Constructing a Innovative Service Development Process Base on Ethics

Hung-Pin Hsu

Abstract—**Service Design focuses on understanding needs and abilities of members in service system. However, members' experiences and responsibilities with product and service development are discrete, especially when faced with new issues like Ethics. This paper presents the ethical issues in New Product Development (NPD) or New Service Development (NSD) from inner and outside organization. By constructing service blueprint, NPD and NSD process can comply with the ethical principles. The potential benefits and challenges are presented and explored through case studies and focus group interview. These focus on the differences in issue and practice generated by members in the development process. The service blueprint has the potential to provide a better development process for members' cooperating and complying with the ethical principles, and enables the successful longer-term evolution of services.**

Index Terms—**Ethics, new service development (NSD), new product development (NPD), biotechnology.**

I. INTRODUCTION

Business ethics refers to applying ethical standards to corporate policy, system, management, and decision-making. Its importance lies in the influence products or services have on people. Hence, enterprises must propose criteria and specifications in line with ethics. Business ethics not only concerns the legitimacy of organizational members' behaviors, decision-making, and action [1], but also involves the balance of interests among customers, investors, and community [2]-[4]. However, businesses often only pay attention to tangible sales, but deem intangible fundamental ethical roles that affect product or service quality as secondary [5]. Only when enterprises attach importance to business ethics before sales and market launch during the development process can they avoid risks and enhance the quality of products or services. Hence, enterprises have started attaching importance to the establishment of an ethic monitoring and control mechanism for development processes [6].

Edvardsson *et al.* divided the development process into: goods-dominant logic (GDL) and service-dominant logic (SDL) [7]. GDL emphasizes on tangible assets created by the provider, such as products and technology used at work or as equipment in the customer value co-creating system; on the contrary, SDL attaches importance to intangible assets, such as customer knowledge, skills, and values in the value co-creating system. The differences between product and service development processes have also been pointed out in a number of studies. Kindström and Kowalkowski proposed a service development cycle frame, consisting of four stages: market sensing, development, sales, and delivery [8]. Among them, market sensing is a continuous process that occurs in the company interior and during interaction with customers; New Service Development (NSD) emphasizes multi-function input at the front end and the back end; New Product Development (NPD) only emphasizes on the back end; in terms of sales, NSD researches place relatively less emphasis on the actual sales stage and the subsequent delivery stage, as services are intangible and two involved parties lack experience in understanding of value creation; service delivery is generated from interaction with customers during the delivery process, thus the fundamental difference between products and delivery [9]. Even though NSD and NPD vary in research, it is not just products or services customers buy, it is the values created from purchases made [10]. Therefore, enterprise organizations must continue to seek learning and growth in order to create values that readily meet dynamic and changing customer needs [11].

Organizational learning is an important criterion for success during the development stage. The internal organization must possess strong communication skills in order to quickly adapt to environmental changes and continue to re-define targets [12]. It also has to rely on the multidisciplinary and cross-sectoral organic team structure within the organization in order to enable organization members to share ideas through open communication, stimulate the organization to resolve complex problems [13], and devise ways to engage in customer communication and provide services [14], thereby effectively reducing development risks and uncertainty [15], [16], enhancing development success rates, and effectively executing decision-making [17], [18].

However, not all cross-sectoral interactions generate positive performance during the development process; sometimes they even produce adverse results [19]. A department sometimes achieves better performance by independently completing, rather than having to communicate with other departments [20]. Depending on the situation and type of interactive communication, suitable communication channels should be provided and complete information must be provided to all participating R&D work members in order to ensure project success. To this end, enterprises must accurately define development processes and effectively execute strategies, not only through organizational cooperation, but also with the support of managers [5], [21]. Enterprise managers' degree of recognition towards development, willingness to authorize,

and provision of resources needed during development often determine the success of a project [22]-[24].

In addition to transparent and systematic definitions, development processes should also meet customer needs in line with future market trends [5]. Customers' opinions and participation are crucial to the success of development [25], as customers can provide knowledge needed to improve product quality in line with the market demand [26]-[30], while the development team can also find out what capabilities and resources are lacking internally during the process [31].

