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Effects of Public Perception of Emergency Medical Service on Brand Equity of the Public Health System

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응급의료서비스에 대한 대중의 인식이 공공의료시스템 브랜드 자산에 미치는 영향

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This study examines the effects of the public's perception of emergency medical service (EMS) on the public health system's brand equity and the moderating effect of governance on this relationship using Keller's customer-based brand equity model. It uses four EMS functions: rescue/first-aid and transfer activities; disaster prevention, preparation, and response activities; educational activities in urgent situations; and medical treatment in emergency rooms to examine the effects of them on brand meaning of the public health system. Our findings are important for understanding the public as customers of the public health system and devising and/ or adapting healthcare policies and marketing strategies to develop brand equity and increase customers' loyalty to the public health system.

Keywords : Emergency Medical Service, Public Health System, Brand Equity, Customer-Based Brand Equity Model, Level of Governance

1. Introduction

Brand equity—the differential effect of brand knowledge on consumer responses to a brand—is an essential concept in marketing literature [34]. Positive brand equity results in a variety of advantages (e.g., in terms of customer attitude, purchase intentions, word-of-mouth marketing, and profits in manufacturing and service sectors) that have been explored in prior marketing studies [19, 44, 51, 54, 62]. Since brand equity is a valuable asset, understanding how to develop, measure, and manage brand equity is extensively discussed in marketing research [17].

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Brand equity may have a more substantial impact on services than on manufacturing firms. It can help consumers confirm a consistent quality level before they experience a service since the intangible nature of services makes it hard for consumers to assess its quality [41]. However, despite the importance of brand equity in the non-manufacturing sectors, there has been relatively scarce research on how brand equity impacts can differ across areas [14, 17, 41]. Primarily, brand equity is essential in government sectors since it can increase the public's credence, trust, and loyalty to the government [9]. Public sectors develop their brand equity to disseminate their messages or policies to the public and thereby achieve their goals of increasing public awareness and participation [4]. However, for the public health system, few studies can be found in the literature on the brand equity effects of governments and public institutions and subsystems. In fact, a previous study on the EMS is Lee et al. [43], but it concerns the operational planning and scheduling of emergency medical systems under uncertainty. Therefore, there is a big difference from this study. Thus, the purpose of our research is to examine how public perceptions of a subsystem's service quality affect the public health system's brand equity development.

The public health system has encountered great challenges due to the rapid transmission of the Middle East respiratory syndrome coronavirus in 2015 as well as the coronavirus disease in 2019. The repercussions of such crises have drawn attention to public concerns over the emergency medical system while highlighting the importance of emergency medical services (EMSs) in the public health system. Despite the importance of the public health sector, there has been criticism that the industry has suffered from lower customer satisfaction due to a lack of understanding of customers' needs from a marketing perspective [64]. Gromark and Melin [24] suggested that the public sector should understand brand values to build a holistic and balanced relationship between a service provider and customers to improve customer satisfaction. Sun et al. [64] applied internal marketing in the Korean public health sector, revealing a positive relationship between self-efficacy, internal customer satisfaction, service innovation, internal service quality, and competitive advantage.

Under these circumstances, EMS has garnered public attention as a subsystem of the public health system with regard to providing solutions for emergencies and crises [18]. EMS provides more opportunities than other health services to obtain health information and advocate for patients and interact with them as they move through the healthcare system [65]. Shah [59] found that EMS has emerged as an essential axis of the public health system due to its influence on medical and historical outcomes or social forces. It is crucial to understand EMS's contributions to the public health system, observe its role, and identify its public perception. However, EMS has mainly been studied separately from the public health system in the literature. Previous research on EMS effectiveness tended to place greater weight on the suppliers' viewpoint (government) than the beneficiaries' (public) [e.g. 30, 57]. Research exploring EMS as a subsystem of the public health system is scarce [18]. Thus, it is pertinent to examine the impacts of EMS services' public perception on the public health system.

