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Paper:

A Strategic Design Guideline for Open Business Models

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To realize a competitive product-service system, a manufacturer is required to change its closed business model and develop open and sustainable alliances with external partners. As an alternative business model, an open business model (OBM) is a new concept, replacing the closed model, that is highly dependent on the company's resources. An OBM is realized via resource sharing and collaboration with external partners. By incorporating an OBM in its operations, a company can receive several benefits, such as long-term profits, by providing new customer value and diversifying risks due to uncertainty in the market environment. A considerable number of studies related to this concept have been conducted. However, a practical method for OBM design remains unavailable. It is therefore difficult to design an OBM via actual design procedures. To this end, the purpose of this study is to support a design for OBMs. To achieve this, eight dimensions of openness in OBMs are first identified. On the basis of these dimensions, the requirements for an OBM design guideline are defined, and the design guideline is proposed. The proposed design guideline includes three steps: requirement analysis, OBM design, and validation. The proposed method was applied in an OBM design workshop, and the usefulness of the design guideline was verified through an evaluation of the eight openness dimensions. Finally, directions for improving the design guideline are discussed as future works.

Keywords: product-service system, open business model, openness, value co-creation, design method

1. Introduction

The product-service system (PSS) has been attracting much attention as a strategy for manufacturers to remain competitive in strained global markets. The PSS is a concept of integrated products and services that satisfy customer needs [1]. The traditional transactional exchange is transformed into a long-term relationship between the provider and customer. The PSS includes intermediate agents or third parties that lead to a complex partnership network involving multiple stakeholders [2]. Manufacturers therefore need to design an open and sustainable alliance with external partners. Specifically, they need to transform their business model from the "closed business model" to an "open business model (OBM)."

To design an OBM as a means of successfully realizing a PSS, the company is required to open up its business model to external ideas and technologies and share its resources with partners [3–5]. The customer is no longer simply a purchaser of the company's products or a target of its value proposition. Customers are major partners in the value co-creation [6]. The company with an OBM therefore needs to both market to and collaborate with its customers.

The realization of an OBM affords companies competitive advantages due to benefits such as capturing and providing greater values to customers [7] and increasing the dynamic capability of innovations [8]. Moreover, it is also expected that new business opportunities will be discovered through various activities with external partners [9].

As previously mentioned, the OBM has attracted attention both from the academic community and practitioners. The study of OBMs is an emerging topic in the existing research [10, 11]. Researchers on this topic have focused primarily on the identification of the benefits and characteristics of OBMs (e.g., [12–14]), development of typologies (e.g., [15–17]), and identification of the challenges associated with implementing OBMs (e.g., [18]). However, practical methods for OBM design are not available, which creates difficulties in conducting actual OBM design activities.

Therefore, this paper first proposes openness dimensions in OBMs on the basis of a comprehensive review of the existing research. Considering these dimensions, this study then presents a design guideline for OBMs. The proposed method was applied in an OBM design workshop involving 21 practitioners from Japanese multinational companies and 13 graduate students majoring in mechanical engineering. The usefulness of the design guideline was confirmed through an evaluation of eight dimensions of openness.

2. Theoretical Foundation

2.1. Business Model

The business model concept has been discussed from the perspective of various research areas in the business industry. However, this concept is not well defined with a commonly accepted view in academic research [19–22]. For example, Casadesus-Masanell and Ricart argued that the purpose of a business model is to communicate strategy to the stakeholders [19]. Magretta argued that a business model is a "story" about a firm's strategy [23]. Both regard the business model as one of the means of value creation. Therefore, the business model plays an important role in describing value creation.

Although researchers define business models in different ways [24], the majority of the provided definitions cover basic information: business models express the company's core logic for creating and capturing value by specifying its fundamental value propositions, the market segments it addresses, structure of the value chain, and mechanisms of value capture that the company deploys [25]. On the basis of this understanding, this paper defines a business model as follows: a business model is the company's core logic for creating and capturing value.

2.2. Open Business Model

The literature on OBMs is divided into two streams [10]. The first stream (e.g., [3, 13, 26]) closely links the OBM to the openness of an organization's research and development (R&D) activities and the open innovation paradigm defined by Chesbrough [27]. This view describes OBMs on the basis of the open innovation concept.

Chesbrough defined open innovation as "the use of purposive inflows and outflows of knowledge to accelerate internal innovation and to expand the markets for external use of innovation, respectively" [27]. This generic definition is used in the context of capturing recent phenomena such as IP commercialization, user and customer integration, and collaborative R&D processes [28]. Although not providing a clear definition of the OBM, Chesbrough argued that "companies must develop OBM if they are to make the most of the opportunities offered by open innovation" [3]. With his focus on technology, innovation, and ideas, Chesbrough ties the OBM to a firm's R&D activities.

