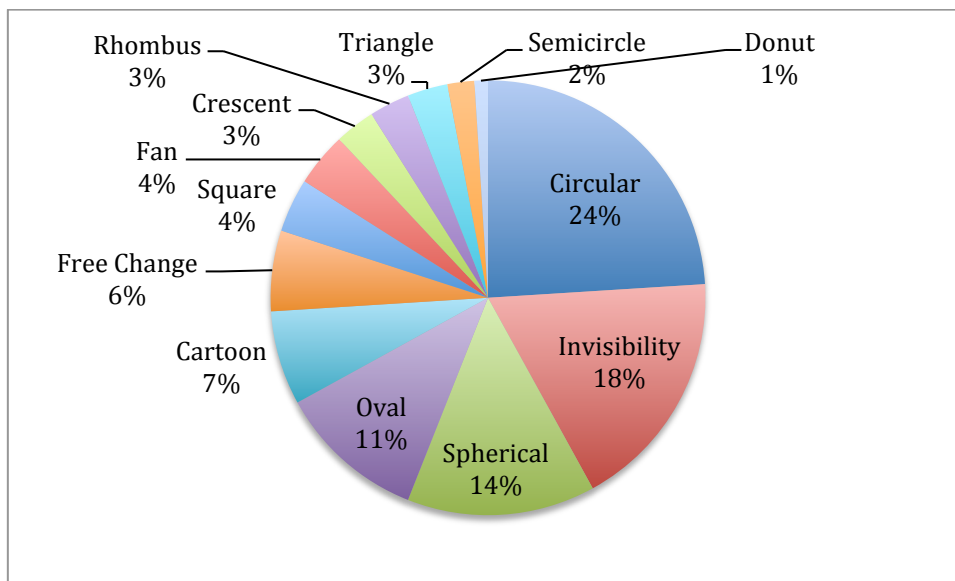


Figure 4-8: The distribution percentage of the desired shape of air conditioner

The result getting from the great amount of interaction with customers at this stage is: the highest proportion on the desired shape of an air conditioner is circular, which accounts for 24% (Figure 4-9). Until now, the shape of the existing air conditioners is square, not circular. The circular air conditioner could be very popular among customers. (a54)

Examples of interaction on how to deliver more comfortable air (Figure 4-10):

悠爸悠妈 | 发表于 2014-07-03 10:04:54 (+3海贝)

1.说说您认为空调如何才能实现如蒲扇般多角度送风的效果。

空调要实现360度无死角送风是有困难的,但是如果给空调一双红外“眼睛”,随时感知人体在室内的位置,然后在空调的出风口位置设置导流板,使得追踪人体定点多角度柔和送风在为可能.

2.如果您还有其他建议和想法,都可留言写下,我们必将洗耳恭听。

要达到蒲扇的效果,还需要轻轻虫鸣的陪伴,空调的导流板轻柔拂动的同时,轻轻虫鸣响起,在主人睡着后,自动关闭

apingu | 发表于 2014-07-03 15:32:20 (+3海贝)

1.说说您认为空调如何才能实现如蒲扇般多角度送风的效果。

自然風式的陣風送風方式、自動擺動柵格、或採圓形擴散出風口+自動旋轉盤改變風向....應該能達到這樣的效果。

宁静的夏 | 发表于 2014-07-08 16:55:13 (+3海贝)

从那个风扇和空调搭配使用的帖子里得到一点灵感，既然空调搭配风扇可以把冷气流动起来，那为什么不直接在空调上安装一个可以分散冷气的设备呢。比如可以旋转的出风口啊，或者像其他网友说的，像蒲扇一般的导风  其他的建议的话，就是增强使用的舒适感，像天樽帝樽的PMV系统，普通空调也可以添加这个功能就好了。

Figure 4-9: Examples of customer engagement on creative functions

The above Chinese posts are translated into English as follows.

User ‘悠爸悠妈’:

“It is a little difficult to realize delivering air from 360 degrees with no blind corner, but if it is equipped with infrared eyes to perceive the location of people and the deflectors in air outlet, it is possible to deliver multi-angle and soft air toward the perceived location.”

“In order to get the effect of cattail leaf fan, we need the chirp sound of insects accompanying us. The sound begins to play while the deflectors start to work, and closes automatically after its hosts sleep.”

User ‘apingu’:

“The following points should be considered: Gust-style delivering like the natural wind, automatic shaking deflector, round and emanative air outlet, automatic rotation to change air direction.” (a55)

User “宁静的夏”:

“I get an inspiration from the post which suggested a combinative use of fan and air conditioner. Since air conditioner with a combination of fan can make the cool air flow around, why does not install a device to scatter the cool air, such as air outlet that can rotate, or a deflector with the function of fan, as other netizens suggested.”

“Plus, to increase the comfortable feeling of experience, which is like the feeling of using the PMV system in TIANZUNDIZUN. It will be nice to have such a function.”

The result getting form the great amount of interaction with customers in this stage is: customers suggested a conditioner with the following functions can deliver more comfortable air like natural wind: multiple air outlets, delivering air in a rotating way, the device of deflectors etc. (Figure 4-11).

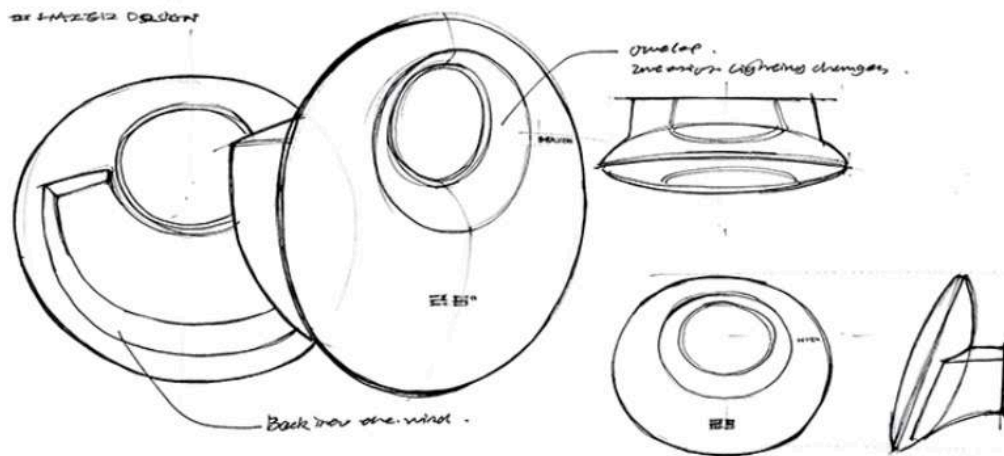


Figure 4-10: The preliminary sketch of a creative air conditioner

September 2014: Virtual designing

With the engagement from the powerful and creative customers, in September 2014 the engineers of Haier made the virtual designing based on the creative ideas (Figure). Moreover, in the process of designing, more than 20 external designing resources, such as Chinese Academy of Science, Xi'an Jiaotong University, and Mitsubishi, were involved to co-design (a56). The whole process was open to customers online from end to end, so the designing was continuously iterated with the advice from netizens (a57). Finally, the virtual prototype was made as illustrated in figure 4-12.

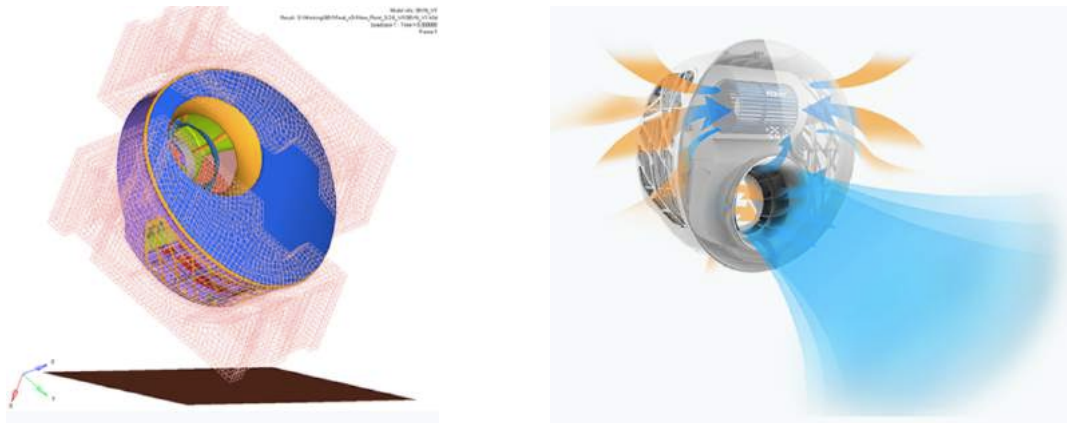


Figure 4-11: The virtual prototype of a creative air conditioner

February 2015: 500 Early Adopters

In February 2015, early adopters of 500 customers reserved the air conditioner (a58). The customers could further customize the pattern according the style of their home decoration. After the order, they could get the visualization of the whole process of

order, production and logistics position (a59).

It also has many smart functions. For example, wherever its users are, they can control its settings by smart phone; if the users forget to close, the reminder of closing air conditioner will be sent if the leaving distance exceeds 1 Kilometer; it is connected to clouding service system, if there is any running problem, the servicemen will know it and provide proactive services to customers.

July through September 2015: Continuous interaction and iteration

Now, it becomes popular among customers. Moreover, according to the suggestions from customers, the second creative designing was made. The new product of 1.5 horsepower and more patterns were supplemented (Figure 4-13).



Figure 4-12: The iterative air conditioner

Haier internet factories also have the websites to interact with users. Zhongchuanghui platform is for users to customize products; HOPE platform is for worldwide R&D resources to provide creative solutions based on interaction; Haidayuan platform is for module companies to provide competitive customized modules to Haier based on customer personalized needs. These platforms are independently operated but share data.

4.3.4 Deep engagement from three types of opinion leaders

Zhangruimin, Haier's CEO, divides enterprise development into three phases. The first phase is traditional era. Getting customers meant all. The firm that held big customers had a strong brand. People looked for products with high-quality and powerful functions. Big firms liked to invest hugely on advertisement over the world. The second is flow era. The firm that had big flow would win the market. It still required marketing and channels. Now it enters the third phase—user resource era. User resource means community (a60). If Haier can organize various communities

around products, it can not only iterate products and services continuously, but also create new value.

Especially when Millennials become the main force of consumption, it is necessary to re-think the interactive methods owing to their distinctive lifestyles (a61). Millennials are the most digital connected generation, making consumption across multiple online channels. Taylor (2014) explains 71% of them are daily users of social networks. They check their smartphones 43 times and spend 5.4 hours on social media averagely per day (a62). Their involvement is crucial to product iteration. Otherwise, neither incremental innovation nor disruptive innovation can ensure its customer value. Obviously, the best way to interact with them is through social networks and platform.

The strategy of customization does not mean Haier can provide a different product or service to each customer who has a different need. Haier gives importance to developing customer communities to realize mass customization because there an opinion leader usually represents masses of customers who have the similar needs (a63).

Idea kings

Users were always the unchangeable core resource of Haier. Haier is well known for the abilities of understanding consumer needs precisely and innovating rapidly to meet these needs. Haier interacts with one million fans on average per day (a64). It comes up with over 200 originalities (a65). Many products, such as “Jhukna Mat” refrigerator in India, Adiabatic icebox without power more than 100 hours in Pakistan, and Handheld washing machine “Coton”, came from the interaction with customers (a66).

Besides valuing the resources from its web community and various social networks form outside, Haier builds the specialized platform named Zhongchuanghui in order to make full use of ideas from customers. The ideas to customize a product completely come from users and the evaluation of feasibility to the product is also made by users. Those who like the creative ideas will reserve the product. The order and its information will be automatically sent to Haier’s interconnected factories to manufacture. Its washing machine named U WICK is such a customized product, which users can set the washing parameters freely, such as water volume, washing times, washing lasting time, washing intensity. The earliest idea of the product came from a user, who wanted to wash his woolen sweater just for a little of time. But his washing machine only had fixed procedures. What he could do was to select one of

them and stop it in the midst of washing. Now at the platform, the washing machine with all functions freely setting was customized. It solves the problem that confused some young people of how to wash a woolen sweater well. It is said the product gets a really nice reception at the users whose zodiac is Virgo (a67). At the platform, it is users that design many products they are in favor of, such as Mikey Little Refrigerator and Removing Formaldehyde Air Conditioner. For these products, all ideas from the creative work to the shape came from users.

Our colleagues found the needs online: some pregnant ladies wanted to lie in bed to watch TV, or at other comfortable angles. Then he looked for resources from both inside and outside. They attracted high-class resources from Silicon Valley and successfully developed the series products of “I see mini”, which meet the needs of customers like those pregnant mothers (G.TP).

Millennials have the strong self-awareness and are going to go to the trouble of pursuing individuality. They have various ideas to enrich their life (a68), wanting the products with distinctive colors or modules, desiring the appliances embedded the latest technology they are in favor of. Haier’s interactive platform is committed to being an entry of those inspirations. Haier regards it as an inspiring direction of mass customization to combine design practice and the era of minority group in the age of network.

Even people without any designing experience or we say zero-base, may create some popular ideas to which our professional designers would not like to pay attention. A user, who is a young mother, said at community if meter scale is designed on refrigerator, it might promote the appetite of children. She said her child did not like having meals. But, children usually like playing refrigerator, looking at the height and having the interest to know what to eat to grow faster (a69). Her idea really became a popular refrigerator with meter scale, which was popular among young families (B.SR).

Geeks

Geeks refer to people who would like to spend a great amount of time in a specific field; most of them even have different major with that field. Geek, being proud of their identity of outsider, believes strongly in the power of technology, liberty, and creativity. They do not like the common sense but like to explore new experience, do not say impossible to new ideas but take the independent route to challenge. Comparing with its negative meaning in the past, the role of Geeks is valued greatly by big companies who have platforms like Haier.