For these reasons, a user-centred approach is necessary to establish a system of governance and infrastructure in the public health system to justify and support the sustainability of policies. The public evaluation should be reflected in related policies as long as public health system is recognized as a public good. Through this process, policies can be improved and validated. However, the interactions among the individual functions of EMS; the public health system as the overall governance of a preventive, proactive, and responsive coordination system; and other forms of social capital have rarely been studied separately in earlier research. Furthermore, it is important to understand how the public evaluation of a sub-system of the public health system such as EMS affects the brand equity of the public health system, as the public does not perceive EMS as a separate system from the public health system [18, 57].

We classify EMS via a user-centred approach into four functions: 1) rescue/first-aid and transfer activities, 2) disaster prevention, preparation, and response activities, 3) educational activities in urgent situations, and 4) medical treatment in emergency rooms (ERs). The functions were based on the existing laws governing the EMS in South Korea, and questionnaires were developed to evaluate public satisfaction with each of the sub-functions. This study analyses the effects of these four EMS functions on the public health system's brand equity using Keller's customer-based brand equity (CBBE) model. A structural equation model was used to empirically test the relationships among the variables.

We provide important theoretical and practical contributions, unlike previous studies that focused on the brand equity of profit organizations, methods to improve the quality of EMS from a supplier's perspective, or an analysis of the operational status of the EMS for disasters [33, 39, 56, 61]. First, we performed the scale development of four EMS

functions. Second, we contribute to the brand equity literature as we lend empirical support for the relationship among brand identity, brand image, brand responses, and brand relationship to understand the establishment of brand equity in the public health system. Third, we examined the impact of public perception of the EMS, which is a subsystem of the public health system, on the brand meaning of the latter. The impact implies that role-sharing can be considered appropriate between the central and subsystem (local) governments. As both are stakeholders in public healthcare governance, this can improve the system's overall coordination. Besides, we find a moderating effect of the level of coordination between the central and local government on the relationships between the four EMS functions and the public health system's brand meaning. If the public perception of the governance structure is low, it would be difficult to support EMS as a subsystem of the public health system.

2. Literature Review and Hypothesis Development

2.1 Emergency Medical Service as a Subsystem of Public Health System

The World Health Organisation (WHO) defines the public health system as all organised measures (whether public or private) to prevent disease, promote health, and prolong life expectancy holistically. In South Korea, the public health system is defined in Article 2 of the Public Healthcare Act as 'all activities, regardless of regions, classes, and sectors, performed by central and local governments and health and medical institutions, so that universal medical service is guaranteed and public health is promoted.' In addition, Article 7, Section 1 in the same Act determines the range of public healthcare, including situations where there is a shortage of medical services due to low profitability such as for childhood and maternal diseases, people with disabilities or mental disorders, EMS for disasters and infectious diseases. Article 3 in the Disaster and Safety Management Act classifies infectious diseases as social disasters and prescribes the establishment of preventive measures against epidemics immediately after the outbreak of diseases such as those in Article 2 of the Prevention and Supervision of Infectious Diseases Act. Likewise, the social role of EMS is defined as a subsystem of public healthcare both at home and abroad.

As stated above, WHO emphasizes the necessity of immediate and overall coordination for infection prevention and a control strategy for infectious diseases that have the potential to cause public healthcare disasters. That is, WHO recommended that the strategy should be implemented systematically at a national level involving administrative control, environmental and engineering controls, and Personal Protective Equipment controls [73]. Additionally, Article 2, Section 5 of the South Korean Public Healthcare Act establishes an overall coordination system to prescribe that "the delivery system in public healthcare implies that central or local governments build a systematic role-sharing among the following public healthcare institutions such as National Medical Center, national university-affiliated general hospitals, and regional (private) and local hospitals to provide the following job tasks of public healthcare, defined at Article 7, Section 1 in the Public Healthcare Act." However, despite the enactment of these laws, 185 human casualties occurred in South Korea in 2015 following the lack of an initial nationwide response and well-organized infection control due to the absence of a holistic national collaborative response system. The total casualties increased to 423 people worldwide, including cases in Saudi Arabia and the UAE [74]. With this new global and national trend, the value of emergency medical treatments by public and private response agencies and an overall holistic national collaborative response system have emerged as social capital that would improve public healthcare.

