

Old yet New Viewpoint of “Value Shift” in Product Design

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Discussion on the importance of “KOTOZUKURI” (a coined word that means new value creation in the market) has a long history, but it has been heating up again in line with the explosive spread of the IoT (Internet of Things) and Big Data in recent years. In contrast to the fact that the Internet has greatly changed the relationship between people in the world, the IoT has interconnected an enormous number of things (sensors and devices) and has been drastically changing the relationship between things and events. In the general consumer market, which is often called the Business to Consumer (B2C) market, the time has come for many people to co-create totally new value by using wearable devices and sharing information through cloud services. This paper surveys the concept of co-creating value that derives from the services based on the service dominant logic (SDL), and then overviews KOTOZUKURI, the trend of value shift from product to solution, in the B2B and B2B2C markets including Yokogawa products and the ideal vision of manufacturing in the future.

INTRODUCTION

Product development is increasingly shifting from “manufacturing to value creation” and “transforming business models” and conventional manufacturing is regarded as if it created no value. Meanwhile, many companies are now facing the problem that conventional business models no longer help to recover investments in development as society changes greatly. As a solution, service dominant logic (SDL)⁽¹⁾ is attracting attention. This approach looks at products from the viewpoint of service provision, where products are used and value is created. Goods dominant logic looks at economic

and social exchange (business) from the viewpoint of products (goods). In contrast, SDL looks at manufacturing products and offering services as an integrated economic activity based on services, and aims to reconstruct the logic of all economic activities. This view can apply to the paradigm shift from manufacturing to value creation not only in the B2C market for general consumers but also in the B2B market, which will be discussed in this paper.

Industrial automation, which is the main business field of Yokogawa, is considered to be more conservative and slower to change than other sectors. Yet even in this field, many things are connected, and huge amounts of data are stored and made available. The whole industry is undergoing a revolution.

This paper analyzes value creation in the B2C market as well as B2B (or B2B2C) market where Yokogawa products are used, and discusses ideal manufacturing based on services in the B2B market.

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SHIFT FROM MANUFACTURING TO VALUE CREATION

First, let’s take a look at the shift from manufacturing to value creation. In this paper, the process of planning and development covering the provision of conventional products (hardware) and contingent services is defined as “manufacturing.” Meanwhile, the process of identifying customers’ problems and then planning and taking action is defined as “value creation.”

- (1) Early days of industry: Products create markets
 The mid-20th century was the age of mass production. Problems were clear and product planning concentrated on how to commercialize technology that solved the problems. Products created new markets and the product cycle was measured in decades; it was the age of slow change. For example, thanks to the advancement of electromechanics, products of modern life such as washing machines and refrigerators spawned new markets one after another.
- (2) High-growth era: Product value grows and extends markets
 Industrialized countries grew greatly in the late 20th century as affluent lifestyles spread worldwide. Products that used to be expensive became cheaper, and many people became able to enjoy affluence. In this process, the respective markets of products and services expanded gradually from the U.S. to Europe, Japan, Asian countries, and other areas. Therefore, many companies were able to keep making profits through globalization. Thanks to this expansion and continuity of business, companies were able to grow. Although this helped solid business models to be established, it also made business models inflexible.
- (3) Matured industry: Commoditization lowers value
 In the 21st century, many manufacturers faced rapid commoditization. Even if they are well-engineered, commoditized products offer no distinctive features, and thus commoditization makes users less willing to pay more and product prices continue to fall. For example, although Japanese manufacturers of audio visual (AV) equipment (typically, music players) worked hard on innovating technology, they could not avoid being overtaken by emerging manufacturers in China and South Korea. User behavior also changed; although people keep listening to music, they no longer put emphasis on physical possession. They shifted from buying music media and playing it on dedicated music players to downloading music from networks and listening to it with smartphones and portable devices. The number of consumers who buy compact discs (media) and music players (hardware) plunged, and the AV equipment business shrank accordingly. Therefore, AV equipment manufacturers had to shift from a business model of making profits from selling music players to a more comprehensive business model spanning all processes of value creation, from creating and delivering contents to proposing ways to enjoy them. This is an example of the paradigm shift from manufacturing to value creation. This trend can be found not only in AV equipment but

also products in other industries such as automobiles and communication devices.

SERVICE DOMINANT LOGIC

The SDL approach is effective for achieving a paradigm shift to value creation in product and business planning. SDL is a comparatively new area of research advocated by two marketing researchers, Stephen L. Vargo and Robert F. Lusch in 2004. This view systematizes how value is created by products and services. SDL defines 11 fundamental premises (FP)⁽²⁾(Table 1).

Table 1 Fundamental premises of service

FP1	Service is the fundamental basis of exchange.
FP2	Indirect exchange masks the fundamental basis of exchange.
FP3	Goods are distribution mechanisms for service provision.
FP4	Operant resources are the fundamental source of strategic benefit.
FP5	All economies are service economies.
FP6	Value is co-created by multiple actors, always including the beneficiary.
FP7	Actors cannot deliver value but can participate in the creation and offering of value propositions.
FP8	A service-centered view is inherently beneficiary-oriented and relational.
FP9	All social and economic actors are resource integrators.
FP10	Value is always uniquely and phenomenologically determined by the beneficiary.
FP11	Value co-creation is coordinated through actor-generated institutions and institutional arrangements.