Geeks are playing a more and more important role in products development, testing and iterating. With the platform organizational structure, Haier turns into a platform in the business ecosystem: one side is the interaction with common users and geeks; another side is the influx of open resources from the world (Figure 4-14). Haier emphasizes the interaction with geeks before production. Haier is committed to change the situation of ‘guessing customer needs’ and instead listen to their voices carefully before production (a70).

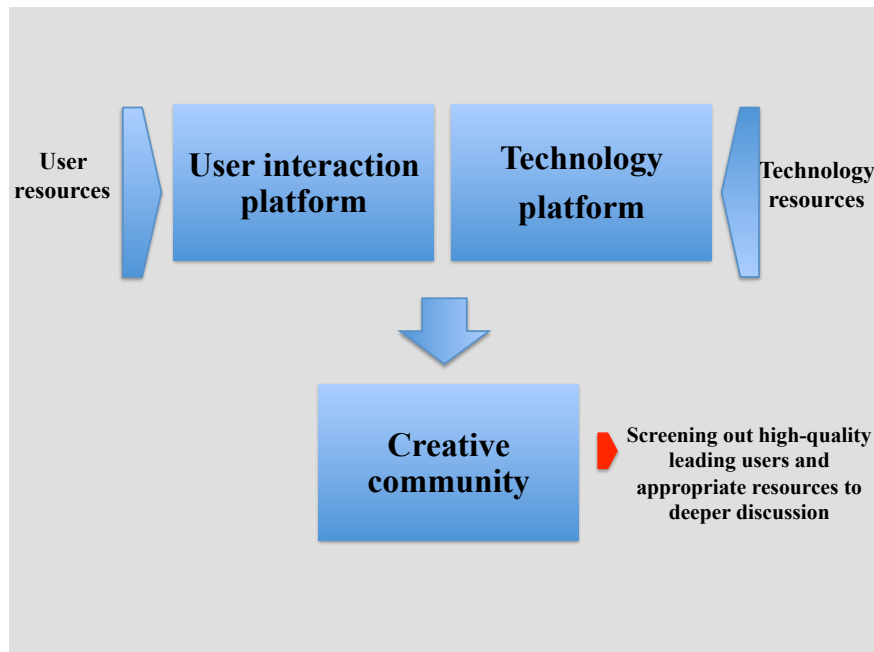


Figure 4-13: Open Innovation

When we interviewed one co-founder of ThundeRobot, we were impressed at geeks’ concentration on the contribution. These geeks do not get monetary rewards from Haier. The motivation why they do is just because they like those things.

Many geeks actually are our big fans. When we design a product, we always can get professional and valuable comments from them. As we started up the business, we sent our first 50 trial game laptops to these fans for testing. Some fans suggested we must change the design and use two copper pipes to dissipate heat instead of one (a71). By our own testing, we judged one copper pipe was enough because we did not find the problem of dissipation. We often chatted online or phoned for several hours to listen to their various experiences with the product (a72). After the product going in market, their valuable advice was verified to be right (A.LX).

These technology fans not only participate in product testing, but also in providing

services to the common users. For example, some sections of the online user community are run by these geeks, who are moderators there and responsible for answering users' daily technique questions (a73). The employees are responsible for the questions on product iteration. The collaboration between them is well integrated.

Their contribution to ThundeRobot is great, but what they really pursue is just for fun, not for money (a74). When we made offline get-togethers to know and thank them. We found most of them do not like face-to-face meeting and they still focused on their smartphone (a75). Now we interact with them mainly at online social community (A.LX).

Zealous posters

According to McKinsey annual report in 2014, China had 633 million Internet users and the number of smart devices also rose from 380 million to 700 million in 2013 alone. These devices connecting to Internet networks are coming together to define the new customer situation. Social networks are essentially a range of online activities that connect individuals to one another. The firm's ability to activate those activities is a key barometer of ability to survive (Shetlon, 2013). They are forming an unprecedented power on marketing and sources of data that firms cannot ignore (a76).

In today's social networks, customers have more power than ever. As Blackshaw (2008) argued, a satisfied customer may tell three friends about good experiences, whereas an angry customer has the potential to tell 3,000 friends in social networks and communities (a77). For the complaints from unsatisfied customers, Haier makes great efforts to fix the internal processes or rules to make customers happy again. On the other hand, Haier is also good at making full use positive comments to provide social proofing and attract new customers (a78).

As we discussed in the previous parts, Haier has been actively making use of social media, where users are invited to participate in end-to-end processes including product design and R&D. Besides that, Haier also proactively invites the user to act as the creator and ambassador for marketing promotion through social networks.

In May 2016, Haier held a social activity named 'the most (adjective) Haier family'. All users could participate in the activity. Complementing the topic, uploading the picture related to Haier's home appliance, writing a short story and so on. The activity involved more than 10 thousands of users (a79). Haier extracted the most impressive stories from them to enrich its brand story.

There is another simple but interesting activity: drawing your image of Hair Brothers. Haier Brothers are the cartoon image of Haier brand. Haier wanted to design

an interactive marketing activity, which users can enjoy and pushes the interaction between users and enterprise and user one another. Together with the drawing, users were also expected to speak out anything they wanted to Haier. The image of Haier Brother was made at its startup when Haier introduced advanced manufacturing technology and equipment from Germany. Haier cartooned one eastern boy and one western boy to form Hair Brothers (Figure 4-15), earnestly hoping a successful cooperation with the west technology. Soon, a professional company made a TV animation using the name and image of Haier Brothers. It exerted a great influence in Chinese Millennials. Many of them said they began to love the brand from watching the positive and wonderful animation. The activity was shared popularly online among the community of Millennials. Many of works created by users were read tens of thousands of times (Figure 4-16). It was not an advertisement but an interactive marketing, where users helped Haier promote the marketing (a80).



Figure 4-14: Hair Brother: cartoon image of Haier brand



Figure 4-15: The example image of Haier Brothers drawn and shared by users

Fun is a motivator, one of the rewards (a81). Through various interactive activities with zealous netizens, Haier Brothers has gathered users to form a Haier Brother Camp online. The active involvement from users is inspiring Haier to create more business around Haier Brothers. Now Haier is planning to develop a culture platform

based on the cartoon image, including cartoons, mobile games, movies and derivative industries such as Haier Brother theme park (a82). In Internet age, not only can “Drawing Haier Brothers” attract a mass of zealous users online to interact actively, which manufacturers cannot imagine before, but also it can draw a big picture for Haier to develop a new culture industry.

4.4 New service values coming from the new interactions

Through the deep interaction, Haier, its customers and even its relevant partner co-create service values.

▪ Proactive and cloud computing services

Haier is using data obtained from sensors embedded in appliances to create innovative after-sales service offerings such as proactive maintenance to avoid using failures. Big Data can be used to develop the next generation of products and services. Haier provides “automatic diagnosis, automatic feedback and proactive services” to users on Internet appliances embedded with intelligent sensors (a83). It updates the mode of maintenance service from “providing reactive services after users’ report” to “providing proactive services before the problem occur”.

Cloud computing is particularly regarded as one of the major enablers for Haier to transform their business models from being product oriented to being service oriented. The cloud computing system can provide the solutions whenever users need in their daily life, automatically diagnose the type of the problem when an exception happens, and send the information to service providers and users simultaneously.

As we discussed before, when a temperature anomaly occurs to a refrigerator suddenly, APP will alert the user to check whether its door is closed properly. If the exception continues after the user checks, servicemen will connect proactively and provide onsite services. If there are foods not in date, the system will send a reminder. When the air quality inside gets bad, the cloud computing system will send a message to the user and start the sterilization to work. Users can also ask for the weather information, recipe, entertainment video, life information and social interaction by voice command. The smart air conditioner can interactively connect with the cloud computing system and detect the air condition of user homes. When the quality turns bad, the air conditioner will automatically activate the healthy function and provide the best healthy solution to users. If the users forget to close, the reminder of closing air conditioner is sent if the leaving distance exceeds 1 Kilometer As the user forgets to shut off the power of water heater and leave for a trip, the heater will monitor the condition of hot water not been used for a long time and alert users to check whether

it is necessary to shut off the power through the program of APP installed. After the user approves, the hot water will be shut off. Combining the information of local water quality, the system can provide the users of water purifiers with the timely suggestions about how to keep a high cleanliness (a84).

Haier's Internet appliances provide timely connectivity with a broad selection of mobile devices, allowing user to manage and control home appliances from anywhere in the world. Users are able to retrieve information and remotely control their appliances either from home or outside, allowing users to do more and worry less (a85). It also maintains appliances in good condition and reduces lifecycle cost through the highly precise detection and proactive services. The system provides the best customer experience in the whole process of product lifecycle.

▪ **Services added by ecosystem**

Through building open partnership ecosystem, customers get additional services from the ecosystems. The services mainly have two types: one is knowledge sharing or creation from the interactive communities and another is convenience from the business ecosystem.

No matter the user is a common customer, a geek, a designer, or even a professional partner, he or she can find his interesting position and topic in the ecosystem (Figure 4-17). Users can utilize others' knowledge to develop their interests through the interactive ecosystems (a86).

At first, I came to the community in order to find some specific solutions in daily life. Gradually, I found there is more helpful information than I expected. It is interesting to communicate with people having the similar interests. (Customer "sobershell")

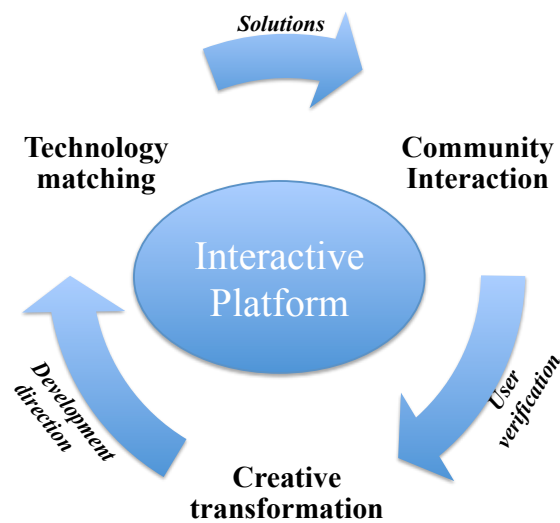


Figure 4-16: Knowledge Interactive Ecosystem

Moreover, users can get faster and easier services from the business ecosystems Haier has built. As we discussed, for the users of smart oven, they can get the package of ingredients in suggested proportion directly through its smartphone APP. The users of smart refrigerators can purchase the supplementary foods conveniently from the display window where the services from Haier’s e-commerce partners are embedded (a87).

▪ **Self-actualization**

The current users, especially Millennials, have the strong self-awareness and creative ideas to enrich their life. When their posters are liked and forwarded by other netizens, the users are encouraged positively to create more with the next things.

The users, whose creative work were read by tens of thousands of people, got the highest satisfaction they never got before just from product functions. When their ideas became products of Haier, their feelings were even more amazing. Fun is a motivation; self-actualization is one of the rewards (E.PY) (a88).

When these users do what they like, where they do it, how they do it, or how they interact with others is totally the purview of the customers. Users could do things for fun and determine their own courses of decision and action on social communities. Creativity is often undermined unintentionally in conventional work environments that were established to maximize business imperatives such as productivity and control. Users will be more creative when they feel motivated primarily by the

interest, satisfaction, and challenge of the work itself and not by extra managerial pressures (a89).

The satisfaction, getting from the self-actualization of customers, upgrades the traditional service concept. A service was always defined as a delivered activity from a provider to a recipient. But in current business model, Haier's users are highly satisfied by the services of self-actualization, which actually are their contribution to Haier although. The two-way interaction brings new services to customers (a90). It activates a positive circle of knowledge and value creation between Haier and its customers, even other partners (a91).

When adding great services and value to customers, Haier is also getting great returns from its business model. Its profits jumped 20 percent year-on-year to 18 billion yuan (\$2.7 billion) in 2015. It gets a high customer loyalty with more than 200 million families Using Haier appliances in China and the world's number one Major Appliances brand in 2015. Owing to the loyalty, some series of products have been reserved by users. This helps Haier really realize zero inventories and reduce the risk of business. More importantly, with the business model, Haier hold a steady stream of creative ideas from users, which keeps its business innovation sustainable, effective and efficient.

Chaper 5 Data Coding and Theoretical Proposition

5.1 Introduction

As discussed above, the data is coded in three levels: open coding, focused coding, and theoretical coding. The process of coding is being continuously conducted before the theoretical saturation (Figure 5-1). As is well known, theoretical saturation is a process of breaking down and analyzing data until no new theoretical insights are being discerned from the data (Glaser and Strauss, 1967).

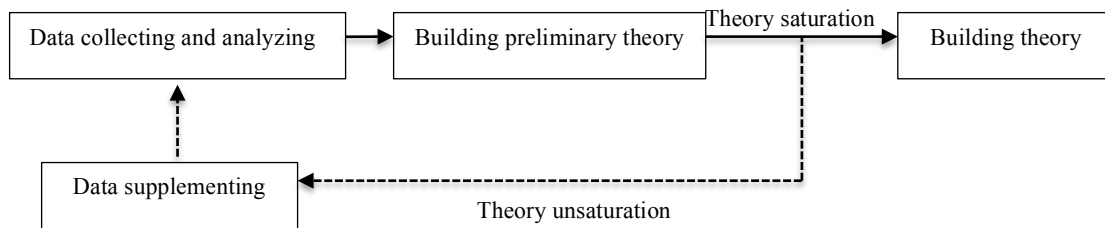


Figure 5-1: Flow chart of data collection and analysis

5.2 Open Coding

Open coding is to conceptualize the collected data from business step by step. Based on the rule of grounded theory, the large amount of data is interpreted in progressive levels: labels, concepts, and categories, showing its content accurately. In the process, the labels and are being thoroughly broken, classified, re-organized and induced to form concepts. The concepts were deemed pertinent to the content of the data.

