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ORIGINAL RESEARCH

Value co-destruction causing customers to stop service usage: a topic modelling analysis of dental service complaint data

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Abstract
This study aims to identify the types of value co-destruction (VCD) emerging in healthcare services that cause patients to reduce or extinguish their intentions to continue using the services; it also aims to identify the VCD antecedents. Complaints from 1075 dental clinic patients, which are collected as textual data, are analysed in this study. The authors adopt an exploratory approach comprising a quantitative analysis based mainly on the topic model, a type of machine learning, and a qualitative analysis based on the KJ method. Twelve types of VCD were empirically identified, three of which had a significant negative effect on the intention to continue using the service. Ten antecedents that cause these types of VCD were identified, when examined based on a multi-level perspective, institutional factors and social norms were found to be related to the VCD process. This study contributes to understanding the mechanisms by which failures in healthcare services occur and to developing effective decision making to overcome them.

Keywords Value co-destruction · Healthcare service · Social norm · Institution · Topic model

1 Introduction

Improving the well-being of actors in healthcare services is an important issue in service research (Ostrom et al., 2015). As healthcare services play an important role in supporting physically and mentally vulnerable people and in enabling them to lead a better life, it is important for service researchers to study the healthcare service field (Berry & Bendapudi, 2007). Healthcare services industry can be affected by many factors (Chen et al., 2019).

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Healthcare services do not only involve dyadic relationships between professionals (medical doctors, dentists, nurses, etc.) and non-professionals (patients), but also they closely involve the third-party actors such as other family members, organisations (public and private) and relative professionals (e.g., healthcare professionals who adopt and use advanced technology (Fan et al., 2020) and facility supporters for service delivery such as healthcare service availability in strategic location (Verter & Lapierre, 2002). Moreover, other relative factors include institutions such as governments, laws and decrees (Beirão et al., 2017; Frow et al., 2016; Kaartemo & Känsäkoski, 2018).

Hence, healthcare services can be considered as a socially responsible service operations process as well that needs to be designed by way of service concept and service delivery system (Jung et al., 2015). And also, healthcare services require to search for optimal methods to assess healthcare quality from the patients' perspective (Kong et al., 2018). Since service-dominant logic (Vargo & Lusch, 2004, 2008, 2016) was developed, service researchers have conducted numerous studies on value co-creation (VCC) perspective. In this perspective, the values are always mutually and reciprocally co-created in the interactions among providers and beneficiaries through the activities of both party's knowledge/resources (Vargo & Lusch, 2008). In professional and high-contact services such as healthcare, however, many actors invest resources to co-create value. McColl-Kennedy et al. (2012) claimed that healthcare service customers co-create value differently, demonstrating different types and levels of activities and integrate resources in different ways through interactions with various actors including individuals from the focal firm, other market-facing and public sources, private, and personal sources. Therefore, the adverse effects of VCC failure can be extensive. That is why it is necessary to pay attention to both positive and negative aspects of VCC (Plé, 2016, 2017) to improve the quality of healthcare services.

The concept of value co-destruction (VCD) has recently been proposed. VCD is 'an interaction between service systems that results in a decline in at least one of the systems' well-being' (Plé & Chumpitaz Cáceres, 2010, p. 431) and, from the service-dominant logic perspective, it can be regarded as service process failure. Studies on VCD have focused on various areas included business-to-customer (Echeverri & Skålén, 2011; Greer, 2015; Kashif & Zarkada, 2015; Smith, 2013), business-to-business (Mills & Razmdoost, 2016; Prior & Marcos-Cuevas, 2016; Vafeas et al., 2016), public services (Järvi et al., 2018), service robots (Čaić et al., 2018), customer-to-customer (Kim et al., 2020), self-services (Robertson et al., 2014), and social media (Dolan et al., 2019). Many of these studies conducted qualitative approach using a small sample size to debate on VCD situations and to identify their antecedents. In addition, previous studies focused only on the description and causes of VCD (e.g. Laud et al., 2019), but not on customers' intentions to continue using a service after VCD occurred. To improve patients' well-being (quality of life), healthcare services require their continuous active participation. The customers' active participation in healthcare service operations process helps to increase the influence of big data through healthcare information systems (Malik et al., 2018) which is useful in data-driven decision making (Oztekin, 2018), resource use, operational performance, and quality of service (Johnson et al., 2020). If patients stop using services due to resource misintegration that results in VCD between healthcare service providers and patients, they will not recover, which may lead to bigger problems later on and result in unexpected additional costs not only to the patient but also to their families, the organisation, and the society. It, therefore, is required to clarify the types and antecedents of VCD that critically affect customers' intentions to continue service usage.

This study addresses the following two research questions to fill up the gaps, using both quantitative and qualitative approaches and larger sample sizes.

RQ1 What types of VCD occur in healthcare services, and which of them negatively affect customers' service usage intentions after VCD?

RQ2 What are the antecedents that may trigger the VCD types, and what is the relationship between them (the VCD types) and the VCD mechanisms, from a multi-level perspective?