In the other research stream, the OBM is not necessarily seen as requiring openness and collaboration to result in open innovation activities (e.g., [17, 18, 29]). Weiblen called this stream the business model view [10]. Although the researchers in this stream frequently reference Chesbrough's papers, they do not follow Chesbrough's original perception that an OBM is built around an openness in an organization's R&D activities. The studies in the latter stream state that the "openness to innovations and the openness of business models need to be adequately recognized, understood, and treated as separate phenomena" [17]. In other words, the studies take a broader view of the OBM. Although the meaning of the "business model" can include collaborative value creation and capture, the "open business model" explicitly includes it. Hence, the role of the term OBM is to indicate those business models that include partnerships and to focus on their openness. Storbacka et al. supported this notion by expressing that "most of the extant research on business models has been firm-centric, whereas this research adopts a network-centric view" [30]. Moreover, Djelassi et al. mentioned that customers in OBMs are no longer simply purchasers of a company's products or targets of its value proposition. The customers are resources who present significant consequences for both the value proposition and the organization [7]. They assert that value can be captured by customer participation, which makes the business model open not only to companies but also to customers.

In alignment with the previous studies, this research considers that the business model view of OBMs encompasses all organizational activities as potential candidates for collaboration with partners and customers to establish openness. Furthermore, on the basis of the aforementioned theoretical foundation, this paper defines the OBM as "a business model whose core logic is based on collaborative relationships with external companies and customers." This definition is based on the business model view.

2.3. Dimensions of Openness

Holm et al. discussed the openness of the OBM from three aspects, i.e., "scope," "directionality," and "permeability" [17]. The scope refers to the range of assets shared with other companies and is characterized as "broad" and "deep." Directionality represents the direction in which assets are exchanged in a business model. This can be divided into two categories: "inward," which involves acquisition of the assets of other companies, and "outward," according to which companies are allowed to provide their assets. Permeability refers to the ability to ensure that a change in one business model component will enable changes in other affected components so that the required adjustments and/or actions can be implemented.

Saebi et al. regarded the openness of the business model from three perspectives: levels of value co-creation, levels of permeability, and levels of collaborative capability [25]. Levels of value co-creation are the degrees of co-creation needed for the company's innovative activities and value creation. The level of permeability means the type of knowledge flow between the focal company and its external knowledge providers. The level of collaborative capability is the degree to which the company needs to develop a collaborative capability to govern its interactions with external knowledge providers.

Frankenberger et al. identified the characteristics of OBMs to be "customer centricity," "relational dimension," "structural dimension," and "cognitive dimension" [29]. The customer centricity refers to the strength

Table 1. Dimensions of openness of OBMs.

Category	Dimension	Description	Reference
Customer relationship	(1) The number of customers	The number of customers with which a company collaborates.	[17], [25], [31]
	(2) Dependency on customer resources	The degree to which a company depends on customer resources.	[17], [31]
	(3) Customer-centricity	The degree to which a company focuses on customers.	[29]
Partner relationship	(4) The number of external partners	The number of partners with which a company collaborates.	[17], [29]
	(5) Dependency on external partner resources	The degree to which a company depends on partner resources.	[17], [29]
	(6) Confidence level with external partners	The level of confidence between a company and partners (e.g., contact frequency and shared ambition and vision).	[29]
Company	(7) Utilization of company resources	The degree to which a company provides resources to support other companies.	[17]
	(8) Permeability	The ability to allow changes to other components affected by changes in a part of the business model.	[17], [25]

of the connection between the company and its customer, such as how much importance the company attaches to the customer demand in providing the solution. The relational dimension refers to the strength of relationships with the external partners with whom a company collaborates, such as the frequency and intimacy at which partners are involved. Whereas the structural dimension refers to the extent to which the focal actor occupies a strategic position in the network by virtue of being involved in many significant ties, the cognitive dimension defines the degree of common recognition among related parties in the network, such as whether or not they share a common purpose and partnership.

Kortmann classified business models according to the degree of customer participation and categorized them as firms, alliances, or platforms, in the order of a low to high degree of customer participation [31]. Firms refer to a form in which companies create value in collaboration with customers and suppliers; however, the final value is acquired only by themselves. Alliances indicate a form in which companies create and acquire value in collaboration with external partners. Platforms define a form in which a company establishes a two-sided or multi-sided platform market and creates and acquires value through a collaboration between customers and external partners on the platform.

Although these existing studies characterize OBMs from different perspectives, they commonly discuss and define the dimensions of the openness of business models. This research identifies and organizes eight openness dimensions of OBMs based on existing studies as shown in **Table 1**. The dimensions of OBM openness proposed in the literature were collected and arranged on the basis of their similarities. Those dimensions with a common meaning were integrated and redefined. For example, Holm [17] discussed the "broad" concept as the number or diversity of other companies with which the company shared assets. He additionally introduced the "deep" concept as the degree of dependency on other companies' resources. On the other hand, Frankenberger [29] mentioned the "relational dimension" that refers to the strength of relationships with external partners. These two proposals can be represented by "the number of partners" and "the dependency on external partner resources." Therefore, the dimensions "(4) the number of partners" and "(5) dependency on external partner resources" were created. **Table 1** presents the dimensions of openness of OBMs based on the primary literature. The details of each dimension are explained as follows.