5.2.1 The purpose of open coding

The purpose of open coding is identifying phenomena and defining concepts. These concepts and the coming categories in the next phase are all convergent to form the theory reflecting the studying phenomena.

5.2.2 Labeling

First, the collected data in the above is labeled with “a + Arabic numerals”, and then given a label to define its meaning. An example of labeling is shown below.

An example of labeling:

(1) Labeling a text with a label (“a2”) :

When it decided to make the latest innovation in corporate strategy in 2012, Haier had retained its place as the world’s No.1 Major Appliances brand with an 8.6% retail volume share. Even holding such a big strength in the marketing,

Haier still decided to disrupt itself again because they thought Haier would be full of the below risks soon if no innovative strategy were adopted (a2).

(2) Initializing a label with the essential meaning of its text (“a2: Risk consciousness”)

The above text is mainly about Haier’s risk consciousness, because it happened even when Haier is in the position of No.1 and its rivals have not started to make such a disruptive reform.

Thus, we define the label “a2” with the meaning of “risk consciousness” and write it as “a2: Risk consciousness”.

Using this method, we make 91 labels and give the meaning to each label according to its context located (Table 5-1).

Table 5-1: Labels to the raw text

Labeling of Data			
1	a1: Self-critical	32	a32: Changes of information and knowledge resources
2	a2: Risk consciousness	33	a33: Big data from connected appliances
3	a3: Eager to know users as well as possible	34	a34: New value from big data
4	a4: Salary by user instead of enterprise	35	a35: More partners connected
5	a5: Beyond transaction	36	a36: Big social data of customer
6	a6: No advantage soon	37	a37: Big picture of customer by big data
7	a7: Keep pace with times	38	a38: Scenario application of big data
8	a8: start-up from bankruptcy	39	a39: Making interaction funny
9	a9: Progress everyday	40	a40: Customer always right
10	a10: Quality consciousness	41	a41: knowledge in customer chat
11	a11: Praised by famous business school	42	a42: No pulling but attracting customers
12	a12: Marketing initiative inside	43	a43: No development behind closed door
13	a13: Bold in global market	44	a44: Mutual value created by customers on community
14	a14: Mutual contribution	45	a45: Experience exchange center
15	a15: Stringent regulation	46	a46: No interaction, No iteration
16	a16: Localization	47	a47: Customer complaint as an opportunity to fix internal process
17	a17: Entrepreneurial spirit	48	a48: Customer complaint as a business opportunity
18	a18: Empowerment	49	a49: Customer as skillful expert
19	a19: Crowd customization	50	a50: Active community
20	a20: Eliminating middle management	51	a51: Mutual encourage between one customer and the other
21	a21: Self-managing	52	a52: Customer Brainstorming
22	a22: Confidence to reform	53	a53: Customer reminding
23	a23: Internal driver	54	a54: Interactive design
24	a24: Daily interaction with customer	55	a55: Customers creating new knowledge through interaction
25	a25: Customer deep involvement	56	a56: Open resources from society
26	a26: Each employee as a parallel node to customers and resources	57	a57: Timely iterative design
27	a27: Internal venture capital for entrepreneur	58	a58: Customer reserve co-designed product before production
28	a28: Brand as resources	59	a59: Visualization of order, production and transport processes
29	a29: Open platform for adding value	60	a60: User resource means community
30	a30: Equality between internal and external resources	61	a61: Different lifestyles of Millennial generation
31	a31: Success of micro-enterprises	62	a62: Digital connected generation making timely iteration coming true

63	a63: Customer community as one key factor for mass customization	78	a78: customer as marketer
64	a64: Huge timely interaction	79	a79: Brand stories made by customers
65	a65: 200 originalities per day	80	a80: Interactive marketing
66	a66: Local customer knowledge for localization	81	a81: Fun as reward
67	a67: Customized by the same zodiac of customers	82	a82: Zealous users triggering a new industrial business
68	a68: Individuality driving Customization	83	a83: Proactive service on smart appliance
69	a69: A small customer idea opening a market segment	84	a84: Cloud computing service
70	a70: Not “guess” customer needs	85	a85: APP-based customer experience
71	a71: Geeks working as developers	86	a86: Knowledge ecosystem for knowledge sharing and creation
72	a72: Amazing enthusiasm of fans	87	a87: Professional and convenient service from business ecosystem
73	a73: Geeks serve other customers	88	a88: Self-actualization as reward
74	a74: Fans pursue for fun, not for money	89	a89: Creativity booming in free context
75	a75: Geeks prefer the virtual world	90	a90: Incubating self-actualization as service
76	a76: Running social community is actually running business	91	a91: Self-actualization motivating a positive circle of knowledge and value creation
77	a77: social network empowering customers		

5.2.3 Conceptualization

On the basis of the above 91 labels, the next step is to further conceptualize these labels. However, it is not a one-time event. In order to find the accurate concepts and category that can reflect the essence of the case, it is necessary to analyze repeatedly among data, labels, concepts and categories. In the process, we also contacted with several interviewees many times to discuss the critical issues and implement new data.

In this stage, in order to deepen the work of refining and downsizing, concepts and categories are gradually used to replace the raw data temporarily. Then, the task of analyzing the huge amount of data is simplified into delving into these concepts, especially the relationship and intrinsic logic between concepts. Through the open coding, the collected data is coded into concise units that are suitable for deep analysis.

We build 20 concepts, which are respectively marked with the alphabet A plus numbering. In the process, we use MAXQDA qualitative analysis software to build

the tree structure of data and keep the connection between data and concepts. The details are analyzed step by step as follows.

Using MAXQDA software to build the tree structure of data and trace raw text

First, in the meantime of labeling the text in the paper, we import the text into MAXQDA and label the text in the same way (Figure 4-19). Each label is linked to the sentences or paragraphs of interview transcripts with which it is associated.

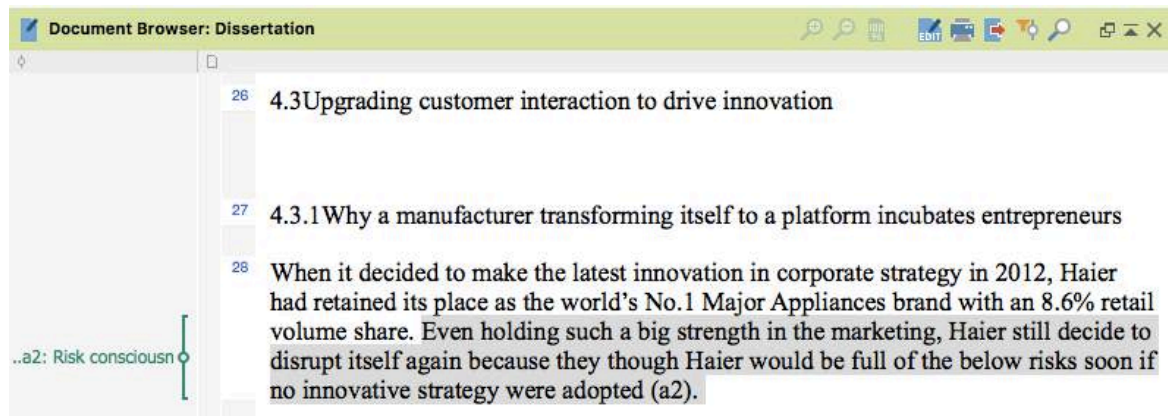


Figure 5-2: An example of labeling in MAXQDA

Second, we focus on analyzing the intrinsic relationship of all labels. The relevant labels are organized together temporarily to form a variety of groups. Then we think over the meanings each group reflects and the logic among them. If its meaning or the logic is not suitable to be put in the same group, the label is been moved out of the group. The process is made repeatedly until all groups are given accurate meanings to form the corresponding concepts. For example, as illustrated in figure 5-3, after analyzing repeatedly, the group of labels including a65, a49, a73, a54, a57, a 71, a45, a62, a41, a5, and a3 is defined as "A3: Zero distance with customer knowledge". The figure shows a snippet of interview script on the right, along with its associated concepts on the left. In the tree structure of A3, its labels not in sequence show the repeated process of analyzing.

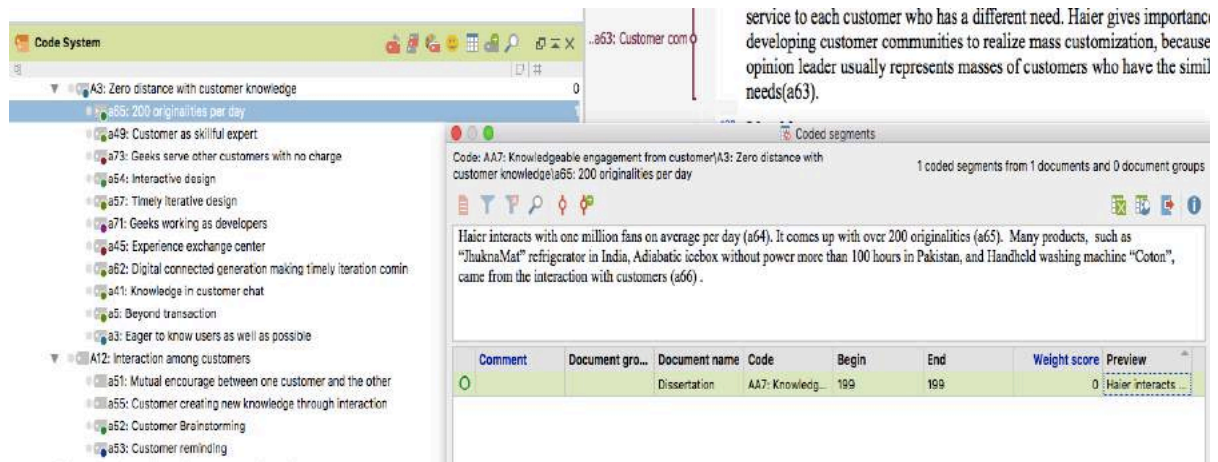


Figure 5-3: An example of conceptualization in MAXQDA

The meaning of each concept is explained one by one as follows.

Concept A1: Humility

(1) Definition

It refers to Haier's humble attitude of organizational behavior when facing its achievement, customers' complaints and the like.

(2) Correlative labels

a47: Customer complaint as an opportunity to fix internal process; a40: Customer always right; a1 Self-critical²⁴

(3) Explanation

In Haier's core value, it is written that the customer is always right and we should always be self-critical and constantly improve ourselves, which is regarded as Haier's motivation to create more customers. Thus, Haier can consider users' complaints positively as one of the best opportunities to fix its internal processes; Haier can value any need from customers even sometimes which seems strange to other companies and develop a product or service to meet it. When customers said they wanted to search for a menu when cooking or chat by video with their mothers for delicious cooking methods and the like, Haier developed the product of Internet refrigerator and the service of providing various cooking recipes on the screen of the refrigerator by attracting third-party partner involved in the business ecosystem.

²⁴ Its labels not in sequence show the process of analyzing repeatedly (similarly hereinafter).

Concept A2: Crisis awareness

(1) Definition

It refers to the sense of crisis, making Haier always innovate proactively to prepare for the emerging challenges.

(2) Correlative labels

a9: Progress everyday; a7: Keep pace with times; a6: No advantage soon; a2: Risk consciousness

(3) Explanation

As its CEO Said: “There are no successful enterprises, only enterprises that adapt to the pace of times”, Haier is always holding the sense of crisis and innovative actively to adapt to the changes of technology development and business environment. When it decided to make the latest innovation in corporate strategy in 2012, Haier had retained its place as the world’s No.1 Major Appliances brand. Even with such a big strength in the marketing, Haier still decided to disrupt itself again, because they thought Haier would be in crisis soon if no innovative strategy was adopted.

Concept A3: Zero distance with customer knowledge

(1) Definition

Haier endeavors to realize zero distance with its customers and utilize their knowledge to differentiate customer experiences in the whole process of value creation.

(2) Correlative labels

a65: 200 originalities per day; a49: Customer as skillful expert; a73: Geeks serve other customers with no charge; a54: Interactive design; a57: Timely iterative design; a71: Geeks working as developers; a45: Experience exchange center; a62: Digital connected generation making timely iteration coming true; a41: Knowledge in customer chat; a5: Beyond transaction; a3: Eager to know users as well as possible

(3) Explanation

Haier has many advantages such as technology innovation and corporate brand. But the most valuable one is the different view on customer value. Haier thinks over the relationship with users and is committed to filling the gap existing in the situation. Haier could not meet its customers, so did among the customers, because in the past it just sold its products to customers through a one-way transaction. Now it has the ability to change the situation. Millennials have become the main force of consumption. Taylor (2014) explains 71% of

Millennials are daily users of social networks. They check their smartphones 43 times and spend 5.4 hours on social media averagely per day. Haier can know its customers timely by smart products with sensors and intelligent chips. Moreover, customers can take part in the product design as early as they are willing. Haier endeavors to realize zero distance with its customer and involves them in the whole process of production from product design to interconnected manufacturing.

To realize the objective of keeping zero distance with customers and making use of their knowledge timely, Haier builds the interactive open platform. Haier interacts with one million fans on average per day. It comes up with over 200 originalities. Many products, such as “JhuknaMat” refrigerator in India, Adiabatic icebox without power more than 100 hours in Pakistan, and Handheld washing machine “Coton”, came from the interaction with customers. At the platform, it is users that design many products they are in favor of, such as Mikey Little Refrigerator and Removing Formaldehyde Air Conditioner. For these products, all ideas from the creative work to the shape came from users. Moreover, the whole process was open to customers online from end to end, so the designing was continuously iterated with the advice from netizens.