Consequently, this study had two objectives and used two procedures. The first objective was to clarify the types of VCD that occurred in healthcare services, using a quantitative approach, and to determine which of these types were relevant to the customers' final negative decisions. The second objective was to identify the antecedents that would most likely lead to these types of VCD, using a qualitative approach. The data used for the analysis were descriptive complaint questionnaires filled out by dental clinic patients in Japan. Although oral diseases are largely preventable, they affect the majority of the world's population, approximately 3.5 billion (Vasdev et al., 2022; World Health Organization, 2022). This means that oral health is an indispensable issue for customers. Since receiving dental care and maintaining good oral health is directly linked to the well-being of the human being, it is important to encourage customers to continue access to dental health care services. Most healthcare services in Japan are operated under the national health insurance system; therefore, many actors (professionals, non-professionals, public and private organisations), social norms, and regulations are involved in the patients' service provision services. In Japan, among all the healthcare services, the market of dental clinics has been getting more competitive. Dental clinics in general, therefore, are improving their services and facilities, which leads to patients' higher expectations. The more they tend to expect better services, the more complaints they have. That is a very reason that we picked dental clinic services as a subject of this research. All the data collected by Fuman Kaitori Center, a service sector managed by Insight Tech Inc., which collects a huge number of complaints against various industry, were analysed. These data are considered valid and trustworthy, as they are widely used in academic research (Mitsuzawa et al., 2016).

In this study, we found twelve VCD types, three of which negatively influenced patients' intentions to continue using services. In addition, ten antecedents of the three VCD types were identified. The theoretical contribution of this study's findings is that it demonstrates that the manifestation of VCD, which could diminish the intention to use a medical service, can be influenced by institutions and social norms. This study responds to the call to study VCD from a multi-level (service ecosystem) perspective (Leroi-Werelds, 2019; Plé, 2017).

In the next section, we present the theoretical background and focus on previous studies on VCD. We then pose two research questions to understand VCD in the healthcare service field better. Subsequently, we describe our study, which comprises two phases. While most previous studies have used a qualitative research approach with a small sample size, we used both quantitative and qualitative analyses with larger sample sizes. In the quantitative analysis, the questionnaire data were analysed and categorised into VCD types using machine learning to attain higher objectivity. Machine learning is an effective method for solving problems in healthcare service operations (Alizadehsani et al., 2021; Malik et al., 2018; Sariyer et al., 2022). In addition, the types that had a significant negative effect on customers' intentions to continue using the service were identified through statistical analysis. In the qualitative analysis, each comment on the questionnaires was extracted, as these types of VCD were analysed using the KJ method to obtain their antecedents. Finally, we discuss our findings and present the conclusions.

2 Theoretical background and questions development

2.1 S-D logic and value co-destruction

In the view of service-dominant (S-D) logic, value is co-created by not only service providers and customers but also by other actors, and all social and economic actors are resource integrators (Vargo & Lusch, 2016). VCC is characterised by three levels (micro, meso, and macro) of interaction as well as a meta layer that reflects their evolution over time (Akaka et al., 2013; Chandler & Vargo, 2011). Value is not co-created only in the face-to-face interaction (micro-level) between service employees and customers. For value to be co-created by a service, the organization (meso-level) providing the service, the trader, and even related government agencies and laws (macro-level) are involved with each other. Therefore, value is co-created multidimensionally (Vargo et al., 2017).

S-D logic has also been applied in studies on VCD, which, as noted above, is defined as 'an interaction between service systems that causes a decline in at least one of the systems' well-being' (Plé & Chumpitaz Cáceres, 2010, p. 431). Value is both co-created and co-destroyed at the provider–customer interface (Echeverri & Skålén, 2011); therefore, VCD can be considered as an outcome of VCC. That is, one is the obverse of the other (Smith, 2013). Many studies on VCC tend to focus on overly positive outcomes that have a strong impact on the term 'co-creation,' that is, 'co-destruction as a criticism of co-creation' myopia (Plé, 2017). Therefore, it is important to pay attention to VCD as well to further expand our understanding of VCC and improve the VCC process.

VCD studies have been conducted for various types of services. Kashif and Zarkada (2015) investigated VCD in banking services using the critical incident technique in structured interviews and found that a communication gap between employees and customers can lead to VCD. Vafeas et al. (2016) investigated VCD for creative agencies and their clients using one-to-one interviews and identified five antecedents of VCD. Järvi et al. (2018) used an abductive qualitative approach to identify eight VCD causes as well as when they emerged in the service interaction process. In the healthcare context, the degree of customer participation (Greer, 2015) and the lack of information and knowledge flow within organisations (Kaartemo & Känsäkoski, 2018) were identified as two factors that cause VCD. Laud et al. (2019) conducted a systematic and iterative literature review on VCD and categorised the manifestation of resource misintegration, as a VCD phenomenon, into ten types. They also suggested causes and developed a conceptual model of the VCD process. The VCD leads to marketing failure. For example, VCD is known to cause unexpected loss of resources (emotional, time, etc.) for customers (Sthapit & Björk, 2019), loss of emotional value for customers (Kim et al., 2020), customer distrust of online sites (Nam et al., 2020), and brand skepticism (Quach & Thaichon, 2017).

2.2 Need for quantitative study and multi-level perspective on VCD for effective decision making

Most of the studies on VCD have been conducted by qualitative analysis and have pointed out the diverse consequences of VCD. For example, Echeverri and Skålén (2011), based on interviews with employees of a transportation company, showed that VCD results in lower customer well-being due to anxiety and stress. In addition, Järvi et al. (2018) pointed out that VCD leads to the non-achievement of service goals based on interviews with public sector service providers. Quach and Thaichon (2017) reported that VCD causes skepticism

and dislike of brands based on interviews with consumers on the topic of online interaction of luxury fashion goods.