Since customer demands change with time, enterprises must grasp customer knowledge and skills and work with customers to create values [32], thus effectively promoting development service processes. Therefore, the inclusion of customers in the development team, having them provide ideas during early design stage, will effectively shorten development time and reduce the need for product information analysis or design modification [33], [34]. Some service processes even require the participation of customers throughout the processes. For instance, surgery requires the physical involvement of customers. Thus, they are producers, employees, and production resources at the same time [35].

As far as service producers are concerned, customers play different roles in three continuous cycles of service engineering [11]. When investigating actual demand, service producers must clearly understand customers' needs before the service design processes commence. During the service design stage, they have to understand customers' needs and achieve the vision in order to reach the ultimate service goal of meeting customer demands. Service delivery feedbacks can help service providers improve service design and provide long-term benefits. Edvardsson believes the service resource structure not only includes employees, hardware and technology, organization and control, customers' participation and contribution should also be taken into consideration [36]. Enterprises must engage in customer-oriented development and try to meet customers' expectations and needs. Customers should also be invited to play the role of the developer. Alam and Perry further pointed in their research that customers can participate in different stages of new service development [37]. During strategic planning, customers can provide service feedbacks; during the stage of concept generation, they can comment on the existing services and offer solutions. They may also assist the development team in market surveys and screening as well as the selection of suitable concepts to b applied and compared with competitors'. In addition, customers can also assist in planning the blueprint during service design and improving service fail points. Before the market launch of services and during the marketing stage, customers may participate in service testing and give suggestions.

In order to transfer customer knowledge to the organization, tacit knowledge should be converted into explicit knowledge through experience sharing, dialogues, discussions, and other forms, thereby enabling the organization to fully utilize customer knowledge and strengthen competitiveness [11], [38]. Therefore, enterprises must conduct training for service, sales, and technical personnel, fostering their ability to communicate with customers [5], [39]. If the service provider makes no effort to appropriately communicate with customers, customers will not know how to participate in service processes due to lack of information. Thus, the service provider's effort to collaborate with customers in designing service blueprints, planning services, and strengthening information management will enhance the efficiency of service processes [35].

Past researches focus on how to promote communication among internal members of the organization, accelerate development efficiency, and let customers participate in product development processes and grasp market preferences in advance through product or service development process planning. However, if product or service development processes lead to ethical problems, the social image of a product or brand may be affected, even to the point of jeopardizing the wellbeing of customers and community [6]. Since product or service development processes are rarely discussed, how to construct product or service development processes in line with ethical principles remains an important research issue.

II. CASE STUDIES: TWO BIOTECH COMPANIES

In order to investigate the ethical issues and practices in product or service processes, the biotech industry was selected in this study for research. Biotech products or services by nature are relatively more hazardous to the human body, thus leading to more ethical issues [6]. This study adopted two biotech companies, namely, TGN-BIOTECH (TGN) and Pharma SNPs (SNP) as case studies for analysis in order to gain an insight into the internal organization and external customer related ethical issues and practices during the product and service development processes [6].

A. Two Biotech Companies

1) Case 1. TGN-BIOTECH (TGN): TGN was founded in 2000. The business model involves the use of pigs to produce more cost-competitive protein needed to manufacture products or drugs for human use. Faced with the issue of pig farming and animal production that may cause environmental impacts and humanitarian opposition, TGN has set up the Animal Welfare and Ethics committee (AWEC). The main purpose is to propose animal welfare related ethical measures to TGN in order to establish a corporate culture that attaches importance to ethics.

2) Case 2. Pharma SNPs (SNP): SNP was founded in the early 1990s. The focus of product development lies in genetic research through pharmacology in order to provide patients with drugs or therapies that suit their physical characteristics. Since the research and development process requires the collection and analysis of a large number of human samples, the SNP has set up Ethics Advisory Board (EAB) to deal with human trial related issues.

B. Ethical Issues within the Organization

1) **In order to reduce damage arising from product**

development, the internal organization has to set up a stringent product ethics monitoring and control mechanism.

The biotech development processes require stringent clinical trials to ensure customers' physical safety. Therefore, the internal organization must set up a product ethics monitoring and control mechanism. TGN realizes that the rapid development of the rapid industry sometimes makes it hard for the local regulations to keep up with the pace. Therefore, the U.S. regulations that are relatively more advanced shall serve as the basis for setting up the product monitoring and control mechanism.