Haier has been considering how to know customers’ ideas timely and meet their diverse and easily changing needs quickly. Haier has transformed its Call Center to a User Experience Exchange Center. It initially had only one telephone communication center. But now, Haier has eight channels, like online chatting, interactive platform and social medias, to provide zero distance service to its customers and create faster and more direct interaction with its customers.

As many interviewees claimed, they believe Knowledge is not created by experts only, instead, everyone can share great ideas and be an expert in his/her specific field. People may think the messages Internet users send are just for show or fun, but there is much useful information and knowledge among them. The ideas of Haier newly launched products, like Tianzun air conditioner and Thunderobot game laptops, came from customer social information. Now most of their new products can involve customers in the early age of design. Like the development of the game laptop, fans suggested Haier should change the design and use two copper pipes to dissipate heat instead of one. These technology fans not only participate in product testing, but also in providing services to the common users. For example, some sections of the online user community are run by these geeks, who are moderators there and responsible for answering users’ daily technique questions. The employees are responsible for the questions on product iteration.

The collaboration between them is well integrated.

Concept A4: Unafraid of change

(1) Definition

It refers to the organizational reforming capability proved by the successful experience of continuous reforms.

(2) Correlative labels

a13: Bold in global market; a22: Confidence to reform; a11: Praised by famous business school; a8: start-up from bankruptcy

(3) Explanation

In the past 33 years since the foundation in 1984, every 7 years Haier made a reform in corporate strategy, organizational structure and management. Through the uncommon experience, Haier is able to make a disruptive reform promptly when needed.

Haier started with the virtually bankrupt. When CEO Zhang Ruimin took over the Qingdao Factory from the government in 1984, Haier had total assets of \$300,000, a net loss of \$178,000 (a huge sum at that time), sales revenues of \$421,000, and 800 workers.

In the subsequent 30 years, Haier implemented five different strategic reforms to maximize customer value and grasp the market opportunities: branding: brand building, diversification, internationalization, global brand, and networking strategy. Accordingly, Haier made five disruptive management innovation: OEC and self-organizing unit, strategy business unit, market chain, the Three Power and the system of Entrepreneur.

With the corporate gene of changing, the staff of Haier is unafraid of changing and adapt to it. Haier has been changing from the start up, but the constant theme of change is kept much closer to its customers. As one interviewee said, if the change is toward connecting with the customer more closely, today's employees of Haier believe we can realize the vision. Now, Every employee may be a center to keep zero distance with customers. The motivation model has been studied and recognized by world-famous business schools and management experts and is considered to be likely to solve the management problems in the Internet era. After the case of "Haier culture activating stunned fish" is studied by Harvard Business School, the case of "Haier's cross-culture integration featuring individual-goal combination" has been listed in the case library of European IESE Business School.

Concept A5: Open platform

(1) Definition

The platforms Haier builds to utilize crowd storming, crowdsourcing and co-creation to empower its staff, break through organizational walls and connect with its customers and partners to solve problems.

(2) Correlative labels

a56: Open resources from society; a86: Knowledge ecosystem for knowledge sharing and creation; a28: Brand as resources; a29: Platform for adding value

(3) Explanation

Haier builds the open innovation platform to crack down the separation barrier. Crowd storming, crowdsourcing, and co-creation are all facets of a new capacity for Haier to empower their employees, break through organizational walls and connect with business partners and customers for solving problems. Haier has built various interactional platforms to meet the different needs of customers and partners. Zhongchuanghui platform is for users to customize products and make full use of ideas from customers. HOPE platform is for worldwide R&D resources to provide creative solutions based on interaction; Haidayuan platform is for module companies to provide competitive customized modules to Haier based on customer personalized needs. These platforms are independently operated but share data. All the stakeholders, even some of which do not belong to Haier group, can utilize the platform with frictionless entry and interact with each other to add value.

Through building open partnership ecosystem, customers get additional services from the ecosystems. The services mainly have two types: one is knowledge sharing or creation from the interactive communities and another is convenience from the business ecosystem. No matter the user is a common customer, a geek, a designer, or even a professional partner, he or she can find his interesting position and topic in the ecosystem. Users can utilize others' knowledge to develop their interests through the interactive ecosystems.

A6: Focus on customer value

(1) Definition

Haier is aiming to maximize customer value through meeting the personalized needs.

(2) Correlative labels

a48: Customer complaint as a business opportunity; a43: No development behind closed door; a19: Crowd customization; a66: Local customer knowledge for localization; a4: Salary by user instead of enterprise; a16: Localization; a10:

Quality consciousness

(3) Explanation

In the Internet era, user's demands have become the main driving force for service innovation. From Haier's viewpoint, the industry 4.0 is not just to replace the human labor with intelligent machines. The revolution needs not only high efficiency but also high accuracy. This means the first question Haier ask itself is producing for whom. As the development strategy requires, each employee is asked to know who is his/her customers and what values can be created for them. In order to solve the awareness of valuing customers' needs, in Haier's compensation mechanism, "pay by users" has superseded "pay by the enterprise". It is driving employees to become entrepreneurs who create value for users while realizing their own value.

The significance of creating value for customers can be tracked from the stage of start-up. Thirty years ago, home appliances were luxuries in China and there were few products in the markets. The maximum customer value at that time was functional value-good-quality products. Haier promised to provide the first-rate products without defective. However, soon after Zhang Ruimin took the role of general manager, he received a complaint letter about a defective product from a customer. He realized there was no future if there were no high-quality products. He called staff of quality control department down to the warehouse and inspected all the 400 refrigerators in the warehouse one by one. They totally found 76 defective refrigerators. In order to change the perception of product quality and improve to the level of "zero tolerance of error", the CEO picked up a sledgehammer and passed it to the corresponding responsible employee to smash those 76 defective refrigerators.

Now Haier has already outdone the stage of mainly focusing on product quality. It is aiming to maximize customer value through meeting the personalized needs. Haier implements various strategies to achieve the goal. The vast majority of Haier's management and employees in any foreign country were local people because they better understood the local culture and customer desire and they could design and deliver quality products to meet consumer demand. Moreover, many products, such as "JhuknaMat" refrigerator in India, Adiabatic icebox without power more than 100 hours in Pakistan, and Handheld washing machine "Coton", came from the interaction with local customers.

In the marketing strategy, the idea is also implemented. At Haier, it is becoming a rule that if you need advertisement to make promotion, it means your products or services still exist a far distance with your customers. Thus, in the phase of

creating ideas for product design, developers would begin to make deep interaction with customers. In order to understand what kind of air conditioner customers really wanted, Haier's developers had involved over 67,000 customers to join in the online discussion and got 30 million responses.

The new mode of interaction with customers forms a positive circulation to maximize customer values: users provide ideas and needs; micro-enterprises develop and manufacture; users give feedback timely; micro-enterprises upgrade and iterate products quickly.

Concept A7: Empowering employees

(1) Definition

Employees are able to bring in their own ideas and recourses to develop new products and services through the organizational platform.

(2) Correlative labels

a31: Success of micro-enterprises; a27: Internal venture capital for entrepreneur; a26: Each employee as a parallel node to customers and resource; a17: Entrepreneurial spirit; a18: Empowerment; a21: Self-managing

(3) Explanation

Haier made the first disruptive transformation on organizational structure in 2009, from a traditional hierarchy structure to an inverted triangle structure. The executives were at the bottom and employees at the top of the triangle. Managers provided employees support instead of giving orders. Employees were empowered with greater decision-making authority and freedom of action. With the bottom-up organization structure, Haier aimed to build a fast executing company that could involve each employee to self-manage and work with the competitive market rules while providing employees with their due wages based on their output performance.

From 2012, Haier has been implementing the networking strategy. It can connect various resources as an open Internet node, establish a user-centered ecosystem for value co-creation and winning together, and integrate them to add value for all stakeholders. Regarding the roles of a unit or employee in the new structure, Haier emphasizes the orientation of Node instead of Position. Position is empowered by the organization or direct supervisors, but the existence of node is based on a business contract or order, which means an objective. At Haier, a node may be a self-managing unit or just an individual employee. Nodes equally exist in the networking organization, driven by customers rather than leaders and meets customer demands through open connection with external resources. Every

employee may be a center to keep zero distance with customers.

With the new strategy of networking, staff could bring in their own ideas and recourses to develop new products and services for customers, with a view to building post-e-commerce ecosystems based on user value interaction for co-creation and winning together to add value for all stakeholders. With the chances Haier's platform creates, an employee could become a real entrepreneur. The employee may choose the internal venture capital to expand the new business or get funding from the society to organize a registered company.

By the end of 2015, Haier's platforms had attracted over 4,700 first-class external resources, 3 billion yuan of venture capital fund, 1,330 venture capital institutions, and 103 incubators, setting the stage for 1,160 projects. Over 3,800 node microenterprises and nearly one million micro-stores on Haier's platforms are socializing their capital and human resources. More than 100 microenterprises boast annual revenue of over 100 million yuan, and 22 have introduced VC, and 12 are valued at over 100 million yuan.

Concept A8: Keeping organization agile

(1) Definition

Haier is committed to make the organization respond flexibly and effectively to adopt the philosophy of “customer-value first.”

(2) Correlative labels

a30: Equality between internal and external resources; a23: Internal driver; a20: Eliminating middle management

(3) Explanation

In order to keep the organization agile, Haier got rid of 10,000 middle managers and transform the whole organization into a platform structure. It turns the functional departments into two platforms: a platform for sharing and a platform for driving. It emphasizes the reason that everyone or every unit exists is more competitive than their counterparts in the outside markets. As one interviewee said: “ To anyone at Haier, you have to make yourself, your unit, become competitive. Otherwise, you are equally replaced freely by others or outside resources.”

Concept A9: No customer interaction, no Haier

(1) Definition

It refers to the forefront strategy about the significance of customer interaction.

(2) Correlative labels

a32: Changes of information and knowledge resources; a46: No interaction, No iteration; a70: Not “guess” customer needs; a64: Huge timely interaction; a76: Running social community is actually running business; a82: Zealous users triggering a new industrial business; a24: Daily interaction with customer

(3) Explanation

The creed “No interaction, no Haier” is written in Haier’s development strategy. Haier is well known for the abilities of understanding consumer needs precisely and innovating rapidly to meet these needs. Customers are always the unchangeable core resource of Haier. It regards customer interaction as the premise of innovation. Otherwise, neither incremental innovation nor disruptive innovation can ensure its customer value. Haier interacts with one million fans on average per day. It is committed to change the situation of ‘guessing customer needs’ and instead listen to their voices carefully before production.

Concept A10: Powerful interaction

(1) Definition

It refers to the customer engagement of being able to create the personalized value, replacing the common interaction between providers and customers.

(2) Correlative labels

a44: Mutual value created by customers on community; a72: Amazing enthusiasm of fans; a69: A small customer idea opening a market segment; a25: Customer deep involvement

(3) Explanation

Haier got customers involved in developing the new products from the very beginning. They are making various powerful contributions to Haier. For the development of one game laptop, customers did not only contribute their ideas in the early stage, even after the first 50 laptops of trial production was made, it was these users that tested the laptops and gave their professional comments to improve the function before the mass manufacturing. For one air conditioner, the concept of ‘cool but not cold’, got from users’ responses, became the tagline for the product in Chinese promotion. The concept was the insight from customers, as opposed to a catchword imagined by marketing professionals. For one refrigerator, a young mother’s ideas really became a popular refrigerator with meter scale, which was popular among young families. There are lots of other examples showing the powerful interaction with customers.

The powerful interaction is effective. As one interviewee experienced, “I often

chatted online or phoned with our fans for several hours to listen to their various experiences with the trail product. After the product going in the market, their valuable advice was verified to be right and help us avoid market loss.”

Concept A11: Zero distance with customer usage

(1) Definition

It refers to the timely connection with customers through the sensor and miniaturization embedded in the product.

(2) Correlative labels

a85: APP-based customer experience; a83: Proactive service on smart appliance; a84: Cloud computing service; a33: Big data from connected appliances

(3) Explanation

The cloud computing system can provide the solutions whenever users need in their daily life, automatically diagnose the type of the problem when an exception happens, and send the information to service providers and users simultaneously.

Haier is using data obtained from sensors embedded in appliances to create innovative after-sales service offerings such as proactive maintenance to avoid using failures. Haier provides “automatic diagnosis, automatic feedback and proactive services” to users on Internet appliances embedded with intelligent sensors. It updates the mode of maintenance service from “providing reactive services after users’ report” to “providing proactive services before the problem occur”. It also maintains appliances in good condition and reduces lifecycle cost through the highly precise detection and proactive services. The system provides the best customer experience in the whole process of the product lifecycle.

Haier has many advantages such as technology innovation and corporate brand. But the most valuable one is the different view on customer value. We have been considering how to know customers’ ideas timely and meet their diverse and easily changing needs quickly. Haier’s Internet appliances provide timely connectivity with a broad selection of mobile devices, allowing the user to manage and control home appliances from anywhere in the world. Users are able to retrieve information and remotely control their appliances either from home or outside, allowing users to do more and worry less.

Concept A12: Interaction among customers

(1) Definition

It refers to the interaction customers make between each other.

(2) Correlative labels

a51: Mutual encourage between one customer and the other; a55: Customer creating new knowledge through interaction; a52: Customer Brainstorming; a53: Customer reminding

(3) Explanation

At the online communities, except for the interaction between Haier and its customers, we can also see the active interaction among customers.