On the other hand, the relationship between VCD and customers' decision to use services has not been well studied. As Daunt and Harris (2017) empirically demonstrated that co-destructive and co-creative behaviours could occur simultaneously, concurrently, and iteratively in service processes. Therefore, what the important point for managers in service sector is to understand which VCD factors have the greatest impact on the customer's willingness to stop using the service. There is a need to identify the types of VCD that affect customer service usage (especially stopping the usage) by conducting empirical research using a larger sample size, which is rare approach in VCD study (Kim et al., 2020; Nam et al., 2020).

Furthermore, Plé (2017)'s calls for the study of VCD from a multi-level (service ecosystem) perspective. Plé (2017) argued that necessary to examine not only the interaction between service employees and customers (micro-level actors), but also how organizations (meso-level actors) and governments, laws and institutions, and social norms (macro-level actors) can affect VCD. Leroi-Werelds (2019, p. 667) asked, 'When and how can value be destroyed, instead of created, in a service ecosystem?' 'What is the role of institutions in value (co-)destruction in a service ecosystem?' In the healthcare service context, Beirão et al. (2017) defined three service system levels. These include 'the micro-level, which comprises individual actors such as health professionals, patients, and family'; 'the meso-level, which comprises public and private hospitals, primary care units, and health support organisations'; and 'the macro-level actors, which include the government, ministry of health, and other organisations that are responsible for defining national health policies'. Research that focuses on VCD arisen from interactions of actors from the viewpoint of a multi-level perspective in the healthcare services is scarce, and conducting research to expand our understanding of VCD, in response to the call by Plé (2017) is worthwhile. If patients stop using services due to resource misintegration that results in VCD between healthcare service providers and patients, they will not recover, which may lead to bigger problems later on and result in unexpected additional costs not only to the patient but also to their families, the organisation, and the society. Therefore, it is essential to clarify the types and antecedents of VCD that critically affect customers' intentions to continue service usage.

3 Research design

3.1 Research methodology

As shown in Fig. 1, our exploratory approach comprised a quantitative approach based mainly on text mining and a qualitative approach based on the KJ method. The quantitative study (Study I) comprised two analyses. First, a topic model, that is, a type of machine learning used to classify a large amount of text data, was used to identify the types of VCD in healthcare services. Second, a chi-square test and residual analysis were used to determine which types of VCD had been significantly related to subsequent patients' behaviours. In the qualitative study (Study II), an analysis was conducted using the KJ method to identify the antecedents of the VCD types found to have statistical significance in the first analysis.

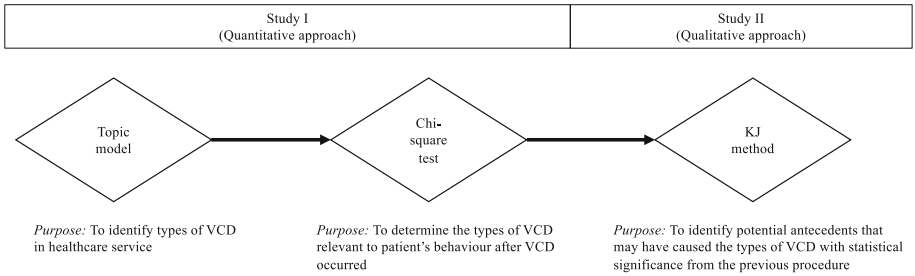

Fig. 1 Analysis flow

3.2 Data sample and collection

The data were retrieved from the database using the keywords 'dental clinic', 'dentistry', and 'dentist', and 1200 complaints were extracted. The database is managed by Insight Tech Inc., which collects a huge number of complaints against various industry. The data and the database are considered valid and trustworthy, as they have been used in academic research (Mitsuzawa et al., 2016). The complaints used in the analysis was collected extensively from all over Japan, specifically from eight regions (Hokkaido, Tohoku, Kanto, Chubu, Kansai, Chugoku, Shikoku, and Kyushu). After all complaints were visually reviewed and complaints irrelevant to this survey were excluded, 1075 complaints remained. Subsequently, the data were cleaned by deleting unnecessary words and correcting punctuation, typographical, and grammatical errors. After data cleaning, the average number of Japanese and Chinese characters per complaint was 58.8 (standard deviation 41.5, maximum 251, and minimum 7). The complainant's gender, age, and subsequent behaviours were also attached to each complaint. There were 254 male and 821 female respondents: 13 in their teens, 200 in their twenties, 429 in their thirties, 260 in their forties, 146 in their fifties, and 27 in their sixties and over. There were four types of responses regarding subsequent behaviours: 'I will not go to the dental clinic again.' (232), 'I do not go to the dental clinic as frequently' (272), 'I will keep going to the dental clinic, although I have some complaints.' (306), and 'I do not know.' or blanks (265).

3.3 Study I

3.3.1 Method

A topic model based on Latent Dirichlet Allocation (LDA) was used to analyse the data. LDA is a 'topic model' (Blei, 2012; Blei et al., 2003; DiMaggio et al., 2013) that uses an exploratory technique and machine learning to discover a set of interpretable 'topics' (i.e., groups of words with a common theme) in large collections of documents (DiMaggio et al., 2013). The consumers' complaints posted online are vague and unstructured in nature (Mishra & Singh, 2018). A topic model provides a new effective and reliable computational lens into the latent structures of a collection of texts, enabling researchers to discover new patterns in text data and analyse more collections than they would by hand (Ali & Kannan, 2022; DiMaggio et al., 2013). Since existing research on VCD has primarily used qualitative approaches with small sample sizes, analysing data from larger sample sizes will be likely to increase the potential for new findings and insights. The authors determined that it is rational

and suitable to use a topic model to analyse over one thousand open-ended questionnaires in order to contribute to the development of the VCD theory, which is still an insufficiently investigated research theme.