In addition to the physical safety of customers, if samples used during the product development process involve infringement of privacy, donors may suffer losses. Therefore, SNP has set up a privacy monitoring and control mechanism for clinical research in order to protect the privacy of sample donors, preventing the samples from penetrating areas not within the confines of the regulations. The data analysis work will be allowed to proceed after securing permission, while personnel in charge of sample and data management must not be involved in other projects.

2) **Establishing an emergency response plan within the organization through the product ethics monitoring and control mechanism.**

AWEC has proposed an emergency response course development plan targeting ethical issues TGN has faced. Through the plan, cross-sectoral members are gathered to discuss ethical issues that likely affect TGN and plan emergency response strategies. The strategies are applied through course training offered to organization members in order for TGN to promptly and correctly mobilize personnel when problems arise and adopt effective ways to resolve problems. Through AWEC's continuous communication and cooperation with the departments, TGN has gradually established the organizational culture that attaches importance to ethics.

3) **The product ethics monitoring and control mechanism has to take the resources available within the organization into account and offer feasible solutions to resolve ethical problems.**

The biggest risk faced by organizations is that managers are usually unaware of their own ignorance. Hence, the organization must be clear about ethical problems likely encountered during product development processes. In the SNP case, EAB's discussion on ethical issues takes into consideration a company's available resources when evaluating the feasibility of executing a project, depending on the EAB chairman's grasp of available resources and the SNP management level's participation in EAB and opinion input.

4) **The product ethics monitoring and control mechanism must make internal organization members believe their suggestions are valued.**

In the SNP case, the EAB members felt SNP showed a keen interest in the ethical viewpoint they put forth, allowed flexibility in analysis, and the opportunity to openly debate on issues, rather than ostensibly promoting to the outside SNP's emphasis for product development ethics for formality sake. EAB members can freely reject SNP's current practices and point out problems, thus the mutual trust between EAB and SNP.

5) **The establishment of the product ethics monitoring and control system must ensure internal organization members' neutrality and privacy.**

The main task of EAB is to offer suggestions to SNP, not final decisions. This will relieve EAB members of their responsibility in decision-making, making it easier for EAB to attract members. This also means SNP does not have to comply with EAB's advice, but it is burdened with the risk of product ethics related problems. In addition, internal organization members can freely decide if they will participate in EAB. SNP's decision not to disclose EAB international organization members' identity will prevent EAB members from being deemed as SNP's publicists that only handle ethical issues. SNP clearly defines the EAB setup as a practical internal tool, focused on product ethics related monitoring and management, rather than sales and marketing.

C. Ethical Issues Outside the Organization

1) **Ensuring product development processes are in line with ethical principles and keeping external customers fully informed.**

When using human samples for biotech product development, donors should first be informed of their rights, and their consent should be obtained. When collecting animal samples for production, ethics should also be observed. In order to ensure the health and comfort of pigs participating in the R&D and production processes, more costly measures were adopted, such as limiting the total number of pigs, the use of sedatives and euthanasia, etc. In addition, TGN also fully informed customers that the samples used for R&D and production are in compliance with the ethical principles, such as no excessive collection of samples that compromise quality, avoiding self-pollution, and avoiding entering the food chain after production.

2) **Observing different local social differences during the development process and choosing a suitable way to invite external customers or the public to participate.**

SNP biotech products are sold worldwide, and samples are taken from all over the world. Different societies tend to have differed concepts towards sample collection, preservation, and use. Thus, SNP adjusted its practices depending on the local social conditions when inviting the public to participate in the development. For example, the public from the Netherlands say that human samples must not leave the country. Therefore, SNP had to translate the documents into the local language, and the researcher had to carefully explain the research to obtain public consent; Since many patients in Brazil are illiterate, the patients' knowledge about their rights was examined and analyzed in diagrams; the Ugandan government prohibited the researcher from asking community leaders to gather the public to participate in the research in order to prevent the public from blindly agreeing to human sample collection against their due to a fear of authority.