“I get an inspiration from the post which suggested a combinative use of fan and air conditioner. Since air conditioner with a combination of the fan can make the cool air flow around, why does not install a device to scatter the cool air, such as air outlet that can rotate, or a deflector with the function of the fan, as other netizens suggested.” “I like the round hanging machine, which can also be seen as a home decoration. But I am afraid of the location. Because home decorations are usually set in the middle part of the wall, if the condition installed there, its pipes affects the esthetic appearance.”

“An air conditioner may be a painting, may be a wall clock. That means it can be anything users can imagine as wall ornaments.”

A13: Adapting to the changing lifestyle

(1) Definition

It refers to making organizational innovation to adapt to the new lifestyle in the social networking.

(2) Correlative labels

a67: Customized by the same zodiac of customers; a50: Active community; a58: Customer reserve co-designed product before production; a60: User resource means community; a63: Customer community as one key factor for mass customization; a68: Individuality driving Customization

(3) Explanation

According to McKinsey annual report in 2014, China had 633 million Internet users and the number of smart devices also rose from 380 million to 700 million in 2013 alone. These devices connecting to Internet networks are coming together to define the new customer situation.

Especially when Millennials become the main force of consumption, it is necessary to re-think the interactive methods owing to their distinctive lifestyles. One interviewee said: “When we made offline get-togethers to know and thank them. We found most of them do not like face-to-face meeting and they still focused on their smartphone. Now we interact with them mainly at the online

social community.”

Concept A14: Running community

(1) Definition

It refers to building the social community online around common interests to help Haier fulfill the strategy of mass customization.

(2) Correlative labels

a61: Different life styles of Millennial generation; a75: Geeks prefer the virtual world

(3) Explanation

Now user resource has become the competitiveness of Haier. User resource means community. Through organizing various communities around products, Haier can not only iterate products and services continuously, but also create new values.

Millennials have the strong self-awareness and are going to go to the trouble of pursuing individuality. They have various ideas to enrich their life, wanting the products with distinctive colors or modules, desiring the appliances embedded the latest technology they are in favor of. Haier’s interactive platform is committed to being an entry of those inspirations. Haier regards it as an inspiring direction of mass customization to combine design practice and the era of the minority group in the age of network.

The strategy of customization does not mean Haier can provide a different product or service to each customer who has a different need. Haier gives importance to developing customer communities to realize mass customization because there an opinion leader usually represents masses of customers who have the similar needs. For the mass customization, the ideas to customize a product completely come from users, and the evaluation of feasibility to the product is also made by users. Those who like the creative ideas will reserve the product. The order and its information will be automatically sent to Haier’s interconnected factories to manufacture.

Concept A15: Just for fun

(1) Definition

It means fun is the principle of designing any interactive activity

(2) Correlative labels

a42:No pulling but attracting customers; a39: Making interaction funny; a89: Creativity booming in free context; a74: Fans pursue for fun, not for money; a81: Fun as reward; a59: Visualization of order, production and transport processes

(3) Explanation

It is a big issue to attract more customers engaged in the process of corporate innovative experience. Haier has accumulated many successful methods to interacting with customers. The principle is creating fun for customers, not asking them to do what they feel reluctant. Customers just do what they like at the time when they want. Then, Haier just takes full use of the information and knowledge customers contribute in the process.

So in Haier's online community, there is no such a special topic to talk about their products. Instead, there are almost the topics closely related to the living scenarios, such as 'Super Mamas' Domination' and 'Super Foods Street'. It is easier to attract more regular customers to immerse themselves in these interesting topics and speak out what they are thinking.

In order to attract customers to come to our interactive platforms, Haier has begun to recruit many new employees who can create fun, such as movie directors, attractive persons, or joke tellers, to interact with customers. Actually, some opinion leaders in customers also have such characteristics. In some cases, it actually makes the interaction more smoothly and creates more original posts.

Fun is a motivator, one of the rewards. For example, customers' contribution to ThundeRobot is great, but what they really pursue is just for fun, not for money. These customers do not get monetary rewards from Haier. The motivation why they do is just because they like those things. Customers could do things for fun and determine their own courses of decision and action on social communities. Creativity is often undermined unintentionally in conventional work environments that were established to maximize business imperatives such as productivity and control. Customers will be more creative when they feel motivated primarily by the interest, satisfaction, and challenge of the work itself and not by extra managerial pressures.

Concept A16: Incubating customer self-actualization

(1) Definition

It refers to Haier's customer strategy of helping customers realize their own interests or ideas with their knowledge.

(2) Correlative labels

a88: Self-actualization as reward; a91:Self-actualization motivating a positive circle of knowledge; a90: Incubating self-actualization as service

(3) Explanation

The users, whose creative ideas are read by tens of thousands people online, got

the highest satisfaction they never got before just from product functions. When their ideas became products of Haier, their feelings are even more amazing. Fun is a motivation and self-actualization is one of the rewards.

The satisfaction, getting from the self-actualization of customers, upgrades the traditional service concept. A service was always defined as a delivered activity from a provider to a recipient. But in the current business model, Haier's users are highly satisfied by the services of self-actualization, which actually are their contribution to Haier although. The two-way interaction brings new services to customers. It activates a positive circle of knowledge and value creation between Haier and its customers, even other partners.

Concept A17: Enterprise-level big data

(1) Definition

It refers to the big data integrated from different enterprise-levels systems, which can describe the characteristics, likes and life habits of each Haier user.

(2) Correlative labels

a34: New value from big data; a38: Scenario application of big data; a37: Big picture of customer by big data; a36: Big social data of customer

(3) Explanation

Besides the data of registration, products selling and after-sales, Haier's CRM platform adds the dynamic data of customer interactive activities on social communities, so the platform is called Social CRM. It includes all the data related to the relationship between Haier and its customers, and the data is not isolated by interconnected. It uses big data mining to analyze the topics Haier users are discussing, which users are opinion leaders and their likes. All the integrative data can describe the characteristic, likes and life habits of each Haier user. The data is coded with tags, which have 7 levels, nearly 150 dimensions, and more than 5000 nodes.

The big data has three key values: providing proactive services, accurate marketing, and interactive innovation. Haier utilizes the technology of data fusion and user identification and has built 10 data models in 3 categories, which define well the priority of user potential needs. Meanwhile, the application of data is to meet the requirement of different scenarios for customer services. Data product for interactive innovation is made to help developers understand user pain points, the characteristics of popular products, the distribution of user interests and the active customers for interaction. Developers can get visual information: what complaints users have, which products and which function; experience pain

points, and which experience should be optimized.

Concept A18: Internal market chain

(1) Definition

It means the internal process is regulated in consistence with the outside market.

(2) Correlative labels

a15: Stringent regulation; a12: Marketing initiative inside; a14: Mutual contribution

(3) Explanation

From the Strategic Business Unit (SBU), to market chain, self-operation unit, and to current employee-entrepreneur, Haier has always been keeping the roles of internal market chain inside its organization. That means every organizational behavior should be responsible for the requirements from the outside real markets; the pressure should not be burdened only by sales or marketing people. Everyone is required to have the sensitiveness on the changes of customer needs and seek innovative solutions to meet them.

Concept A19: Business ecosystem

(1) Definition

It refers to the ecosystem made through uniting other business partners.

(2) Correlative labels

a35: More partners connected; a87: Professional and convenient service from business ecosystem

(3) Explanation

Through making Internet appliances, Haier is producing a major engine for creating new services. Increasingly, the product is merely a component in the total customer experience. Customers can get faster and easier services from the business ecosystems Haier has built. Haier's real goal is to create the total customer experience. It is learning how to do this with each of its products. Taking the above cases as examples, there is a life circle of engagement with eating fresh foods that include buying a refrigerator as a small component. Haier maximizes the rest of the experience. Listening music when cooking, watching the recipe video by experts online or video chatting with a master according to the contents inside, buying the lacking foods immediately, and so on. Its users can purchase the supplementary foods conveniently from the display window where the services from Haier's e-commerce partners are embedded. The users of the smart oven, they can get the package of ingredients in suggested proportion directly through its smartphone APP.

Concept A20: Customer as marketer

(1) Definition

It refers to the phenomenon of customers acting as the creator and ambassador for marketing promotion through social networks.

(2) Correlative labels

a80: Interactive marketing; a78: customer as marketer; a77: social network empowering customers; a79: Brand stories made by customers

(3) Explanation

In today's social networks, customers have more power than ever. Haier is good at making full use positive comments to provide social proofing and attract new customers. Besides that, Haier also proactively invites the user to act as the creator and ambassador for marketing promotion through social networks. Haier utilizes a variety of interactive activities to innovate its marketing.

The 20 concepts above are established based on the analysis of the intrinsic logic among the 91 labels. They are the basis of the next more refined coding stage- Focused Coding.

5.3 Focused Coding

5.3.1 The purpose of focused coding

Focused Coding is employed to identify the emerging core categories. In the process, if the categories cannot establish the logic structure of a case story, it is compulsory to return to the stage of data collection to enrich the data until the theory is saturated.

5.3.2 Categorization

On the basis of the 20 concepts, with the tool of MAXQDA, we created 9 categories to further refine the data towards inducing the line of findings. They are Continuous disruptive management transformation, Organizational capability, No interaction, no Haier, Platform Ecosystem, Customer Community, Digital engagement from customer, Knowledgeable engagement from customer, Social engagement from the customer, New customer experience (Table 4-2). These categories are marked with AA plus numbering, such as "AA1: Continuous disruptive management transformation".

Because all the concepts have been given the clear and contextual meanings in the case, it is easy to understand these categories that are created by integrated relevant concepts (Figure 5-4). We do not need to specifically define the categories. The figure shows a snippet of interview script on the right, along with the tree structure of

categories on the left.

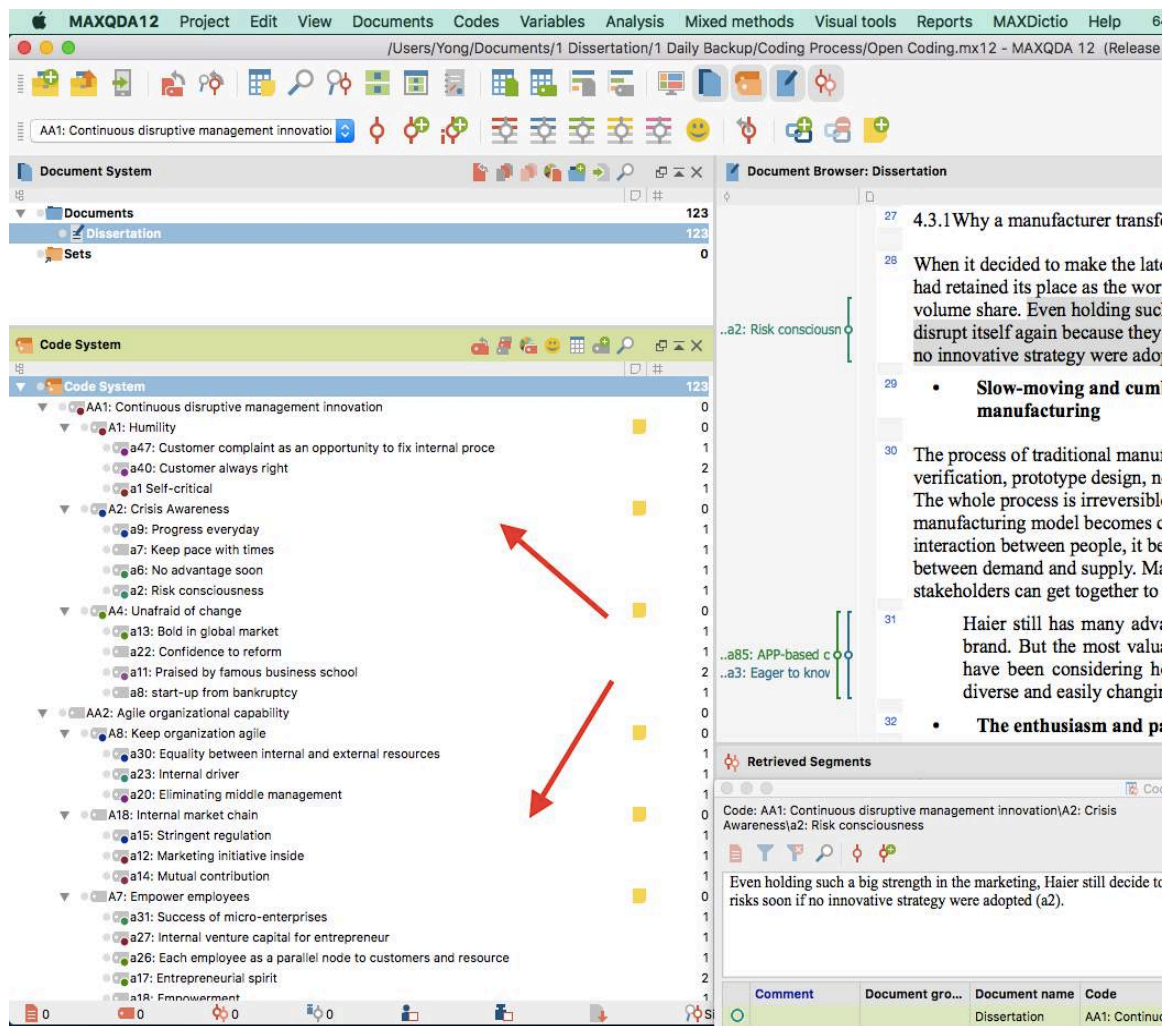


Figure 5-4: Using MAXQDA to create the tree structure of categories

Thus, the tree structure of categories has been completed in the qualitative analysis software. The structure is exported into the following Excel format (Table 5-2). It helps us to focus on understanding the relationship between labels, concepts, and categories. If it is necessary, it is convenient to check its content of the raw text and writing memos in the software.