The analysis comprised four stages. First, morphological analysis using Tiny Text Miner (Matsumura & Miura, 2014) was conducted on the 1075 complaints. Nouns, verbs, adjectives, and adverbs were analysed. Next, to obtain an approximate 'number of topics' (a parameter set in the topic model), we asked dozens of dentists and staff in dental clinics to state how many types of complaints had been reported. The types of complaints they were able to come up with were generally about ten. Therefore, eight topic modeling analyses were conducted with the number of topics ranging from eight to fifteen. The model with the number of topics set at twelve was the most optimal in terms of interpretability. Third, the probabilities of each analysed complaint belonging to each topic were calculated, and each analysed complaint was allocated to the topic with the highest probability, according to the calculation result. Topic modelling was conducted using the R statistical computing language and environment (R Core Team, 2017), the topic models package (Hornik & Grün, 2011), and the lda package (Chang, 2010). Finally, all complaints were visually checked to ensure that they were allocated in the appropriate category (topic). If any allocation was clearly wrong, we reallocated it to a more appropriate topic.

After topic modelling, we used the chi-square test and residual analysis to analyse the relationships between the VCD types and the patients' intentions on subsequent behaviours. As such, we identified the types of VCD that significantly affect customer intention (e.g. 'I will not go to the dental clinic again', 'I do not go to the dental clinic as frequently', and 'I will keep going to the dental clinic although I have some complaints'). Of the 1075 complaints, 810 were analysed, excluding responses such as 'I do not know' and blanks.

3.3.2 Results

After topic modelling with LDA, we assigned names to the twelve topics, according to the high-frequency words for each topic and the most common complaints (see Table 1). Prominent words within a topic are those that tend to occur together in documents more frequently than they would normally (DiMaggio et al., 2013), that is, each topic can be regarded as a type of VCD.

Type I VCD was named 'cost of service', as it includes dissatisfaction with the cost of the service provided. Types II and III were named 'loss of trust,' and 'quality of treatment', respectively. Type IV was named 'attitude of receptionist', as it mainly includes dissatisfaction with the receptionist. Type V was termed 'Appointment/Time', as it includes the difficulty in making an appointment or having to wait for treatment past the appointment time. Type VI was named 'fear of treatment', because it includes anxiety and 'fear of treatment'. Types VII, VIII, IX, X, and XI were named 'condition besides treatment', 'attitude during treatment', 'environment of clinic', 'duration of treatment', and 'peripheral service', respectively. Finally, Type XII was named 'beyond health insurance coverage', as it includes treatments not covered by insurance.

The results of the chi-square test and the residual analysis are shown in Table 2. The numbers refer to the total number of patients' intentions of service usage for each VCD type. The number of intentions for 'cessation of service usage' was significantly larger for types II and VII. The number of intentions for 'reduction in frequency' was significantly larger for type X., and the number of intentions for 'cessation of service usage' was significantly smaller for types V and IX. However, only the high numbers of intentions should be considered, as the objective of this paper is to identify and find solutions to the antecedents of VCD.

Table 1 Identified value co-destruction type by topic model

#	Five most frequent words	Common complaints	Name of VCD type
I	Expensive, dental cost, finish, pay, money	I've always been surprised that the bill is so high The costs are opaque. There are no itemized lists but just a total. The receipt is only for a total that includes the cost of medicine, and it seems much higher than it should be for the treatment given I was surprised when I was told, "You're quite rich, aren't you?" The total was 10 times higher than usual. I was surprised that they just seemed to swindle money	Cost of service
II	Dentist, understandable, mount, hear/inquire, denture	The dentist seems unprofessional and has not earned my trust In the past, this was the only dentist near me, so I didn't have a choice but to visit. I brought my child, but when he cried I saw three adults holding him down and forcing his mouth open for the procedure. My child learned to hate going to the dentist. What's worse, the cost was very high. When I asked about it I was told that the points were high. I have a friend in the dental industry, so I pointed out that this was incorrect, and then I was told that he had been confused with another patient. They were just trying to take advantage of us	Loss of trust
III	Inlay, cavity, pain, check-up, scaling	Although I had my filling fixed, it was still painful I've had check-ups every three months. I pointed out the area that was uncomfortable for me, but no treatment was done. The dentist was told me later that I had had a cavity. I don't understand what the point of the regular check-ups was The tartar removal process is too painful. Even if I brush my teeth, it still needs to be removed, and I feel blue when I have to go. I want them to find a way to remove tartar without so much pain	Quality of treatment
IV	Receptionist, phone, attitude, reservation, inaudible	The receptionist was so unfriendly and a bit frightening I called the dentist to make an appointment, but the person on the phone spoke too weakly and I couldn't hear her. When I pointed out that I couldn't hear her, she hung up the phone. I called back, and even though I said that I couldn't hear her, she still spoke in a small voice. Someone who is unable to communicate on the phone shouldn't answer the phone The attitude of the receptionist was truly horrible. The person didn't give me any time to think about or answer questions but kept asking me questions after question. It really made me feel bad	Attitude of receptionist