Customer relationship

This category includes three dimensions: (1) the number of customers, (2) dependency on customer resources, and (3) customer-centricity. (1) The number of customers is defined as the number of customers with whom a company collaborates, and (2) dependency on customer resources is the degree of the company's dependence on customer resources such as knowledge and ability, while (3) customer-centricity means the degree of the attention to the customers such as how much the company emphasizes customers' requirements and feedback.

For example, Uber, a car-hailing application run by Uber Technologies, is built around people using their own spare time and cars to transport others [32]. Therefore, the dependence on customer resources is higher than that for a business model of a general taxi company, and (2) increases in this respect. In addition, the openness (1) increases as the number of customers increases. Moreover, the openness (3) increases as the service improves in customer availability and accessibility on the basis of customer feedback.

Partner relationship

This category includes three dimensions: (4) the number of external partners, (5) dependency on external partner resources, and (6) confidence level with external partners. (4) The number of external partners is defined as the number of partners with whom a company collaborates. (5) Dependency on external partner resources means the degree of the company's dependence on external partners such as on their technologies, ideas, and human resources. (6) Confidence level with external partners is the bond strength between a company and its partners (e.g., contact frequency and shared ambition and vision).

For example, the iTunes store operated by Apple is a

software-based online digital media store that provides music, video, and applications [33]. The value of the iTunes store for customers is realized on the basis of contents such as music and video provided by the developers. Apple has contracts with companies around the world as external partners; thus, the openness (4) is higher. In addition, although Apple develops and provides some content on its own, the core value of the iTunes store is not enhanced only by their contents. Therefore, the openness (5) is high. Apple, on the other hand, does not necessarily have a cognitive trust with developers. Many of their relationships are merely contractual. Therefore, the openness (6) of the iTunes store is low compared to other dimensions.

Company

This category includes two dimensions: (7) utilization of company resources and (8) permeability. (7) Utilization of company resources presents the degree to which a company provides its resources to external partners to support them in implementing their business model, while (8) permeability means the degree of a company's ability to adapt and sustain a business when a part of the business model changes.

For example, NTT data's Visual Analytics Platform (VAP) [34] is one of its assets in the form of software licenses, which are packaged and sold to other companies. By analyzing big data via VAP, it becomes possible to develop business models that leverage data to create value. The packaged software can support more enterprise business models. Therefore, (7) of this business model is higher than it is for a business model that develops unpackaged contract software. Furthermore, (8) is, for example, generally higher for small new-venture companies than it is for large manufacturing companies with solid organizational structures.

2.4. Research Position and Approach

Although the OBM has received some research attention, the existing studies on OBMs are limited to comparisons with similar concepts. Thus, it remains challenging for a company to design an OBM in an actual case. The purpose of this research, therefore, is to support the strategic design of OBMs. This paper proposes a design guideline for OBMs.

The paper is structured as follows: Section 3 defines the requirements for an OBM design guideline on the basis of the dimensions of openness and proposes an OBM design guideline. In Section 4, the proposed method's application to an OBM design workshop is discussed, and its usefulness is shown through an evaluation of the eight dimensions of openness.

3. Design Guideline for Open Business Models

This section provides a design guideline for OBMs with high openness. First, the requirements for the design guideline are defined on the basis of the dimensions of openness shown in **Table 1**. From these requirements, the design guideline for OBMs is proposed.

3.1. Requirements for the Design Guideline

On the basis of the dimensions of openness in OBMs, this paper defines five requirements for the design guideline from (a) to (e) as follows.

(a) The guideline should analyze the customer's characteristics and requirements.

The openness from (1) the number of customers and (2) dependency on customer resource dimensions can be increased by considering the range of the target customer and the necessity of the customer's resources on the basis of an analysis of the requirements of the target customer.

(b) The guideline should design and evaluate the provided value from the customer perspective.

The openness of the (3) customer-centricity dimension can be increased by designing the value proposition on the basis of a customer-requirement analysis and evaluating it from the customer's perspective. For example, it is effective to utilize customer analysis and prototyping tools.

(c) The guideline should include a step to analyze and describe the functions to create value for the customers.

(4) The number of external partners, (5) dependency on external partner resources, and (6) confidence level with external partners are the dimensions in the partner relationship category. The partner means the co-creator that complements the functions involved in realizing the value proposition. To the external partners, the functions for value proposition should be classified effectively. Therefore, it is possible to improve openness by newly involving partners necessary for realizing the identified functions.