The role of EMS is defined in Article 2 of EMS Act, as "any medical treatments for emergency patients, including counselling, rescue, transfer and first aid, in a medical treatment process from the occurrence of emergency patients until the patients has recovered from a life-threatening risk or the serious mental or physical injuries have been removed." In summary, an operational definition of EMS based on the above definition, Article 25 in the EMS Act, Article 1 in the Rescue and Relief Act, Article 4 in the same act, enforcement decree 12 in the Disaster and Safety Management Act, and Article 4 in the Prevention and Supervision of Infectious Diseases Act has been provided. This operational definition includes: 1) rescue/first-aid and transfer activities, 2) medical treatment in ERs after transfer to hospital, 3) disaster prevention, preparation, and reaction activities including for infectious diseases, and 4) educational activities in urgent situations such as fire, disasters, and occurrence of emergency diseases before arrival at the hospital. <Table 1> shows the subsystem and definitions of emergency medical services. In this paper, 1) first-aid activ-

ities, 2) disaster reaction activities, 3) educational activities, and 4) medical treatment in ERs were included.

<Table 1> Operational Definitions of Four Functions in the Emergency Medical Services

Functions	Operational Definition	Related Laws
Rescue/first-aid and transfer activities	Paramedics receive professional instruction on how to treat emergency patients, perform first aid, and transfer patients to hospital.	- Act of Emergency Medical Service - Act of Rescue and Relief
Disaster prevention, preparation, and reaction activities	The disaster response system prepares regularly for multiple types of disasters. Activities include coping with new epidemics, large numbers of casualties and ensuring that disasters are contained quickly and effectively.	- Act of Disaster and Safety Management - Act of Emergency Medical Service - Act of Prevention and Supervision of Infectious Diseases
Educational activities in urgent situations	Educational activities targeted at the general public are done systematically and include first aid for emergency patients, safety training for disasters, and instructions on how to use first-aid appliances such as automated external defibrillators.	Act of Emergency Medical Service
Medical treatment in emergency rooms (ERs)	For in-patient treatment, priority is given systematically based on the level of severity.	Act of Emergency Medical Service

2.2 Brand Equity

The three main streams in the literature on brand equity are Ahmad and Thyagaraj [2] 1) factors that affect brand equity, 2) impacts of brand equity, and 3) development of brand equity measurement. The first stream examined factors that influence brand equity. Customer satisfaction [66], brand credibility, brand commitment and loyalty intentions [45], word-of-mouth marketing [49], country-of-origin of brand [48], country of origin [53], service quality [27], product country image and marketing activities [7], advertising [13], corporate social responsibility and corporate reputation [60], service empathy and network quality [27], and recall management [40] affect brand equity. These studies suggest that consumer perceptions of a company's product or service should affect branding performance (e.g. brand credibility, reputation, and brand equity). Despite several studies that identified the factors influencing brand equity, research to help understand brand equity in the public sector is scarce. Therefore, our study examines the impact of public perception of EMS on the public health system's brand equity.

The second stream explored the impacts of brand equity. Consumer preference and purchase intentions [14], retailer's dependence and commitment to the manufacturer [19], risk to the firm's debt/equity holders [54], brand loyalty [51], customer acquisition, retention, and profit margin [62], consumers' willingness to pay price premiums, and consumers' attitude towards brand extensions, brand preference, and purchase intention [12] are some of the factors affected by brand equity.

Since our study develops scales to measure the public health system's brand equity, we mainly focus on the third stream. Aaker [1] used brand loyalty, brand awareness, perceived quality, brand associations, and brand assets to measure brand equity. Keller [34] added brand knowledge, combining brand awareness and brand image to measure brand equity. Yoo and Donthu [75] developed a multidimensional consumer-based brand equity scale—perceived quality, brand loyalty, and Brand awareness/associations. Vázquez et al. [68] developed a consumer-based brand equity scale that included product functional utility, symbolic product utility, brand name functional utility, and brand name symbolic utility. Netemeyer et al. [52] developed scales to measure the brand equity of 16 different brands from six product categories in the US. They used perceived brand quality, perceived brand value for the cost, brand uniqueness, brand awareness, brand familiarity, brand popularity, organisational association, and brand image consistency. Pappu et al. [53] added brand personality and organisational association to measure brand associations of cars in Australia. Wang et al. [71] developed a brand equity index that includes brand awareness, brand associations, service quality, and customer loyalty in the context of Taiwan's healthcare industry. Baalbaki and Guzmán [6] introduced two new dimensions (sustainability and social influence) to measure smartphones' brand equity in the US.