Table 1 (continued)

#	Five most frequent words	Common complaints	Name of VCD type
V	Appointment, available, wait, time, appointment time	I arrived in time for my appointment but was forced to wait for 30 min. What is the point of making an appointment? I don't understand why I can't make an appointment in the next one or two weeks. They don't seem to be that busy I had trouble making an appointment and I had to wait for 3 weeks. After all that, I arrived 5 min before my appointment time but was made to wait for 40 min. What's the point of making an appointment?	Appointment/time
VI	Pain, extract, anaesthesia, grind, wisdom tooth	It was too painful to have my wisdom tooth removed. Even after the procedure, I was in horrible pain for three months I was given anesthetic to have my tooth removed, but rather than doing it all of a sudden, I wanted to be informed that the dentist would give an injection so that I wouldn't have been stunned Can they do something about that drilling noise? The noise makes it twice as frightening	Fear of treatment
VII	Child, parking, noise, waiting room, fearful	We went to a pediatric dentist, but there was no background music in the waiting room or the treatment room. They should reconsider this. It is frightening for children to wait in a silent environment like that, and it is not sufficient to simply place a TV set on the ceiling above the dental chair The entire waiting area was filthy. They should clean the place up The parking lot is too small. It only holds four cars, so I want them to make it bigger	Condition besides treatment

Table 1 (continued)

#	Five most frequent words	Common complaints	Name of VCD type
VIII	Open, dentist, hand, pain, visible	Although advertising pediatric dentistry, during my child's visit they overwhelmed her with an intimidating attitude, causing her trauma. I will never take her there again I don't like going to the dentist in the first place, but when the dentist is a smoker it get more horrible. His fingers go into my mouth and his face comes close to me, and they all smell like cigarettes. I wish they'd be more thoughtful about such matters They tell me to call out or to raise my hand if it hurts, but when a dental hygienist is pressing down on my arms and holding down my tongue with instruments, how can I do that?	Attitudes during treatment
IX	Dental chair, water, extremely, put in, lack of cleanliness	The patient's gargling sink is filthy. Just looking at it makes me feel disgusting. Even the tray for the instruments is dirty I don't know if it's water or saliva, but some water hits on my face during treatment and I don't like it. Maybe they could use a towel to cover my face like they do at beauty salons The fact that the dental chair has hair on it shows that the clinic has not been cleaned and isn't sanitary. I feel uncomfortable sitting in it	Environment of clinic

Table 1 (continued)

#	Five most frequent words	Common complaints	Name of VCD type
X	Duration, take, long, visit, money	Each treatment is too long. Even if it costs more, I'd like them to do more work during a single visit It takes too long for treatment to finish. It's common to see progress, but it's troublesome to have to take so much time off for every visit. Even if something can't be fixed in one visit, it would be helpful if the total number of visits required could be reduced. I'd like more rapid treatment I'm sure that the dentists have their reasons, but the number of visits required is just too high. I don't have that much free time	Duration of treatment
XI	Brushing, gum, hygienist, toothbrush, brush	A variety of tubes of toothpaste for whitening were sold in the dental office. I don't know why I had to pay high price to have my teeth whitened I have used floss since they ordered me to, but I feel like that made grooves between the teeth. I wonder if I really need floss. I think there are disadvantages as well I had a pain in my teeth and I went to the dental office to have all bad teeth treated. When it comes to getting tartar, the dentist always pressed me to buy an interdental brush and a toothbrush. When I told him that I would buy them at a store for a lower price, his face turned to a terribly disgusting one. Even going to the dentist is depressing, but it got more depressing	Peripheral service
XII	Insurance, out-of-pocket expense, orthodontics, expensive, silver crown	Every dentist in charge of a dental check-up at school notifies me that my child's teeth are crooked, but when I go to the dentist, I find that the cost of orthodontics is much too high. I feel sorry for my child, but it's too expensive. It's strange that Japan's universal health insurance system does not cover this Recently I was told that dental implants would be ideal, but the out-of-pocket cost is too high. It would be best if Japan's universal health insurance system covered this Ceramic crowns are too expensive, so I wish Japan's universal health insurance system could cover them	Beyond health insurance coverage

Table 2 Patients' intentions of service usage for each VCD type

Value co-destruction type		Patients' intentions of service usage		
#	Name of VCD type	Cessation	Reduction of frequency	No specific change
I	Cost of service	17	22	25
II	Loss of trust	49*	29	31*
III	Quality of treatment	30	37	41
IV	Attitude of receptionist	11	18	11
V	Appointment time	16*	43	47
VI	Fear of treatment	12	8	14
VII	Condition besides treatment	31*	15	19
VIII	Attitudes during treatment	19	14	24
IX	Environment of clinic	9*	20	27
X	Duration of treatment	20	41*	26
XI	Peripheral service	6	10	13
XII	Beyond health insurance coverage	13	15	27

N = 810, Chi-square value 58.52, DF 22, Cramer's V = 0.19, Cohen's w 0.27 (95% CI [0.20, 0.33]), *$p <$ 0.05

3.4 Study II

3.4.1 Data and method

Next, we identified the antecedents of the three types of VCD (II, VII, and X) that affected patients' behaviours more negatively, compared to the others. The data used were patients' complaints for each type: 49 complaints for type II, 31 complaints for type VII, and 41 complaints for type X.