(d) The guideline should include steps to describe the relationships with external partners.

This requirement addresses the need for a high level of openness regarding the (7) dimension concerning utilization of company resources. If the designers can understand the relationships with external partners, they can recognize the strategic position of the company. Then, they can discuss these relationships according to the descriptions and adjust the strategic position considering their resources.

(e) The output of the guideline should be easy to disseminate to all partners even if they do not directly collaborate in the design process.

To increase the openness in the (8) permeability dimension, information about business model changes should be shared with all partners in a smooth and transparent manner. Thus, the tools utilized in the design guideline can be easily understood, for example, commonly utilized tools and visual output tools.

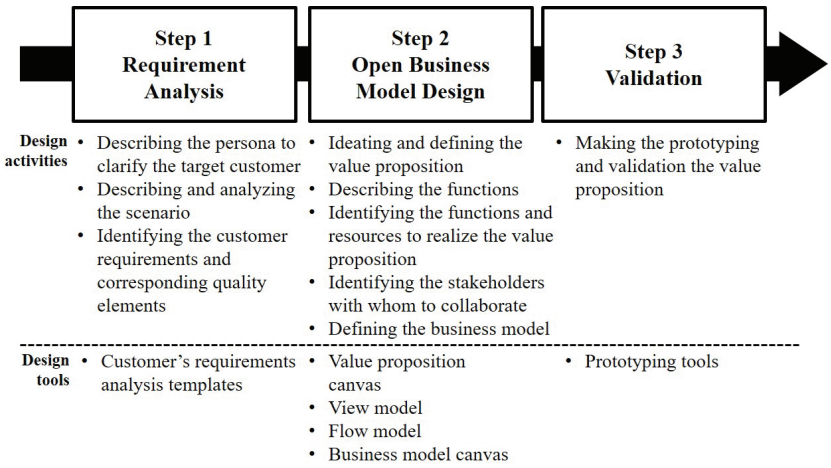

Fig. 1. The design guideline for OBM.

Table 2. Customer requirements analysis template set [35].

Template	Explanation
Persona template	The template for defining the persona. This template includes the schemes to write two types of data: demographic (ex. gender, residential area, and job) and psychographic data (ex. personality, preference, and lifestyle).
Scenario template	This template supports designers in writing the scenario related to the persona's lifestyle and actions in detail.
Keywords template	This template supports organizing the keywords included in the scenario. The format of this template is shown in **Table 3**.
Quality element template	This template supports identifying the quality elements that satisfy the customer requirements. A quality element is derived through the process as follows: describing a keyword, describing the customer's (persona's) requirement / required quality on the basis of the keywords, and identifying the quality element corresponding to customer requirements / required quality.

3.2. Design Guideline for an Open Business Models

On the basis of the requirements for the design guideline described in Section 3.1, this section constructs the design guideline for an OBM. **Fig. 1** presents an overview of this design guideline, which comprises three steps: Step 1: requirement analysis, Step 2: open business model design, and Step 3: validation. These steps facilitate the realization of a customer-oriented OBM design and satisfy requirements (a) and (b) of the design guideline. Step 2 includes an analysis of functions and description of the relationships with external partners. These steps are proposed on the basis of requirements (c) and (d). The tools used in each step are selected on the basis of (e). Each step and tool is explained in detail as follows.

Step 1: Requirement analysis of a customer

In this step, the target customer's requirements and characteristics are analyzed by using the customer requirements analysis template set. As shown in **Table 2**, this template set is composed of four templates [35]. By using this template set, the designers can analyze the customer requirements step-by-step as follows: Step 1-1 describing the persona to clarify the target customer, Step 1-2 describing and analyzing the scenario, and Step 1-3 analyzing and describing his/her requirements for products/services. As a result, the designers can obtain the quality elements, which means the criteria to evaluate the quality of products/services. Each step is detailed as follows.

• Step 1-1: Describing the persona to clarify the target customer

Step 1-1 clarifies the target customer by using the persona template. This template employs two types of data: demographic and psychographic data. The demographic data include social statistical attributes such as "age," "gender," "job," "residential area," "academic background," and "family." The psychographic data are qualitative attributes of the persona such as "lifestyle," "personality," "habit," and "belief." The persona template provides the designers with writing forms composed of these components. Using the description of the persona using this template, the designers can clarify the target customer.

• Step 1-2: Describing and analyzing the scenario

The scenario, that is, the story related to the persona's life and the use case of products/services, is described using the scenario template. On the basis of the persona described in Step 1-1, the designers write the story in the scenario template. To describe a fruitful scenario, it is better if the story includes not only the actions and events of persona but also his/her emotions such as his/her positive and negative feelings.