3) **Introducing products and advocating the concept to external customers or the public in a simple way.**

Biotechnology is a field unfamiliar to average persons and difficult to understand. During the TGN's product development process, customers had doubts over possible environmental hazards arising from pig farming and were concerned whether animal testing was humane. Therefore, TGN carefully communicated with customers and neighboring community residents and was cautious about the language used in order to impart the idea that products can improve life under safe conditions the product value lies in saving lives and helping those in need. Prior to it, TGN first predicted possible pollution to air, water, and soil and invested in a processing system, which served as the basis and premise for communicating with customer and the public.

4) **Openly accepting inspection by external customers and experts will help maintain product quality and promote product progress.**

Provided that product competitiveness is not compromised, the full disclosure of product development information will help gather opinions of the public or experts regarding the products. Therefore, despite the fierce competition in the biotech industry and the fact that product patency needs to be protected, TGN tried to publish research results in academic journals as much as possible in order to comprehensively disclose information for public discussion by professional fields. TGN believes that it is only through honest and open discussions can we learn to more stringently maintain product quality and gather opinions from all sides needed to promote product progress.

5) **Inviting external members from various fields to participate in the product ethics monitoring and control mechanism is conducive to a more comprehensive view.**

TGN's AWEC member configuration includes: three TGN employees and five external members who fully engage in the collection of opinions about ethical issues associated with TGN's product development. The members must include professionals with medical background in order to control the impact of product R&D, production, and human body use.

SNP's EAB members come from different fields, including philosophy, law, medicine, public health, biological ethics, public, customers, etc. There must be two member representatives from each field and one chairperson. Additionally, the SNP board members also participated in the meetings. Although SNP is aware that groups made up of 4-6 people operate more efficiently, EAB needs opinions coming from all sides to inspect the product development ethics from a more all-rounded viewpoint.

Since the ethics monitoring and control mechanism members come from all fields, in order to avoid endless discussions due to disagreement, the EAB chairperson was responsible for collecting and presenting members' different opinions. After adding the company's viewpoint on available resources, the problems were unfolded for debate and decision-making. After the meetings, the chairperson summarized the consensus reached and sent it to the members. The members then sent their feedbacks on the consensus reached. After collecting the opinions, the meeting consensus, along with the controversial issues were put forward to propose recommendations for the company.

III. Focus Group: Service Blueprint

Based on the analysis results of the case studies, the focus group interview approach was adopted in this study. 25 product development employees from three biotech companies were invited to participate. Through the analysis of the group members' discussions, the ethical experiences during the biotech product development process were collected (Vaughn et al., 1996; Krueger & Casey, 2000). Since the companies' product development processes and departments involved varied and that the ethical experiences of the companies during product development were collected in this study, each group consisted of employees from the same company, thus the absence of limitations with regard to their professional background, gender, and age. In compliance with the focus group interview method, the number of people was limited to 10-12 people per group. The makeup of the members in the three groups is as shown in Table I.

TABLE I: The Makeup of the Members in the Three Groups

Departments	Group 1	Group 2	Group 3
Marketing	2	1	none
Legal	2	1	2
R & D	3	4	3
Production Management	2	none	2
Public Relations	none	3	1
Customer Service	2	3	2

The interview outline is comprised mainly of the analysis results of the case studies, including common ethical issues, monitoring and control of product related ethical practices, cooperation among members throughout the product development process, collection of customers' feedbacks, and other issues. During the interviews, the groups were requested to describe the product development processes and discuss the above issues in order to provide past experiences and practices that lead to a better future. Due to the considerably large number of participants in the focus group interviews, in order to avoid interfering with the biotech companies' operations, the interviews were held in the conference rooms. However, in order to meet the research needs, the groups were not to be disturbed during the interview procuress. Three sessions of focus group interviews were held in October 2015. The researcher served as the moderator and guided the focus group members to express their views. The interviews each lasted for about 90 minutes. The focus group interview members' opinions were recorded and plotted, as shown in Fig.1.