We used the KJ method (Scupin, 1997), which can extract the essence of data by repeating the grouping of qualitative data. Since it adopts the bottom-up sorting process and is very useful for classifying data to find new ideas and summaries (Cheng & Leu, 2011), it is suitable in this analysis. First, we wrote down every complaint for each topic separately on a piece of paper to create classification cards. Next, we grouped the cards based on their likelihood to have common and/or similar elements. This procedure was repeated until the cards could no longer be grouped. Since the KJ method is a subjective classification method, to enhance objectivity, we had 17 students, who were trained on the KJ method, perform the same procedure using the same data. Their results were almost the same as ours, which proved that the objectivity of our results was trustworthy. The slight difference was the usage of vocabulary they used. One of the only few examples is that we used the word, "inconsiderate behaviour" while they used "lack of concern", which fell into the same category.

3.4.2 Results

The identified antecedents are shown in Fig. 2. Four antecedents were identified for 'loss of trust' (Type II): (i) Inconsiderate behaviour (18 complaints), (ii) Fraudulent action (10

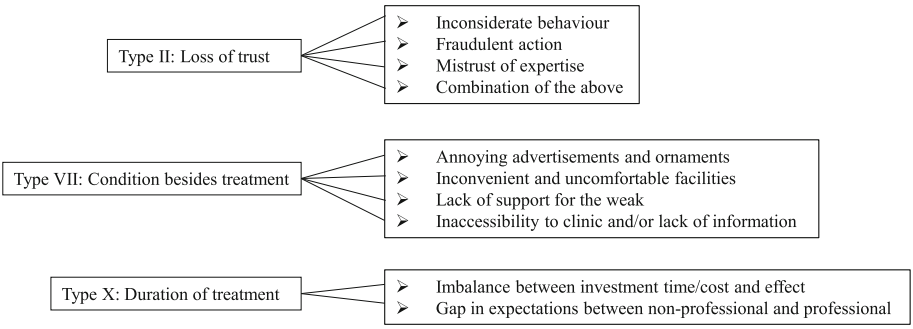

Fig. 2 Antecedents for three VCD types negatively affecting patients' intentions

complaints), (iii) Mistrust of expertise (17 complaints), and (iv) Combination of the above (4 complaints).

Inconsiderate behaviours of service providers (dentists, dental hygienists, and receptionists, etc.) could lead to patients' disappointment and anger and trigger VCD. Typical complaints on 'inconsiderate behaviour' include the following:

> My dentist was arrogant, which infuriated me. I did not have any cavities and was not in a hurry to go in, but when I did not go in for a while because I was too busy, he asked me, 'Do you not have any intention of coming in? I have more important things to do' and I did not like his words, so I have decided to go to another dentist.
> — woman in her 30s

The second antecedent is 'fraudulent action,' which can make a patient feel that he/she has been deceived by the service provider, leading to VCD. Typical complaints on 'fraudulent action' include the following:

> Sometimes, when they examine patients, they do it in two sessions, even though it should only take one. I think the dentists that divide the sessions do it to profit from the higher fees. This is fraud. It is also difficult to go twice. I will not go to the dentists that do this. I think the Ministry of Health, Labour, and Welfare should investigate them.
> — woman in her 30s

The third antecedent is 'mistrust of expertise.' VCD can occur when a patient becomes sceptical about service providers' words and actions. An example is as follows:

I wanted to ask my dentist about an out-of-pocket treatment called direct bonding. When I called the clinic, the dentist got on the phone to speak with me personally, but he had a know-it-all attitude. This is a procedure to fix gaps between teeth. It has to be paid out-of-pocket because it is aesthetic, but he said the insurance might cover it. Then, he suddenly started using technical terms when speaking, and I felt I could not trust him. I thought this would be an easy clinic to go to because they remain open on Sundays, but my impression of them completely changed. What a shame.
— woman in her 30s

In the above scenario, the dentist explained to the patient that the insurance would not cover the special treatment, but when the patient confirmed this information with the dentist thoroughly, the dentist used many technical terms to imply that the insurance may cover the

treatment. This dentist's behaviour most likely to have caused the patient not to trust the dentist's expertise.

The fourth antecedent is 'combination of the above.' Although the antecedents include those described above and those related to other topics, VCD ultimately could occur because of patients' distrust. The following is a typical example of a combination of complaints:

> The receptionist was rude. They tried to sell me medicine that I had already. I went in for dental scaling; during the procedure, my gums were injured and became painfully swollen. However, they completely denied that, telling me that I hurt my gums myself. Then, they discovered that I had a wisdom tooth. Even though it did not hurt, they recommended removing it. Before the dentist explained the procedure, he ground the tooth down. I had no idea of what they were doing. I had no pain at all before I went in, but after I went, things only got worse. Those people are the worst ever.
> — woman in her 20s

Four antecedents were identified as 'condition besides treatment' (Type VII). This type of VCD might have been caused by the following: (i) Annoying advertisements and ornaments (8 complaints), (ii) Inconvenient and uncomfortable facilities (16 complaints), (iii) Lack of support for the weak (4 complaints), and (iv) Inaccessibility to clinic and/or lack of information (3 complaints).

The first antecedent 'annoying advertisements and ornaments', including excessive advertising, unnecessary equipment, and inappropriate service offerings, may have resulted in patients avoiding to visit a dental clinic. A typical complaint for 'annoying advertisements and ornaments' is.