The scenario described above includes a large amount of information such as latent needs, thus the designer can obtain many clues for customer requirements. However, because the scenario itself is qualitative data, it is not easy to identify the customer requirements directly. For sufficient identification of the persona's requirements, a pre-analysis step is proposed. Thus, the designers extract keywords from the scenario using the keyword template. As shown in **Table 3**, the keyword template is composed of two dimensions: service encounters [36] arranged in

Table 3. Keyword template.

	Action	What	What like	Where	When	How
Access						
Check-in						
Diagnosis						
Service delivery						
Check-out / disengagement						
Follow-up						

Table 4. Phases of service encounter [36].

Phases of service encounter	Explanation
Access	The phase in which the customer knows the service and starts to access the service.
Check-in	The phase in which the customer appears in front of the providers.
Diagnosis	The phase in which the customer notices his/her own needs to the providers.
Service delivery	The phase in which the core of the service is delivered to the customer.
Check-out / disengagement	The phase in which the customer checks-out / disengages from the service.
Follow-up	The phase in which the customer follows-up with the service again.

Table 5. 4W1H for organizing keywords.

4W1H	Explanation
Action	The actions and motivations of the persona.
What	The artifacts of the persona's actions and characteristics of artifacts.
What like	The appearance of the persona's actions.
Where	The place where the persona acts.
When	When the actions take place.
How	The means/way of the persona's actions.

Table 6. Quality element template.

Keyword	Customer requirement / required quality	Quality element

the vertical column and 4W1H (what, what like, where, when, and how) arranged in the horizontal line. On the basis of these perspectives, the designers place the keywords into each cell referring to the scenario. The meanings of the perspectives of service encounters and 4W1H are shown in **Tables 4** and **5**.

• Step 1-3: Identifying the customer requirements and corresponding quality elements

Step 1-3 identifies quality elements using the quality element template shown in **Table 6**. This template identifies the customer requirements / required quality and quality elements on the basis of keywords. The customer requirement refers to what the customer wants to be/do or about what the customer complains. The required quality implies the requirements of the products/services, which can be assumed on the basis of an analysis of the customer. The quality element is the criteria on the basis of which the quality of the products/services should be evaluated. In this step, first, the designers need to choose and place the keywords derived from Step 1-2 into the keyword column. Next, the customer requirements / required quality for products/services needs to be completed. Finally, a quality element corresponding to the customer requirement / required quality is identified.

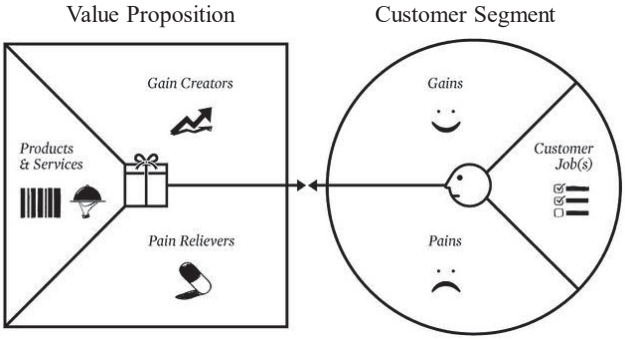

Fig. 2. Value proposition canvas [37].

Step 2: Open business model design

To design an OBM, the following steps are needed.

• Step 2-1: Ideating and defining the value proposition

Step 2-1, involving ideating and defining the value proposition, can be performed using the value proposition canvas (VPC) [37] as shown in **Fig. 2**. The value proposition is used in three ways: all benefits, favorable points of difference, and resonating focus [38]. The value proposition as all benefits is a simple list of all the benefits the providers believe that their offering might deliver to the target customer. The favorable points of difference indicate all the favorable points of the difference a market offering has relative to the next best alternative. The resonating focus is one or two points of difference for which an improvement will deliver the greatest value to the customer for the foreseeable future [38]. In this design guideline, the value proposition is defined as the total benefit promised to the customer.

To define the value proposition, first, the designers arrange the result of Step 1 using the value proposition canvas shown in **Fig. 2**. Clearly, they arrange the customer requirements / required qualities of their target customer on the right side of the VPC (**Fig. 2**). Then, the designers ideate the value proposition that meets the customer requirements / required qualities and place it on the left side of the VPC. Finally, the designers check whether the value proposition on the left side of the canvas can meet the customer requirements / required qualities on the right side of the VPC. If they are not matched, the ideation is iterated again.

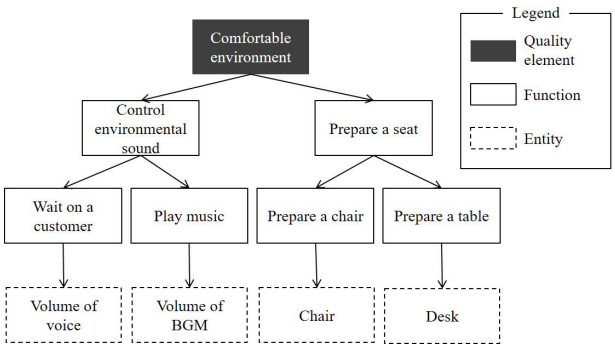

Fig. 3. View model [39].