A. The Ethics Committee

In response to the scale of biotech companies or input of resources in ethical reviews, through the work management procedures, an ethics review mechanism is introduced, and questionnaire or market surveys are conducted to hear customers out. This approach replaces the Ethics Committee comprised of full-time experts and the public, which is believed to be a more feasible measure in compromise. However, compared to the Ethics Committee, this practice lacks debates on issues due to the absence of full-time or permanent members' participation. When the mechanism is

introduced to the departments for ethical review, there is limited room for company employees to independently and freely express their ideas. Hence, how to achieve balance between limited ethics monitoring resources and independent and objective opinions is an important issue when promoting ethics monitoring work the during product development process.
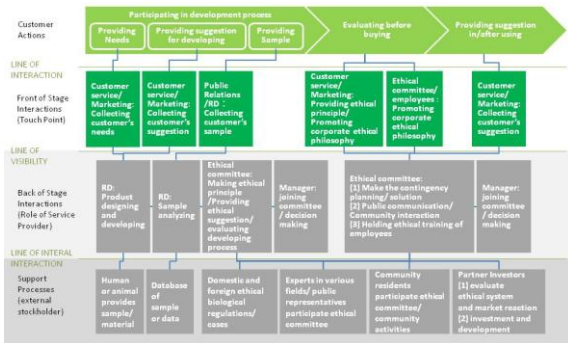

Fig. 1. Service blueprint in NSD.

B. Corporate Employees

Unlike the analysis results of the case studies, the focus group members believe that corporate employees are the most effective advocates of an enterprise's emphasis for the ethical principles of product development. The enterprise should establish the image of being a company that highly values ethics to win employees' general recognition. When employees see that the company they work is for is a socially friendly one that values ethics, they will express their sense of belongingness to the public in daily life. In particular, employees engaged in ethics monitoring and control work are better able to explain to the public the company's ethical spirit. Public relations work is not the only job of employees who are engaged in monitoring and control, but it is the most important one.

C. Decision Makers

How to win the support of the decision-maker is the main axis of focus group discussions. Based on the group members' experiences, convincing the decision-maker to accept recommendations that have no direct benefit to revenues or modification to the existing system is considered the most difficult task. This implies the work focus of employees engaged in ethics monitoring and control is to present strong evidence that the decision-maker cannot deny but implement the ethical plan, rather than offering suggestions to the decision-maker for reference only. Employees engaged in monitoring and control not only have to have the ability to observe ethical issues and plan solutions, they must analyze the impact the solutions have on the departments and the company as a whole through cross-sectored communication and cooperation in order to support their viewpoint and convince the decision-maker to invest in the ethics plan implementation.

D. Partnership Investors

The focus group members proposed investors' viewpoints not available in the previous case analysis. From product R&D to market launch, the biotech industry needs to input more time and capital. Therefore, a large number of partnership investments have to be injected into the company operation. Since investment returns tend to fluctuate with the market, investors are more concerned than customers about the impact of corporate image. Shareholders meetings and quarterly briefings are channels for explaining to investors the company values ethical principles of product development. In addition, collaborating with enterprises that also value ethics, maintaining friendly relationships with community residents, and having channels that facilitate communication with customers will lead to investors' positive evaluation of the company.

E. Community Residents

Open and transparent interaction is the best communication between biotech companies and community residents. Through business visits (such as fieldtrips), park access (such as shared club and leisure facilities), co-sponsored publications (such as business or community special issues), and even the provision of full-time job or internship opportunities for community residents to learn more about the company, all of which are considered more effective than holding regular briefings or deliberate reunions.

F. Customers/ Users

Product customers and users must be clearly defined during the product development process. The focus group members believe that ethics monitoring and control personnel should provide complete ethics information to customers that purchase products, including self-concept, R&D, production, sales, and recovery of product resumes in different stages, in order for customers to determine whether to purchase products. Although this part has not yet been implemented for current products, the focus group members believe that it is the future goal of enterprisers and an appealing incentive for customers. For biotech product users, in addition to fully informing them about product composition and instructions of use, complete services should also be provided to track results after use, which are the future development direction of biotech companies. In other words, selling services that costumer can actually derive values from, such as ensuring the relief of symptoms and cure of a disease, rather than selling only the physical product on the display shelf. Enterprises will also be able to obtain information about product improvement by tracking customers' condition after use.

IV. CONCLUSION

This paper has presented a cooperative process of developing new service or product, one built on the cornerstone of ethical principles. The strength of this process lies in the cooperation of members to handing the ethical issues as a shield for not only user but also relative people, evoking responsibility in ling-term commitment of product as well as service development. Indeed this paper has explored how understanding the experience members' have in the development process and also important ethical issues within. The development process and ethical issues are able to apply

in more types of industries and companies in the future.

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