> There is a big sign with a large picture of exposed gums and missing teeth, which causes me to feel nauseous.
> — woman in her 40s

The second antecedent, 'inconvenient and uncomfortable facilities,' can be related to clinics not providing the desired level of patients' comfort, resulting in patients no longer visiting their clinics. The typical complaints regarding 'inconvenient and uncomfortable facilities' are as follows:

> The parking lot was too small, with only four parking spaces. I would like them to make it larger for the ten parking spaces.
> — man in his 20s

The third antecedent is 'lack of support for the weak.' Patients possibly felt that 'I cannot continue going to the clinic because I saw that….' When patients saw or felt that their clinics neglected thoughtfulness for the weak, they might stop visiting. They may have imagined that their dentists would also lack concern for their well-being. A typical complaint of 'lack of support for the weak' is:

> The facility is new and was built one or two years ago. However, wheelchairs and canes were forbidden. The reason seems to be that small children crawl on the floor. Would it not be better to create a space exclusively for children? In practice, entry seems forbidden for the elderly or disabled people. I have never known such an inconsiderate dental clinic.
> — woman in her 50s

The fourth antecedent is 'unavailability and/or lack of information.' A typical complaint of 'unavailability and/or lack of information includes.

With so many choices, I cannot determine which dentist to visit.
— woman in her 30s

Two antecedents were identified as 'duration of treatment' (Type X): (i) Imbalance between investment time/cost and effect (31 complaints) and (ii) Gap in expectations between non-professional and professional (10 complaints).

The first antecedent means that patients might feel that the result of the treatment was not worth the cost (mainly time and money). Generally, in Japan, patients visit dental clinics once a week for several weeks for a 15- to 30-min treatment per visit. Seeing the effect of each treatment may be difficult because the treatment is often carried out systematically. Consequently, patients are apt to distance themselves and consider visiting clinics as futile. They probably would like to receive their treatment all at once or at least with fewer visits. Dental clinics have not managed to meet this demand. Typical complaints of an 'imbalance between investment time/cost and effect' are as follows:

I had to go to the dental clinic once a week for over a month just to have one tooth treated. Could it not be done a bit faster? I wish I could have gone more often to shorten the treatment period. I wondered how long I would have to visit. I started to hesitate to go there.
— woman in her 40s

The second antecedent is 'Gap in expectations between non-professional and professional.' This is similar to the previous antecedent, but it can be considered a more deteriorated phase of VCD. This may have been caused by dissatisfaction with the long treatment period, leading to suspicions about the treatment provided. A typical complaint of 'Gap in expectations between patients and service providers is as follows:

The treatment sessions were too long. I go to the dentist despite my busy schedule, so I would like them to stop removing the filling in one day and replacing it another day. I have come to believe that they made the process longer on purpose. I do not have any free time for the fishy treatment.
— man in his 40s

4 Discussion

4.1 Theoretical implications

This study analysed descriptive critical complaints against medical services and classified VCD types using a machine learning method. While most of the previous studies have focused on the description of VCD and analysis of the factors that cause VCD, using interview data, this study identified three VCD types: loss of trust', 'condition besides treatment,' and 'duration of treatment', which could have negative impacts on patients' intentions to continue using the service. Furthermore, the qualitative analysis revealed ten antecedents that might have caused the three VCD types. This study's findings contribute to the literature by suggesting that the manifestation of VCD, which is catastrophic to the intention to use a medical service, can be partly attributed to institutions and social norms. Plé (2017) and Leroi-Werelds (2019) suggested that with respect to the manifestation of VCD, the study of VCD should not be limited to the micro-relationship between service providers and customers but extended to a multi-level relationship including elements besetting a legal system and

social norms. This study responds to this call. Since two out of ten antecedents are closely related to what they claimed, these two antecedents are discussed as below.

First, 'unavailability to clinic and/or lack of information' was extracted as one of the important antecedents that can lead to VCD. This antecedent may lead to resource misintegration by unsettling the customer (patient), who has to find the desirable service provider (dentist) or to receive the appropriate service. This antecedent corresponds to 'absence of information' identified by Järvi et al. (2018) and 'blocked access to integrate resources' in the VCD research review by Laud et al. (2019). Moreover, this antecedent is due to the lack of information provided by not only service providers but also the Ministry of Health, Labour, and Welfare (MHLW) regulations, including laws and official guidelines, and the Dental Association (a mutual aid association) regulations. Japan's healthcare system imposes many regulations and rules to provide high-quality healthcare to the public as fairly as possible. For example, strict restrictions prevent dental clinics from competing for customers with merely attractive advertisements. In addition, the Dental Association strictly requires dental clinics to abide by these restrictions. Therefore, dental clinics have to provide stereotypical information, making it difficult for patients to judge which dental clinic is the most suitable for them. In other words, institutional factors inhibit access to information for resource integration. Legislation is an important factor that affects the interaction between healthcare service providers and patients (Pop et al., 2018). This study shows that the institutions and systems surrounding dental clinics may prevent patients from accessing appropriate resources, leading to resource misintegration and VCD, which may reduce patients' intentions to use services.