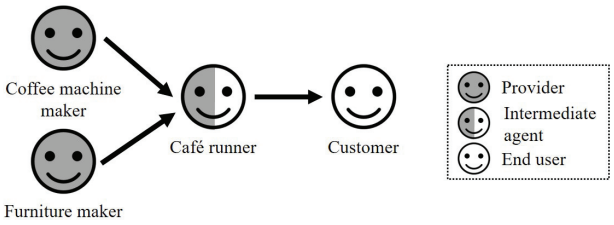

Fig. 4. Flow model [39].

• Step 2-2: Identifying the functions and resources to realize the value proposition

Referring to the VPC completed in Step 2-1, Step 2-2 identifies the functions needed to deliver the value proposition to the customer. **Fig. 3** shows the view model [39] to support the identification of the functions. In this design guideline, the function is defined as the product/service behavior that satisfies the customer requirements. The function can be decomposed into sub-functions, a so-called functional decomposition [40]. Using functional decomposition, the means to achieve the upper functions are determined.

On the basis of the above definition of the function, the functions that satisfy the customer requirements are identified at the beginning of Step 2-2. Then, as far as possible, these functions are decomposed into sub-functions. Finally, the designers identify the resources (e.g., technologies, human resources, infrastructure, products) that seem to have the specified sub-functions. Throughout this process, the view model shown in **Fig. 3** is constructed.

• Step 2-3: Identifying the stakeholders with whom to collaborate

To deliver the value proposition to the target customer, in Step 2-3, the stakeholders with whom to collaborate are identified, and the flow of value to the end-user is designed. These collaborative relationships are modeled in the flow model [39] shown in **Fig. 4**. First, the designers identify what their company can supply among the entities described in the view model (**Fig. 3**). An entity means a tangible or intangible resource. Through this process, the designers can recognize which entity their company cannot supply. Next, the external companies that can supply the lacking entity are identified. Finally, the flow model is described. As shown in **Fig. 4**, the stakeholders are described by nodes, and the flow of value is described by links. The nodes have three types: "end-user," "provider," and "middle agent." The "end-user" is the target customer of this business. The "provider" has a role to provide value on the basis of its own resources. The role of "middle agent" is to add value to the received value from other stakeholders or to transform the value by using his/her resources.

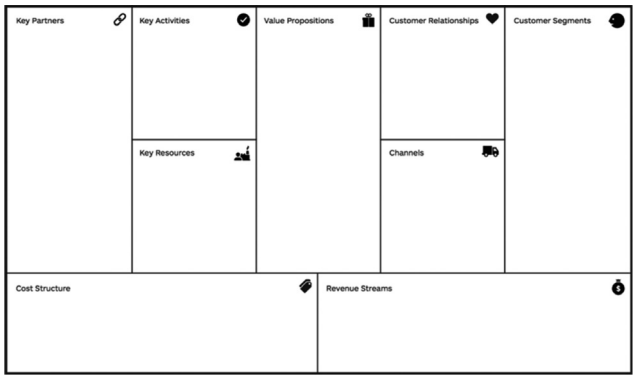

Fig. 5. Business model canvas [4].

• Step 2-4: Defining the business model

Step 2-4 defines the business model using the business model canvas (BMC) [4] as shown in **Fig. 5**. The designers describe and share the business model on the BMC, and can discuss and improve their business model.

Step 3: Validation

In Step 3, prototyping methods, such as paper prototyping, user story, and role play, are applied. Through prototyping, the designers can experience the value proposition from a customer's perspective and can validate the value proposition.

4. Case Study

To verify the usefulness of the proposed guidelines, we conducted a design workshop as a theoretical test in which the proposed guidelines were used and evaluated. Step 1 to Step 3 were implemented in the workshop. The details of the workshop and evaluation are as follows.

4.1. Setting the Design Workshop

An industry-university cooperation workshop was held for the purpose of designing OBMs for 18 months. The participants were 21 practitioners from Japanese multinational companies and 13 graduate students majoring in mechanical engineering. The participating companies included railway, manufacturing, communications, tourism, publishing, and retail industries. The participants were randomly divided into six groups: A to F. First, each group set the topic for a new OBM to "trip" or "shopping"

Table 7. Summary of outputs of each group till Step 2-2 of the OBM design workshop.