Table 5-2: The tree structure of categories (with concepts and Labels)

Code System	
AA1: No interaction, no Haier	
A6: Focus on customer value	
	a48: Customer complaint as a business opportunity
	a43: No development behind closed door
	a19: Crowd customization
	a66: Local customer knowledge for localization
	a4: Salary by user instead of enterprise
	a16: Localization

a10: Quality consciousness
A9: No customer interaction, no Haier
a32: Changes of information and knowledge resources
a46: No interaction, No iteration
a70: Not “guess” customer needs
a64: Huge timely interaction
a76:Running social community is actually running business
a82: Zealous users triggering a new industrial business
a24: Daily interaction with customer
AA2: Continuous disruptive management innovation
A1: Humility
a47: Customer complaint as an opportunity to fix internal process
a40: Customer always right
a1 Self-critical
A2: Crisis Awareness
a9: Progress everyday
a7: Keep pace with times
a6: No advantage soon
a2: Risk consciousness
A4: Unafraid of change
a13: Bold in global market
a22: Confidence to reform
a11: Praised by famous business school
a8: start-up from bankruptcy
AA3: Agile organizational capability
A8: Keep organization agile
a30: Equality between internal and external resources
a23: Internal driver
a20: Eliminating middle management
A18: Internal market chain
a15: Stringent regulation
a12: Marketing initiative inside
a14: Mutual contribution
A7: Empower employees
a31: Success of micro-enterprises
a27: Internal venture capital for entrepreneur
a26: Each employee as a parallel node to customers and resource
a17: Entrepreneurial spirit
a18: Empowerment
a21: Self-managing
AA4: Platform Ecosystem
A5: open platform
a56: Open resources from society
a86: Knowledge ecosystem for knowledge sharing and creation
a28: Brand as resources
a29: Platform for adding value
A19: Business ecosystem
a35: More partners connected

a87: Professional and convenient service from business ecosystem
AA5: Customer Community
A13: Adapt to the changing lifestyle
a61: Different lifestyles of Millennial generation
a75: Geeks prefer the virtual world
A14: Running community
a67: Customized by the same zodiac of customers
a50: Active community
a58: Customer reserve co-designed product before production
a60: User resource means community
a63: Customer community as one key factor for mass customization
a68: Individuality driving Customization
AA6: Digital engagement from customer
A17: Enterprise-level big data
a34: New value from big data
a38: Scenario application of big data
a37: Big picture of customer by big data
a36: Big social data of customer
A11: Zero distance with customer usage
a85: APP-based customer experience
a83: Proactive service on smart appliance
a84: Cloud computing service
a33: Big data from connected appliances
AA7: Knowledgeable engagement from customer
A3: Zero distance with customer knowledge
a65: 200 originalities per day
a49: Customer as skillful expert
a73: Geeks serve other customers with no charge
a54: Interactive design
a57: Timely iterative design
a71: Geeks working as developers
a45: Experience exchange center
a62: Digital connected generation making timely iteration true
a41: Knowledge in customer chat
a5: Beyond transaction
a3: Eager to know users as well as possible
A12: Interaction among customers
a51: Mutual encourage between one customer and the other
a55: Customer creating new knowledge through interaction
a52: Customer Brainstorming
a53: Customer reminding
AA8 Social engagement from customer
A10: Powerful interaction
a44: Mutual value created by customers on community
a72: Amazing enthusiasm of fans
a69: A small customer idea opening a market segment
a25: Customer deep involvement

A20: Customer as marketer
a80: Interactive marketing
a78: customer as marketer
a77: social network empowering customers
a79: Brand stories made by customers
AA9 New customer experience
A16 Incubating customer self-actualization
a88: Self-actualization as reward
a91: Self-actualization motivating a positive circle of knowledge
a90: Incubating self-actualization as service
A15 Just for fun
a42: No pulling but attracting customers
a39: Making interaction funny
a89: Creativity booming in free context
a74: Fans pursue for fun, not for money
a81: Fun as reward
a59: Visualization of order, production and transport processes

Labels, concepts, and categories are arranged as table 5-3 to show in parallel.

Table 5-3: Labels, Concepts, and Categories

Labeling	Conceptualization	Categorization
a1: Self-critical a2: Risk consciousness a3: Eager to know users as well as possible a4: Salary by user instead of enterprise a5: Beyond transaction a6: No advantage soon a7: Keep pace with times a8: start-up from bankruptcy a9: Progress everyday a10: Quality consciousness a11: Praised by famous business school a12: Marketing initiative inside a13: Bold in global market a14: Mutual contribution a15: Stringent regulation a16: Localization a17: Entrepreneurial spirit a18: Empowerment a19: Crowd customization a20: Eliminating middle management a21: Self-managing a22: Confidence to reform a23: Internal driver	A1: Humility (a1, a40, a47) A2: Crisis awareness (a2, a6, a7, a9) A3: Zero distance with customer knowledge (a3, a5, a41, a49, a54, a57, a62, a65, a71, a73) A4: Unafraid of change (a8, a11, a13, a22)	AA1: No interaction, no Haier (A6, A9) AA2: Continuous disruptive management transformation (A1, A2, A4) AA3: Organizational capability (A7, A8, A18) AA4: Platform Ecosystem (A5, A19)

<p>a24: Daily interaction with customer a25: Customer deep involvement a26: Each employee as a parallel node to customers and resources a27: Internal venture capital for entrepreneur a28: Brand as resources a29: Open platform for adding value a30: Equality between internal and external resources a31: Success of micro-enterprises a32: Changes of information and knowledge resources a33: Big data from connected appliances a34: New value from big data a35: More partners connected a36: Big social data of customer a37: Big picture of customer by big data a38: Scenario application of big data a39: Making interaction funny a40: Customer always right a41: knowledge in customer chat a42: No pulling but attracting customers a43: No development behind closed door a44: Mutual value created by customers on community a45: Experience exchange center a46: No interaction, No iteration a47: Customer complaint as an opportunity to fix internal process a48: Customer complaint as a business opportunity a49: Customer as skillful expert a50: Active community a51: Mutual encourage between one customer and the other a52: Customer Brainstorming a53: Customer reminding a54: Interactive design a55: Customers creating new knowledge through interaction a56: Open resources from society a57: Timely iterative design a58: Customer reserve co-designed product before production a59: Visualization of order, production and transport processes a60: User resource means community</p>	<p>A5: Open platform (a28, a29, a56, a86) A6: Focus on customer value (a4, a10, a16, a19, a43, a48, a66) A7: Empower employee (a17, a18, a21, a26, a27, a31) A8: Keep organization agile (a20, a23, a30) A9: No interaction, No Haier (a24, a32, a46, a64, a70, a76, a82) A10: Powerful interaction (a25, a44, a69, a72) A11: Zero distance with customer usage (a33, a83, a84, a85) A12: Interaction among customers (a51, a52, a53, a55) A13: Adapt to the changing lifestyle (a61, a75)</p>	<p>AA5: Customer Community (A13, A14) AA6: Digital engagement from customer (A3, A12) AA7: Knowledgeable engagement from customer (A3, A12) AA8: Social engagement from customer (A10, A20) AA9: New customer experience (A15, A16)</p>
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<p>a61: Different lifestyles of Millennial generation</p> <p>a62: Digital connected generation making timely iteration coming true</p> <p>a63: Customer community as one key factor for mass customization</p> <p>a64: Huge timely interaction</p> <p>a65: 200 originalities per day</p> <p>a66: Local customer knowledge for localization</p> <p>a67: Customized by the same zodiac of customers</p> <p>a68: Individuality driving Customization</p> <p>a69: A small customer idea opening a market segment</p> <p>a70: Not “guess” customer needs</p> <p>a71: Geeks working as developers</p> <p>a72: Amazing enthusiasm of fans</p> <p>a73: Geeks serve other customers</p> <p>a74: Fans pursue for fun, not for money</p> <p>a75: Geeks prefer the virtual world</p> <p>a76: Running social community is actually running business</p> <p>a77: social network empowering customers</p> <p>a78: customer as marketer</p> <p>a79: Brand stories made by customers</p> <p>a80: Interactive marketing</p> <p>a81: Fun as reward</p> <p>a82: Zealous users triggering a new industrial business</p> <p>a83: Proactive service on smart appliance</p> <p>a84: Cloud computing service</p> <p>a85: APP-based customer experience</p> <p>a86: Knowledge ecosystem for knowledge sharing and creation</p> <p>a87: Professional and convenient service from business ecosystem</p> <p>a88: Self-actualization as reward</p> <p>a89: Creativity booming in free context</p> <p>a90: Incubating self-actualization as service</p> <p>a91: Self-actualization motivating a positive circle of knowledge and value creation</p>	<p>A14: Running community (a50, a58, a60, a63, a67, a68)</p> <p>A15: Just for fun (a39, a42, a59, a74, a81, a89)</p> <p>A16: Incubating customer self-actualization (a88, a90, a91)</p> <p>A17: Enterprise-level big data (a34, a36, a37, a38)</p> <p>A18: Internal market chain (a12, a14, a15)</p> <p>A19: Business ecosystem (a35, a87)</p> <p>A20: Customer as marketer (a77, a78, a79, a80)</p>	
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5.4 Theoretical Coding and findings

Through the further analysis of the 9 categories, their association with concepts and the interactive comparison with the raw context, we can find the saturation of theory describing the information system infrastructure of customer interaction at Haier. The theoretical findings from this case are summarized as follows.

5.4.1 The intrinsic logic of categories

As Chandler (1962) suggested, organizational structure must follow strategy. In other words, a new strategy can be successfully implemented only if the executives are willing to wrench their organizations into new forms. Along with the theory, the intrinsic logic of the categories is depicted in figure 5-5.

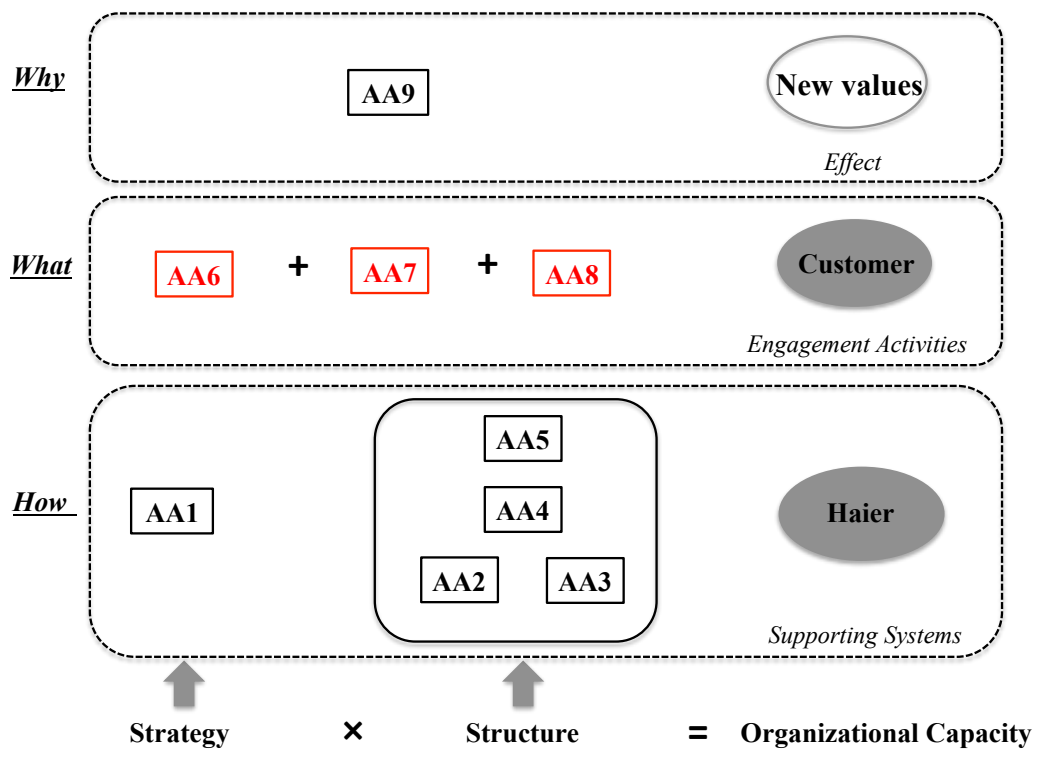


Figure 5-5: The intrinsic logic of 9 categories

In order to realize the creed “No interaction, no Haier” for maximizing customer value, Haier made continuous disruptive management innovation to get the agile organizational capacity. Through building the open platforms and customer communities, customers were attracted to engage deeply in digital, knowledgeable

and social ways. In the process, customers get brand-new experiences of self-actualization and funny interaction. They used their enthusiasm and knowledge to meet their own interests that were anything they thought interesting and satisfying. New value is created solely as a by-product. Therefore, AA6, AA7 and AA8 are the core categories to the research. They present the three aspects in upgrading customer interaction.

- Category AA6: Digital engagement from customer
- Category AA7: Knowledgeable engagement from customer
- Category AA8: Social engagement from customer

Among other categories, AA1, AA2, AA3, AA4 and AA5 act as supporting roles to the core categories, and AA9 as the outcome.

5.4.2 The upgrade of customer interaction

New interaction generates new values. In the early development stages, Haier had transformed the customer interaction from inert touch points into live interaction by providing intimate services. Currently, Haier further upgrades the interaction to customer engagement by building IT-based open platforms to attract customers contributing their knowledge (Figure 5-6).