However, there is still a need to construct brand equity measurements for different industries [6, 68]. These brand equity measurements should prove useful in different industries, as they are psychometrically robust and parsimonious enough to be manageable [2, 70], potentially allowing practitioners to measure the customers' perceptions of brands. We found only a few studies measuring brand equity in the health system. Berry and Seltman [10] conducted a case study of

the Mayo Clinic to investigate the interrelationship between brand communication with customers, brand awareness, brand meaning, and brand equity. Kim et al. [37] identified five dimensions—trust, customer satisfaction, relationship commitment, brand loyalty, and brand awareness—of building brand equity in hospitals.

2.3 Customer-Based Brand Equity in Public Health Service

A typical measure of brand equity uses Keller's CBBE [35] model. Keller elucidated how for-profit and nonprofit organisations could construct their brand equity both in the manufacturing and service sectors. The CBBE framework follows a four-stage sequential process consisting of brand identity, brand meaning, brand response, and brand relationship. Brand identity is the first stage of CBBE and is concerned with whether the brand is known and recognised by customers, and whether the brand performs its functions properly [37]. There are two reasons why brand identity is essential: first, customers tend to respond more actively to a brand they feel a personal connection with [29]; second, brand meaning affects how brand identity is established [37]. Becker-Olsen and Hill [8] found that when brands from nonprofit organisations are consistently exposed to the public and perform their functions properly, customers associate themselves with those particular brands, which becomes their brand identity. In this context, we studied four EMS functions: rescue/first-aid and transfer activities, disaster prevention, preparation, and response activities, educational activities in urgent situations, and educational activities in urgent situations, and 4) medical treatment in ERs.

A lasting and consistent brand identity gives a special meaning that involves an intrinsic image or belief regarding the brand. These images and beliefs are multi-faceted [38] and differ by nature of the organisation [69]. Most importantly, it should fit the intrinsic brand identity image that customers recognise [8]. Customers or the public assign characteristics to a brand, such as ruggedness, sophistication, competence, excitement, and sincerity, through exposure to it [11]. These characteristics embody the brand identity association [36]. Such systematic brand management is essential for EMS. Therefore, as mentioned above, EMS is managed within or together with public health system. The EMS is perceived by the public as a part of public health system, and the image of EMS will affect the overall image of the public health system. At this point, the perspective of this study, which regards EMS as a lens in recognizing the public image of public health system, is a unique perspective of this study and corresponds to its contribution.

Based on the review results of previous studies introduced above, the operational definitions of the main concepts of this research model are summarized in <Table 2>.

<Table 2> Operational Definitions of the Seven Constructs in the Instrument

Construct	Operational Definition
Rescue/first-aid and transfer activities	Paramedics receive professional instruction on how to treat emergency patients, perform first aid, and transfer patients to hospitals.
Disaster prevention, preparation, and response activities	The disaster response system regularly prepares for multiple types of disasters. Activities include coping with new epidemics and large numbers of casualties and ensuring that disasters are contained quickly and effectively.
Educational activities in urgent situations	Educational activities targeted at the general public are conducted systematically and include first aid for emergency patients, safety training for disasters, and instructions on how to use first-aid appliances such as automated external defibrillators.
Medical treatment in emergency rooms	For in-patient treatment, priority is given systematically based on the level of severity.
Brand meaning	The customer's image and beliefs regarding the public health system.
Brand response	The customer's personal opinions, evaluation, and emotions and feelings.
Brand relationship	The intensity of the customer's psychological bond of loyalty to the brand.

Next, the research hypotheses were then formulated as follows:

H1: The functions of EMS are positively associated with the brand meaning of the public health system.

The following four sub-hypotheses were posited for each function.

H1-1: Rescue/first-aid and transfer activities are positively associated with the brand meaning of the public health system.

H1-2: Disaster prevention, preparation, and response are positively associated with the brand meaning of the public health system.

H1-3: Educational activities in urgent situations are positively associated with the brand meaning of the public health system.