Group	Theme	Target customer	Scenario and customer requirements	Value proposition
A	Trip	The 28-year-old female office worker who has visited Japan many times for business	- Wants local information for sightseeing in Japan - Wants to utilize time effectively - Wants to experience the Japanese culture	Application to connect foreign tourists to resident supporters: - Support to plan for a trip by chatting or calling the resident supporters - Chat-bot support for travel - Route search service for city walk and transportation
B	Trip	The 37-year-old man who has two young children	- Wants to reserve accommodation that satisfies the needs of the family - Difficult to search the accommodations for family	Search engine site for a family trip: - Easy to access information on accommodations for a family with children - Easy to judge the reliability of information - Customized reservation support
C	Shopping	The 34-year-old man who has two small children	- Wants to enjoy shopping accompanied by children	Childcare service from residents in the shopping mall: - Enjoy the shopping - Let the children experience communication with diverse people
D	Shopping	The 35-year-old man who works in manufacturing	- Wants to spend a shopping time with a relaxed feeling - Wants to manage shopping time - Troublesome to carry heavy luggage	Next-generation type mass customized shopping mall: - The customized information of each customer - Virtual fitting experience - Order and delivery service online
E	Shopping	The office lady aged 38 who works in real estate	- Wants to enjoy shopping in an actual store - It is difficult to represent my needs for clothes, but I want to get a clear answer	Application to consult coordination and plan for shopping: - Recommend fashionable clothes for each customer
F	Trip	The 35-year-old man who is a programmer	- Wants to see a musical - Does not want to fail - Wants to share the feeling of being moved	Application to enhance the value of box-office events: - Receive the related information of box-office events before/after the event and enhance the value - Share the feeling of being moved through social networking service on the application

Table 8. Summary of business models that each group designed in the OBM design workshop.

Group	Customer segment	Value proposition	Channel	Customer relationships	Revenue streams
A	See **Table 7**.	See **Table 7**.	Application of smart phone	Registration Dissatisfaction collection system Expansion to other countries Advertisement Awareness increase due to enhanced blog	Chat/telephone brokerage fee Advertising income Marketing information sales income
B			Website Word of mouth, SNS Mother magazine work activities	My page Chat function Review Continuous promotion request Consulting Listing contract	Publishing fee Sales promotion fee
C			Website Word of mouth, SNS Mother magazine work activities	My page Chat function Review Continuous promotion request Consulting Listing contract	Publishing fee Sales promotion fee
D			Shopping mall	Treat customer as a VIP Customer rank rules	Tenant usage fee
E			Application of smart phone Magazine advertising Storefront Social network service (SNS)	Customer nurturing via app of the smart phone Conversation using smartphone	Billing the customer's app Advertising income Information sales fee
F			Entertainment-specific SNS	High satisfaction Experience that cannot be replaced	Recommendation engine usage fee Base annual contract + α special event support

at the desires of group members. Groups A, B, and F selected "trip" and groups C, D, and E selected "shopping" as the workshop theme. **Tables 7–9** show a summary of the output of the design workshop.

4.2. Openness Evaluation of Output

The openness of the business models designed in the OBM design workshop was evaluated using the dimensions of openness (**Table 1**). The openness evaluation was performed on the business models designed by the groups on a scale of 1–4, with the openness increasing as the evaluation scale value increases. Fifteen of the participants in the OBM design workshop replied to the survey. Each respondent evaluated the business model designed by his/her group. **Table 10** shows the mean of the evaluation results for each group and the overall average. Cells with an average value of 3 or more are colored in gray.

However, evaluating the dimension of "(8) permeability" was difficult because this evaluation is only possible during the business model operation phase. For this reason, the evaluation from this dimension was not performed in this application.

Table 9. Summary of business models that each group designed in the OBM design workshop.

Group	Key resources	Key activities	Key partnerships	Cost structure
A	IT infrastructure server IP management system	Acquisition of supporters Nurturing supporters System management/improvement	Local supporters who provide information App development outsourcing company	Personnel expenses App development cost Advertising cost (user/supporter) Payment to supporters (chat/phone)
B	Human resources (web related, marketing, inn rater, consulting)	Site promotion Marketing analysis/direct marketing Accommodation consulting Homepage operation and development	Accommodation service provider Mother's magazine Provider of accommodation information	Homepage development and maintenance cost Marketing expenses Sales promotion expenses
C	Shopping The mall Patent CRM / POS system	Training and training of providers Intellectual property promotion	Utsunomiya City Nursing school University tenant Senior citizens	Maintenance costs Opportunity loss (tenant fee) System development cost Maintenance costs Promotion fee
D	Buildings Facial recognition system Original customer service manual	Provide the buildings Provide facial recognition system Provide original customer service manual	Tenant System bender	Equipment maintenance cost Service operating cost Face pass system operating cost
E	Data management analysis system Human assets (system engineering skills, animation creation skills) Customer information	Enclosure of partners Sales (new customer acquisition) System operation Data operation Content creation	Department store Shopping center Apparel maker Market research company	Communication expenses Cloud service usage fee Personnel expenses Information purchase fee Marketing operating expenses
F	Knowledge of money-saving feeling Recommendation engine SNS content	Recommendation engine Development and operation Service operation Sales to partner companies Public relations/advertising activities	Ticket seller	Engine development costs SNS site development costs Service operating cost Public relations/advertising expenses

Table 10. Evaluation result of the openness of business models designed in the workshop.