FUTURE VALUE CREATION

Among FPs, FP1, 6, 10, and 11 are crucial and called axioms. They define that service is the foundation for all exchanges of value (transaction) as well as for the economy, and that providers and customers co-create value in the field where products and services (or services alone) are used. In addition, the value of service is always determined by the customer depending on value-in-context. Value-in-context is the value determined by elements of customers, such as scenes in which products and services are used, and the degree of satisfaction after use.

For value creation in the future, we must go back to basics and consider what value users can enjoy. Users’ four requirements for new value are explained below.

(1) Clarifying the root cause of problems and proposing solutions

First, it is necessary to visualize not superficial problems but essential problems and propose solutions. For example, operational errors and sudden failures at manufacturing sites should be solved not by using symptomatic therapies such as adding checkpoints but by identifying root causes underlying the operation and work environment.

(2) Intelligibility of new solutions

Solutions should be understandable and convincing. Although artificial intelligence (AI) including deep learning is a useful tool to solve problems, it is often difficult to explain how the solutions were obtained. The solutions should be understandable for ordinary people who have little technical knowledge. This is much more effective than providing scientific and technological explanations. It is necessary to clarify the mechanism of gaining acceptance among ordinary people.

(3) Balance between risks and benefits

New solutions inevitably involve risk. Not only the benefits but also the risks should be presented. If users can clearly see substantial benefits, they will accept some risk. The reversibility of solutions is also important. Users tend to emphasize whether the solution can be cancelled and the condition can be returned to the original state in case the effect is not satisfactory.

(4) Accumulating a track record

New solutions need a track record. People are naturally anxious about whether new products and services will work well. When the effect of new technology has been adequately proven, they feel more confident about applying the solution to their applications. Although the track record of products can be clearly measured by sales volume and number of users, the effectiveness of service is difficult to measure. Conventionally, formal application starts only after a steady track record is built, however, quick application is required in the new paradigm, which is achieved through demonstrations at an initial stage such as proposing a proof of concept (PoC).

PLANNING AND DEVELOPING NEW PRODUCTS

Next, we apply the SDL perspective to past products of Yokogawa and those it should provide in the future. Under the theme of measurement, control, and information, Yokogawa has provided products that directly and continuously measure physical quantities such as pressure, flow rate, temperature, and liquid level, and control production processes that are supported by using these physical quantities. From the early days of industry to the high-growth era, Yokogawa steadily grew by efficiently manufacturing products for plants that were built one after another. In this growth model, it was important to incorporate various customer needs into standard specifications and offer universal products efficiently and in large quantities. This was goods dominant logic (GDL), which is in clear contrast to SDL. Then, in the era of matured industry, the number of plant construction and expansion

projects decreased drastically, making it more important for Yokogawa to offer optimum solutions to customers by carefully analyzing the problems and needs of each customer, such as renovating existing plants and improving performance.

FP10 of SDL defines “Value is always uniquely and phenomenologically determined by the beneficiary.” Some people may think this approach is applicable specifically to consulting services that start by assessing the customer’s problem or large-scale projects over a long time, but not to conventional manufacturing. However, when planning and designing products such as sensors, manufacturing involves urging a customer to join the planning, analyzing the customer’s problem, and planning the functions and price of the product based on economic value created when the product is used by the customer. Thus, the view of SDL is also applicable to conventional manufacturing. In the future, we should shift from being a product provider that encourages customers to purchase its sensors and controllers, to a service provider that has a new business model such as a charging system in which products are charged for according to the hours used. Currently, personnel in charge of research and development, and planning at Yokogawa actively communicate with customers even in the research phase to achieve co-creation with customers, which is advocated in SDL, and work on the above-mentioned PoC proposals at the product concept stage.

This special issue titled “A New Trend in the Product Business” introduces Yokogawa’s commitment to developing customer value by transforming from manufacturing to value creation (offering solutions), and features papers on the co-creation of new value with customers by proposing new usages or combinations of Yokogawa products. The product business is expected to grow by combining existing products with more precise measurement of value, which is made possible by the rapid development of the Internet of Things (IoT), artificial intelligence, and analytics technology. In manufacturing that aims to create value, product and service providers and users will closely interact with each other through various new technologies. As a result, providers and users will co-create new business models that both are satisfied with.

CONCLUSION

This paper examined a manufacturing approach that aims to create value. In the 20th century, manufacturing sustained the economy, in other words, products created value. In the first phase of value creation, companies focused on customers’ problems and proposed new solutions, thus creating new value with the market-in approach. To explore new innovation, it is necessary to discover and identify potential issues in the future and create new markets with unimagined value .

As a manufacturer, Yokogawa will always consider matters from the viewpoint of future customers, and work on creating new value with the market-out approach.

The Control and Energy Management Committee of the Japan Electronics and Information Technology Industries Association (JEITA), which the authors are members of,

has compiled a report on the industrial automation service class control based on the view of value-based service, and is publicizing this concept. In March 2016, the explanatory document titled “Industrial Automation Service Class: Its Definition and Use”⁽³⁾ was published. We recommend it to those who are interested in this topic.

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