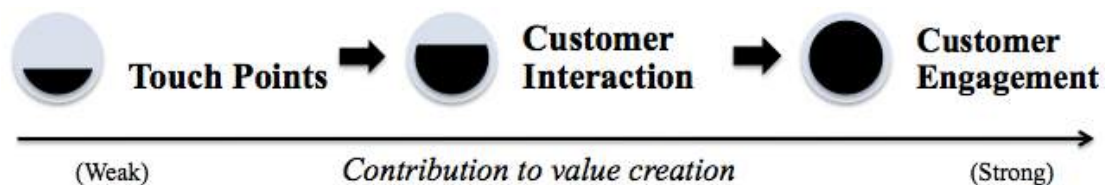


Figure 5-6: The upgrade of customer interaction

New customer values are co-created when the interaction is upgraded into customer engagement. Gouillart (2011) argued that touch points are only the company's side of the interaction. When firms evolve their customer-facing processes with customer processes, they inevitably find that the customer experience improves. Customer engagement was depicted as the intensity of an individual's participation in and connection with an organization's offerings and/or organizational activities (Vivek et al., 2012). We define it as a process of customer self-actualization, where customers use their enthusiasm and knowledge to do what they are interested in.

The finding is concluded from the comprehensive analysis of the three core categories: digital engagement, knowledgeable engagement and social engagement

from customers. Customers are attracted to engage timely and deeply in digital, knowledgeable and social ways.

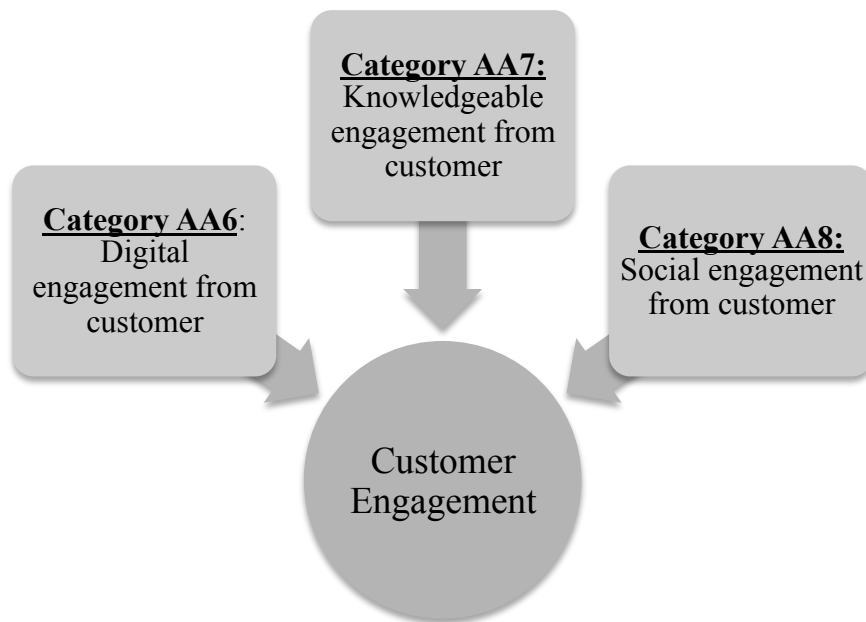


Figure 5-7: The three aspects of customer engagement

In the brand-new customer engagement, it is necessary to highlight the following two sub-findings.

(1) Self-actualization as a customer value

The sub-finding is concluded from **the concept A16 (Incubating customer self-actualization)**.

Customer value is the benefit that customers enjoy or experience from the receipt of products and service. Woodruff (1997) defined customer value as: “is a customer's perceived preference for and evaluation of those product attributes, attribute performances, and consequences arising from use that facilitate (or block) achieving the customer's goals and purposes in use situations. (P.142)” Advanced management of technology moves its focus to the higher value added services innovations by integrating more sophisticated service functions to the conventional products and systems (Kameoka, 2008). MacKay (1999) discussed that a product's or a service's appeal is an amalgam of rational and emotional factors. The emotions play a part in every purchase decision.

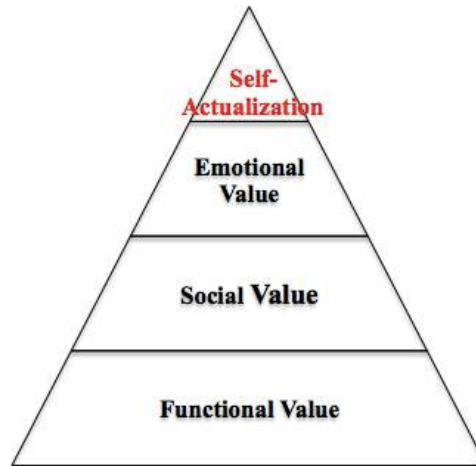


Figure 5-8: Self-actualization as the upper level of customer value

Sweeney and Soutar (2001) revealed a stable structure of four dimensions to describe customer value. Functional value on performance and quality refers to the utility derived from the perceived quality and expected performance; functional value on price and value for money is the utility derived from the product due to the reduction of its perceived short term and long term costs; social value refers to the utility derived from the product's ability to enhance social self-concept; emotional value is the utility derived from the feelings or affective states that a product generates. These four-dimension values are created based on the offerings from the provider. Customer self-actualization, as a new experience adds to the total customer value (Figure 5-5). We emphasize this point because it is created by customers themselves. It exists in the interactive process on the open platforms. Customer value is far beyond product function and is anything that customers think is useful to them.

(2) The service for Self-Serving

The sub-finding is concluded from **the category AA9 (New customer experience)**.

The emotional award, which customers get from the self-actualization, develops the traditional service concept. A service was always defined as a delivered activity from the provider to the customer. But in the current business model, Haier's customers are highly satisfied by the services of incubating self-actualization, which actually are their contribution to Haier although. The two-way interaction brings new services to customers and Haier itself. It activates a positive circle of knowledge and value creation between Haier and its customers, even other partners.

Chaper 6 Conclusions

In this chapter, we briefly summarize the main points and the reflection on the research from the following aspects. First, the major findings are summarized through answers to the research questions. Then the theoretical implications of such findings and the model of Customer Self-Serving Platform (CSSP) are presented. Next, we discuss the practical implications, where we provide some suggestions for practitioners. Finally, we suggested how the study and research area could be further developed.

6.1 Answers to research questions

With the previous work of preceded scholars and our qualitative analysis of research data we collected from the case company, the major findings from the above chapters are summarized through answers to each of the subsidiary research questions and a synthesis in the answer to the major research questions.

SRQ1: Why did the manufacturer have to upgrade customer interaction in the mobile Internet era?

First, manufacturers try to keep closer with the customer in order to adapt to the changing markets toward knowledge and information explosion. With the power of mobile information technology, customers become well-informed and knowledgeable; they are not willing to accept experiences that are fabricated by manufacturers. Increasingly, customers want to shape these experiences themselves or in tandem with other customers. Haier could not meet its customers, so did among the customers, because in the past it just sold its products to customers through the one-way transaction. Haier thinks over the relationship with users and is committed to filling the gap existing in the situation. In order to design popular products and services, Haier wants to realize the earliest interaction with customers to achieve a solution that responds to customer wants and needs. As many interviewees claimed, they believe Knowledge is not created by experts only; instead, everyone can hold great ideas and be an expert in his/her specific field. When others may think messages Internet users send are just for show or fun, Haier wants to find useful information and knowledge via effective interaction.

Second, in mass manufacturing, the traditional development methods were slow-moving comparing with the rapidly changing and diverse customer needs. The process of traditional manufacturing includes market research, solution verification, prototype design, new product introduction and mass manufacturing etc. The whole process is irreversible. Facing the diverse needs in the Internet era, Haier judged this

manufacturing model becomes cumbersome. If Haier takes advantage of mobile Information technology to make deep interaction with customers, it becomes possible to realize the timely integration between demand and supply. Manufacturing in the Internet era is iterative. Haier is committed to change the situation of ‘guessing customer needs’ and instead listen to their voices carefully before production.

Moreover, manufacturers have to interact with customers in the way they prefer. As smartphones are replacing the two things people have long carried in pockets-keys and wallets, the mobile Internet has changed the way people interacting with each other. Social media and social networks are building platforms that can change the way we create- called social production or co-creation. Mobile makes it possible to engage whenever and wherever-which in practice means everywhere and all the time. Call center solely by telephone, email or face-to-face communication lag behind for listening to customers’ ideas and getting them involved.

SRQ2: How could it upgrade the interaction with customers?

Haier is well known for the abilities of understanding consumer needs precisely and innovating rapidly to meet these needs. Customers are always the unchangeable core resource of Haier.

Haier raises ‘customer interaction’ to the height of corporate strategy. It embeds the creed “No interaction, no Haier” into organizational behaviors. In the Internet era, customer demands have become the main driving force for service innovation. From Haier’s viewpoint, the industry 4.0 is not just to replace the human labor with intelligent machines. The revolution needs not only high efficiency but also high accuracy. This means the first question Haier ask itself is producing for whom. As the development strategy requires, each employee is asked to know who is his/her customers and what values can be created for them

Haier made continuous disruptive management innovation to get the agile organizational capacity. In order to keep the organization agile, Haier got rid of ten thousand middle managers and transform the whole organization into a platform structure. It turns the functional departments into two platforms: a platform for sharing and a platform for driving. It emphasizes the reason that everyone or every unit exists is more competitive than their counterparts in the outside markets. From 2012, Haier has been implementing the networking strategy. It can connect various resources as an open Internet node, establish a user-centered ecosystem for value co-creation and winning together, and integrate them to add value for all stakeholders.

Through building the open platforms and customer communities, customers were

attracted to engage deeply in digital, knowledgeable and social ways.

SRQ3: What kinds of service values had been created through these interactions?

Through the new interaction, Haier, its customers and even its relevant partner (co-) create various service values.

First, Haier could provide customers proactive and cloud computing services. Haier was using data obtained from sensors embedded in appliances to create innovative after-sales service offerings such as proactive maintenance to avoid using failures. Haier provided “automatic diagnosis, automatic feedback and proactive services” to users on Internet appliances embedded with intelligent sensors. The cloud computing system could provide customers the solutions whenever they need in their daily life, automatically diagnose the type of the problem when an exception happens, and send the information to service providers and users simultaneously. Haier’s Internet appliances provide timely connectivity with a broad selection of mobile devices, allowing the user to manage and control home appliances from anywhere in the world. Users are able to retrieve information and remotely control their appliances either from home or outside, allowing users to do more and worry less. It also maintains appliances in good condition and reduces lifecycle cost through the highly precise detection and proactive services. The system provides the best customer experience in the whole process of the product lifecycle.

Second, customers could get additional services of knowledge sharing and creation from the interactive platforms and communities. No matter the user is a common customer, a geek, a designer, or even a professional partner, he or she can find his interesting position and topic in communities. Customers could also utilize others’ knowledge to develop their interests through the interactive communications.

Third, users can get faster and easier services from the business ecosystems. For example, for the users of smart oven, they can get the package of ingredients in suggested proportion directly through its smartphone APP. The users of smart refrigerators can purchase the supplementary foods conveniently from the display window where the services from Haier’s e-commerce partners are embedded.

Finally, customers achieved their self-actualization of their own hobbies or interests through the interaction with Haier and other customers. The current users, especially Millennials, have the strong self-awareness and creative ideas to enrich their life. When their posters are liked and forwarded by other netizens, the users are encouraged positively to create more with the next things. They got the highest satisfaction they never got before just from product functions. When their ideas

became products of Haier, their feelings were even more amazing.

MRQ: What new customer interactions did the manufacturer develop to accelerate servitization strategy implementation in the mobile Internet era?

Start with openness and willingness to be wrong, which helps firms learn from failure timely rather than being afraid to fail (Shetlon, 2013). Haier states the same belief in its core values, the customer is always right and Haier should always be self-critical. It is the basic motivation for Haier to create more customers.

In order to know the customer well to maximize customer value, Haier saw the creed “No interaction, no Haier” as the strategy for product and service innovation. It regards customer interaction as the premise of innovation. Otherwise, neither incremental innovation nor disruptive innovation can ensure its customer value.

First, Haier can keep timely connection with its customers through smart products. Haier updates its home appliances to Internet appliances. Internet appliances are playing an important role in happy life solutions in the Internet age. Haier has launched a variety of Internet appliances in each of seven smart ecosystems: food, air, cleaning, water, security, entertainment, and education. These products are interconnected to be the entry for smart life. Haier has seen the data collected from Internet appliances as the top-drawer data asset in future. These products bring the timely interaction among machine, human and environment, and collects the data from temperature, to energy cost, using time, using place, using habit, air quality and the like. The knowledge getting from big data informs the creation of new service offerings and the design of future products.

The interaction for knowledge sharing and value creation is made through open platforms and communities. Now Haier has eight channels, like online chatting, interactive platforms, and social medias, to provide zero distance service to its customers and create faster and more direct interaction with its customers. These channels help Haier interacts with one million fans on average per day. It comes up with over two hundred originalities. Many products, such as “JhuknaMat” refrigerator in India, Adiabatic icebox without power more than one hundred hours in Pakistan, and Handheld washing machine “Coton”, came from the interaction with customers.

Haier realized the visualization of customer experience in the whole process from order to production in its interconnected factories and logistics position. Via the APP, customers are easy to evaluate its services or make comments. Haier’s performance appraisal system for service staff is running based on the evaluation from customers, instead of the previous evaluation from their managers.

Haier also proactively involved the outside customer in acting as the creator and ambassador for marketing promotion through social networks. Haier utilizes a variety of interactive activities to innovate its marketing. In the meantime, as an internal marketing rule, the idea is also implemented. At Haier, it is becoming a rule that if the developer needs additional advertisement to make promotion, it means the product or service still exist a far distance with its customers. Thus, in the phase of creating ideas for product design, developers would begin to make deep interaction with customers.

Haier interacts with one million fans on average per day. It is committed to change the situation of ‘guessing customer needs’ and instead listen to their voices carefully before production. In the process, customers get brand-new experiences of self-actualization and funny interaction. They used their enthusiasm and knowledge to meet their own interests that were anything they thought interesting and satisfying. New value is created solely as a by-product. The new mode of interaction with customers forms a positive circulation to maximize customer values: users provide ideas and needs; micro-enterprises develop and manufacture; users give feedback timely; micro-enterprises upgrade and iterate products quickly.