Categories	Dimensions	Mean of each group						Overall mean (N=15)
		A (N=3)	B (N=3)	C (N=3)	D (N=1)	E (N=3)	F (N=2)	
Customer relationship	(1) The number of customers	3.67	1.67	3.67	4.00	2.33	4.00	3.07
	(2) Dependency on customer resources	3.67	3.67	3.00	2.00	3.33	2.50	3.20
	(3) Customer centricity	2.33	2.67	3.33	2.00	3.33	1.50	2.67
Partner relationship	(4) The number of external partners	3.00	3.33	2.67	3.00	3.33	2.50	3.00
	(5) Dependency on external partners resources	3.00	3.33	4.00	1.00	3.00	3.00	3.13
	(6) Confidence level with external partners	3.00	2.67	3.67	1.00	1.67	3.00	2.67
Company	(7) Utilization of company resources	3.00	2.00	3.00	1.00	2.33	3.00	2.53
	(8) Permeability	—	—	—	—	—	—	—

5. Discussions

5.1. Usefulness of the Design Guideline

In all the teams except for groups B and D, four or more of the dimensions, half of the openness dimensions, received scores of 3 or higher. On the basis of this result, it can be said that the consideration of this guideline is useful for designing an OBM.

Except for the evaluation results for dimensions (3), (6), and (7), the results for all perspectives were high as shown in **Table 10**. In particular, all evaluation results from the dimensions that were categorized as "partner relationship" were high. Therefore, the proposed design guideline can promote the design of an OBM that emphasizes the relationship with external partners. Thus, if a closed company applies this design guideline at the beginning of a strategy for transforming to an OBM, it can expect to discover opportunities to collaborate with external partners. In this way, the proposed design guideline can contribute to designing an OBM.

5.2. Limitations and Future Research

In this study, we organized the dimension of openness on the basis of existing research and constructed guidelines on the basis of the results. It is possible to design an OBM by following the procedures of the proposed guidelines. However, this study cannot confirm whether the OBM designed is feasible to be practically implemented. Furthermore, business sustainability, particularly in terms of economic performance, is also out of the scope of this research. As emphasized by Khumalo et al., there is a need to evaluate the performance of a business model be-

Table 11. Improvement directions to increase the level of openness in OBMs.

Categories	Dimensions	Improvement direction
Customer relationship	(1) The number of customers	To add a step to consider how to expand the segment of the target customer, for example: writing the business scenario in the middle term
	(2) Dependency on customer resources	To add a step to survey and clarify the resources of the target customer To show the designers past cases to utilize the customers' resources
	(3) Customer-centricity	To add tools to support ideation for the value proposition in Step 2-1 To have an opportunity to receive regular feedback on value proposition from real customers To involve the target customer in the design team To establish a method for using prototyping
Partner relationship	(4) The number of external partners	To add steps to consider how to evolve the business
	(5) Dependency on external partners resources	No ideas
	(6) Confidence level with external partners	To add a step to plan to share the vision with the external partners related to designed OBM
Company	(7) Utilization of company resources	To add a step to consider how to utilize resources of the company
	(8) Permeability	-

fore it is implemented [11]. The lack of prior evaluation methods leads to ineffective decision-making when the choice of a business model is a purely intuitive choice that is not based on rational criteria.

In addition, the results in **Table 10**, especially for dimensions (3), (6), and (7), are relatively lower than those for the other dimensions. This result indicates that the proposed guideline is not always optimal. Therefore, it is necessary to further improve the guidelines in the future.

Furthermore, in this study, the responses to the qualitative questionnaires were from participants who were the same people as the openness evaluators described in Section 4.2. The questions were associated with each dimension of openness, and the question was stated as follows: "What are the factors included in the design guideline affecting your evaluation of openness in this dimension?"

On the basis of the result of the survey, this study suggests improvements in the design guideline for OBMs with more openness. **Table 11** shows lists of improvements to the design guideline. Each list is associated with a dimension of openness in OBMs.

6. Conclusions

To support the strategic design of OBMs, we first clarified the dimensions of openness in OBMs in this study. On the basis of these dimensions, the requirements for a design guideline of OBMs were defined, and a design guideline was proposed. To apply the results, an OBM design workshop was conducted, and the proposed design guideline was utilized in this workshop. The openness of the OBM derived in the workshop was evaluated using the eight dimensions of openness. The application result confirmed the usefulness of the proposed design guideline as an opening activity to transform OBMs.

Potential future works include the improvement of the design guideline for OBMs and applications to real business schemes.

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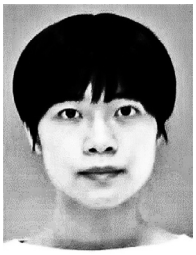

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