Second, 'lack of support for the weak' is also an important antecedent that causes VCD and can be related to the influence of social norms in the VCC process. Social norms are known to affect the VCC process (Edvardsson et al., 2014; Vargo & Akaka, 2012), and customers tend to engage negatively when they perceive a deviation from a social norm during the consumption process (Li et al., 2018). Overall, these features suggest that customers' perceptions of deviations from social norms can promote resource misintegration, resulting in VCD, which can reduce or extinguish the intentions of service usage. The presence of VCD antecedents that violate social norms may be characteristic of services that require public and ethical standards. People's normative sense of 'this is how services should be', whether right or wrong, is likely to emerge for those who engage in services where inclusiveness is required (Fisk et al., 2018). Van de Walle (2016) found a close relationship between deviation from established norms and service failure in the context of public services. These findings can be applied to healthcare services that have a negative impact on customers' intentions to use services. This illustrates how adherence or deviation from the ethical standards that customers implicitly hold for healthcare services is critical to the success or failure of value creation.

4.2 Practical implications

4.2.1 Service encounter and servicescape

This study has implications for practitioners in that it discloses the types of VCD and antecedents that healthcare service practitioners should know. This study reveals that the four antecedents of VCD type II (loss of trust), 'mistrust of expertise', 'fraudulent action', 'inconsiderate behaviour', 'combination of the above', and two of the antecedents of VCD type VII (condition besides treatment), 'annoying advertisements and ornaments' and 'inconvenient and uncomfortable facilities', may result in reduction of intention to use services.

Regarding the four antecedents of type II, 'customer neglect by service providers' (Bitner et al., 1990) and 'opportunistic behaviours of service providers' (Chowdhury et al., 2016; Pathak et al., 2020) can result in customers' distrust of the service providers (Järvi et al., 2018; Vafeas et al., 2016). Service providers should be aware of the importance of appropriate behaviour and service encounters to prevent the termination or reduction of customers' intentions to use services caused by VCD. In addition, we noticed an interesting finding that two antecedents of VCD type VII: servicescape (Bitner, 1992; Hoffman et al., 2003) may negatively affect resource integration, which significantly affects the patients' perception of the value proposition by service providers. To circumvent VCD, service providers need to examine whether the servicescape is appropriate from the customers' perspectives.

4.2.2 Handling time/cost-conscious customers

Healthcare service providers may understand the importance of paying attention to patients' time and cost. Particularly, this study shows that practitioners need to pay attention to the antecedent 'imbalance between investment time/cost and effect.' This antecedent emerges when patients feel that the cost and time spent on treatment are not commensurate with the results. This results in coercive resource integration (Laud et al., 2019), with patients experiencing dissatisfaction with perceived benefits and perceived costs (Prior & Marcos-Cuevas, 2016). However, this antecedent goes beyond the dental clinic–patient dyad relationship explained. In most cases, dentists do not want their patients to waste time and money; however, to provide a wide range of standardised treatments to the public, the MHLW has established standardised treatment procedures and penalties. In addition, most inlays and crowns are produced in external dental laboratories, not in dental clinics, making it difficult to complete these procedures on the same day. Therefore, even if the patient wishes to finish treatment quickly, the dental clinic must follow a standardised procedure, and the length of treatment is affected by the workload of the external laboratory. Most patients are unaware of these situations and feel forced to spend more money and time. As this situation worsens over time, it can change into a 'gap in expectations between patient and service provider.' To prevent VCD due to these factors, dentists and staff should provide patients with background and relevant knowledge of healthcare services.

5 Conclusion

This study aimed to identify the types of VCD and their antecedents that critically affect the reduction of patients' intention to use healthcare services, using an exploratory approach. Using the topic model, a textual data analysis of 1075 patient complaints regarding dental clinics resulted in their categorisation into twelve types of VCD. Statistical testing revealed that three of these VCD types had a significant negative effect on patients' intentions to use services. We then identified ten antecedents that significantly affect service usage intention.

The most important contribution of this study to service research and service operation is that the relationship between VCD and the reduction of service usage intention was analysed using empirical data. Conventional studies have been conducted on VCD alone, and pioneering studies have analysed the relationship between VCC and goods purchase intention (Leroi-Weldens et al., 2017). Nevertheless, to explore the importance of VCD for service research and service operation, it is necessary to analyse the relationship between VCD and the reduction of service use intentions. Furthermore, it also responds to the importance of

using a multi-level perspective. Based on this analytical perspective, institutional factors and social norms, such as macro-level actors, were found to influence the process of VCD and to inhibit resource integration, which results in reducing or extinguishing customers' intentions to continue service use.

While this is a novel study on the classification of VCD types that cause the reduction of service use intention, it has three explicit limitations. First, this study only included data on healthcare services, specifically dental services in Japan. Further studies are needed to investigate the types of VCD and customers' service usage intentions in other countries and other areas of business. Second, we did not use data from service providers, as this study focused on customer complaints only. A similar analysis using service providers' data should be conducted to clarify the types of VCD from the service providers' perspectives, as well as their antecedents. Finally, a study on how service providers should improve their services to avoid VCD and offer best service experience to patients should be further studied.

Despite these limitations, this study has revealed the impact of VCD caused by institutions and social norms, which will encourage future research. Therefore, although only one social norm was found to have an impact on VCD in this study, other social norms and prejudice are likely to have a similar impact. Institutions and social norms that may affect VCD can vary by service type, and further research is required to identify them. Moreover, in service marketing research and practice, a study that analysed VCD while utilising data mining of electronic word of mouth (Gkritzali et al., 2019) has recently identified the actual needs of customers and their complaints against the service. Consequently, in the future, an effective analysis of qualitative data will be important in the service sector.

Declarations

Conflict of interests The authors have no relevant financial or non-financial interests to disclose.

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