6.2 Theoretical implications

The research explores how manufacturers can take advantage of mobile information technology to change the manner in which they interact with their customers, the manner in which value is created, and the manner in which the servitization is performed.

Many scholars have argued early involvement with the customer is essential for manufacturers to design effective services. Customer orientation, as key success factor of implementing servitization strategy, enables manufacturers to achieve a solution that responds to customer wants and needs. (Baines et al., 2009; Baines and Lightfoot, 2013; Oliva and Kallenberg, 2013). The servitization literature lacks the empirical insight and model into customer interaction that would enhance servitization of an industrial company. The present study tries to respond to that void in the literature by proposing the mode in Figure 6-1.

When manufacturers commit themselves to design the services and products that customers truly want, to be effective, they must involve customers as early as possible in the process. More importantly, customers could participate in a manner that they like, at any time and at any place they prefer. To meet the two critical factors, it is imperative for manufacturers to take advantage of information technology to create platforms by which customers are willing to contribute their enthusiasm and

knowledge. The platforms are defined as Customer Self-Serving Platforms (CSSP). Service is the application of knowledge and skills for another party's benefit (Vargo and Lusch, 2008a) and a supporting activity to help an individual or organization to achieve its objective (Kameoka, 2007; Mathieu, 2001). A CSSP is a platform on which customers can exert voluntary efforts that utilize their knowledge to meet their own interests. Consequently, added value is created. On the platform, customers are involved as early and as deeply as possible.

When customers are attracted by something funny or inspired by a vision, many of them are willing to make voluntary efforts to engage in what they are interested in. CSSP meets the emerging situation of customer voluntary involvement in the mobile Internet era. The CSSP incorporates three parts: 'Product', running as one part of service platforms to ensure customer digitally engaged; the manufacturer's open internet platforms, allowing everyone access to making the contribution and keeping knowledgeable engagement; and the Social Networking Service (SNS). Manufacturers have to embed sensors, chips, and wireless connections into their products and upgrade the product to run one part of a service platform. Application programming interfaces (APIs) provide a standard means for manufacturers to obtain data from products. In business, the rising value of data and information in products and services is being attached more and more importance to. Manufacturers, their partners or other stakeholders may have creative ideas and innovative business models on how to use the data to create new values. Advanced customers drive application innovation by contributing their knowledge to the forum and community via the Internet platform and various communities. These customers play a leading role in the platform and SNS. In the We Media era, customers rapidly spread word of mouth. All, particularly advanced customers, exert the crucial influence on other potential customers. This word-of-mouth has primarily replaced the conventional marketing functions of manufacturers.

These three parts affect and promote each other. The interactive power brings new opportunities for the manufacturer to extend its conventional single business to various ecosystems. In the research, we found the manufacturer builds three ecosystems:

- Business ecosystem
- Knowledge ecosystem
- Social ecosystem

Around the scenario of customer use, the manufacturer allies its partners to form a

business ecosystem and provide the total service in use, which brings convenience or brand new services its customers. Around the innovation of product and service, it attracts common customers, idea kings, geeks, zealous poster and industrial solution providers to form knowledge ecosystem, which innovates its products and services customers really want. Around the marketing, it involves customers to form a social ecosystem, where customers act as creators and ambassador of interactive marketing.

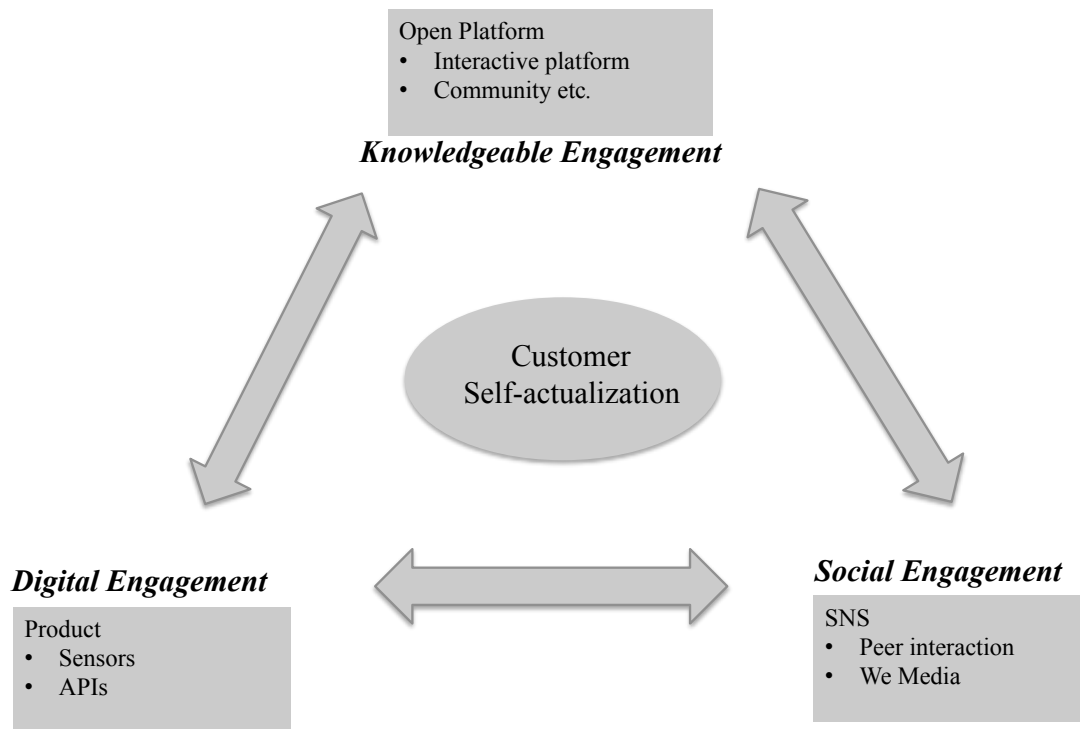


Figure 6-1: Customer Self-Serving IT Infrastructure

The CSSP provides the platform on which customers serve themselves and utilizes their knowledge to meet their own interests. New value is created solely as a by-product. It is a process of self-serving and eventually motivated by self-actualization of customers. The emotional award extends the traditional service concept and as a new experience adds to the total customer value.

6.3 Practical implications

First, it is time for manufacturers to embed sensors and interconnected miniaturization to make their products smart. It adds enormous value to the customer experience of using the product and attracts a mutually beneficial ongoing interaction.

Second, the closed-door mode of research and development is filled with risks, and manufacturers should re-evaluate it and upgrade the mode according to their industrial

situation. With the power of the Internet and new digital technology, manufacturers are able to timely connect with their customers and business partners and make effective interaction with them. This helps them develop the products and services customers really want.

Moreover, it is the time manufacturers should value the power of platform and ecosystem business. For the leading manufacturer, it has the ability and necessity to build open platforms to attract its stakeholders together to develop ecosystem business. For the ordinary manufacturer, it seems not easy or not necessary to build its own platform. However, it is necessary to find suitable open platforms and join them. It can leverage resources it does not own and create a compelling experience for customers in a similar way.

Finally, the CSSP is a platform on which customers can exert voluntary efforts that utilize their knowledge to meet their own interests. Consequently, added value is created. In the first two phases of servitization, manufacturers focus on their internal capacity to design services, based on their own research and assuming it could fulfill their customers' needs. Comparing the previous two phases, the CSSP produces blocks for systems that can change the manufacturer's business model and the means of interacting with customers. On the platform, customers are involved as early and as deeply as possible. It can create a differentiated advantage for the manufacturer and great value for its customers. The manufacturers' benefit is that they are able to be extracted from the dilemma of servitization. A contrast of the three phases of servitization is summarized in table 6-1.

Table 6-1: The contrast of three phases servitization

Features	The Phases of Servitization		
	1st Phase	2nd Phase	3rd Phase
	Product-Related services	PSS	CSSP
Role of Product	Full offering	Key offering	One part of the service platform
Value proposition	Product function	Manufacturer-based solution	Customer-driven solution
Value Creator	Manufacturer		Manufacturer + Customer
Core Capacity	Product, cost and brand	Expert in the field of customer business	Expert in the ecosystem of industry
Risk	Commodity trap	Service cost-effectiveness	Platform openness and viscosity

6.4 Research limitations

This research is based on the study of a B2C manufacturer. The extent to which our findings may be extended to B2B manufacturer remains to be explored. Whether the findings will apply equally in other industrial contexts cannot be stated. However, the depth of evidence is significant and allows analytical generalizations, which could lead us to tentative propositions for future research.

6.5 Suggestions for future research

Customer engagement is one key success factor for manufacturers to make effective service innovation in the mobile Internet era. We present the new concepts and model on customer interaction including self-actualization and self-serving platform. We suggest this study could be continued to formulate the questions like how to cope with the challenges of the self-serving platform in B2B industry.

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To build the customer self-serving platform model in my research, I deeply interview Haier-the biggest home appliance manufacturer in the world. The six senior managers and the coordinator for enterprise-university cooperation discussed with me repeatedly and helped me even with their busy schedule. In Japan, the senior managers of Hitachi Construction Machinery Co., Ltd accept my interview and give me so much helpful advice. I owe deep gratitude to all of you.

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Appendix 1: Interview application and semi-instructed questions

(The main points of the content are similar to the Research Questions in the dissertation.)

海尔案例研究-采访提纲

研究背景

在互联网知识经济时代，企业无法再以产品或制造的思维模式为客户创造价值。企业传统的生产方式是在内部完成价值创造，然后以交易的方式交付给客户(Value-in-Exchange)。客户在价值创造过程中很少或几乎没有参与，这种产品主导逻辑(Goods-Dominant Logic)在知识经济下缺乏竞争力并远离客户价值需求。相反，服务主导逻辑(Service-Dominant Logic)主张，有竞争力的价值创造模式是与客户实现价值共创(Value Co-creation)。企业只是借助产品、技术方案或服务进行价值提议，但企业本身并不决定其价值，价值是由客户决定的(Value-in-Use)。

在诸多领域，海尔创造了令全球瞩目的管理思想和管理实践。我对于海尔提出的“用户交互”有极大的兴趣，我认为它很好地体现了企业与用户的价值共创。我计划从以下几个问题着手进行研究。

采访问题

1. 海尔是如何吸引和激发用户，以实现有效交互的？
2. 一般认为，与用户交互，量少时成效较小；而来自用户的个性化建议或创意数量级变大后，如何管理和利用又成为一个课题，海尔是如何解决的？
3. 您认为在哪些方面用户能够与企业实现共同创造价值？
4. 您对我的研究有什么建议？

预期采访对象

熟悉与用户交互平台运作的员工、主管和经理们

感谢您的鼎力支持和帮助！

聂勇

日本学术振兴会特别研究员

北陆先端科学技术大学院大学 博士后期课程

手机: (0081) 090-8095-5266 电话: (0081) 0761-51-1111

Email: nieyong@jaist.ac.jp <http://www.jaist.ac.jp>

Appendix 2: The list of research achievements

International Journal Papers

1. Nie, Y., Shirahada, K. and Kosaka, M. (2013). Value Co-creation Oriented Leadership for Promoting Service-Centric Business. *Intercultural Communication Studies*, 22 (1), pp.216-228.
2. Nie, Y. & Kosaka, M. (2014). A New Perspective on Leadership for Achieving Servitization of Business. *Journal of Management Research*, 6(4), pp.50-62.
3. Nie, Y. & Kosaka, M. (2016). Customer Self-Service Platform: The Next Practice for Servitization of Manufacturing. *International Journal of Services and Operations Management*, Vol. 25, No. 2, pp.259-273.

International Conference Proceedings

4. Nie, Y.; Shirahada, K.; & Kosaka, M., "Transforming Leadership for Corporate Transformation", *Proceedings of the 13th International Symposium on Knowledge and Systems Sciences*, CD-ROM, JSBN 978-4-903092-34-8, pp.81-87, Nomi, Japan, 2012.
5. Nie, Y. & Kosaka, M., "The Emerging Factors on Leadership in Service- Dominant Logic", *Proceedings of the 18th International Conference of the International Association for Intercultural Communication Studies*, CD-ROM, pp.217- 225, Taiwan, 2012.
6. Nie, Y., & Kosaka, M. "Co-creating vision with employees: The driving force of corporate transformation", *The 10th International Conference on Service Systems and Service Management*, pp.41-46, IEEE, Hong Kong, China, 2013.
7. Nie, Y., & Kosaka, M. "Managing the process of value co-creation with customers", *The Third Asian Conference on Information Systems*, pp.470-476, Nha Trang, Viet Nam, 2014.
8. Nie, Y., & Kosaka, M. "Taking Advantage of Information Technology to Involve Customer in the Process of Value Creation ", *The 4th International Symposium on Business and Social Sciences*, pp.392-398, Hokkaido, Japan, 2015
9. Nie, Y., & Kosaka, M. "Building Customer Self-Service Platform: The Next Generation of Servitization in Manufacturing", *The Fourth Asian Conference on Information Systems, Penang, Malaysia*, ss1-5, pp1-8, Penang, Malaysia, 2015.

Domestic Academic Conferences

10. Nie, Y.; Shirahada, K.; & Kosaka, M., "The Variation of Relationship between leadership and Followership," *Proceedings of Technical Meeting on Information Systems*, IEE Japan, IS-12-001-021, pp.37-42, Kaga, Japan, 2012.
11. Nie, Y. & Kosaka, M. "Building Customer Self-service Platform: An Effective Approach for Servitization", *Society for Serviceology*, Poster Presentation, Kanazawa, 2015