H1-4: Medical treatments in ERs are positively associated with the brand meaning of the public health system.

Brand response can be considered a cognitive and emotional response developed by brand meaning [36]. Cho et al. [15] argued that certain images, such as those that convey mystery, sensuality, and intimacy, influence a customer's response to fashion brands—that is, customers may generate favourable or unfavourable responses depending on the brand image. For the public health system, its intrinsic and unique image guides public response in distinct ways [47]. For example, a patient's trust in the public health system is critical because it delivers services as part of the social infrastructure and requires cooperation or collective action [23]. The services provided by the public health system are intangible in nature and difficult to measure, thereby making trust necessary to reduce transaction costs and perceived risks. Thus, we hypothesise the following:

H2: Brand meaning is positively associated with brand response to the public health system.

Customers develop a unique relationship with a brand through the accumulation of cognitive and emotional responses to the brand. This relationship constitutes brand loyalty, and the brand relationship strengthens as customers' loyalty increases [35]. Service organisations need to build customers' loyalty, which is the ultimate goal of all marketing activities. Thus, we hypothesise the following:

H3: Brand responses to the public health system are positively associated with the brand relationship between the public and the public health system.

2.4 Role of Public Health Service Governance in Establishing Image

Governance refers to an autonomous and horizontally complex organisation with interdependent players, such as the state, market, and civil society [32], and shares commonalities with policy networks [55]. Thus, the concept of governance is useful in resolving almost all areas of difficulty involving multiple stakeholders in modern society. Governance has been studied mainly in public administration focusing on the organising factors in networks [e.g., 28, 32, 63].

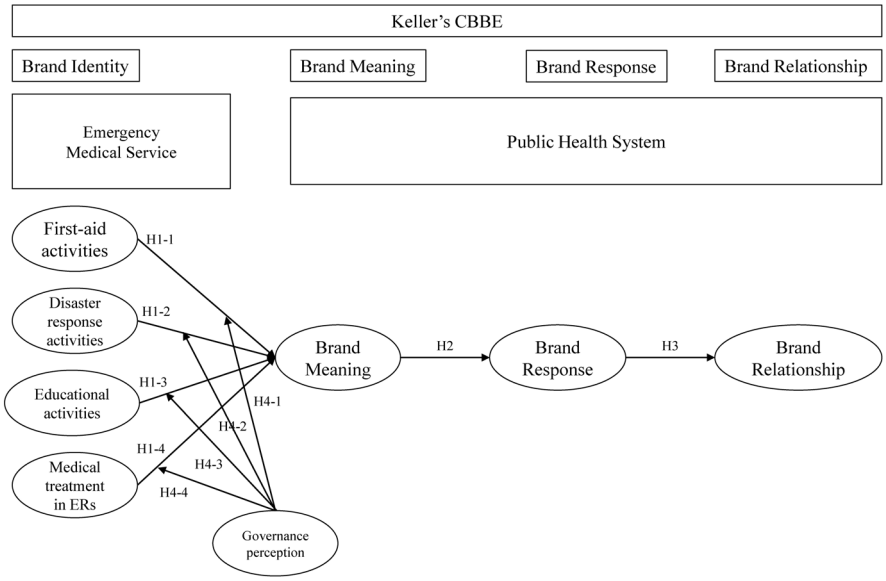
A governance structure that includes interactions among stakeholders is also vital to overall health system performance [5]. Many experts and non-governmental organisations have severely criticised the global governance regime in healthcare, attributing failures to deal with emergency disaster situations to a lack of disaster response capacity of individual national governments and the inability of a joint response by the concerned international community [18]. Gulland [25] pointed out that many state officials recognise that crises in the public health system may go far beyond the public healthcare problem itself. However, effective governance is also possible when public participation is voluntary and thus, is not merely a governmental matter [63]. This requires a positive response from the public and depends on the credibility of the various institutional actors [23]. In a sense, even if the public has a positive perception regarding individual players, it is unlikely to show strong support for policy performers if its overall perception of governance is poor. This belief also applies to the cooperative relationship between the public health system and EMSs. The public reflects the functions of the EMS more actively in the brand meaning of the public health system when they have a positive brand meaning, rather than a negative one, based on their perception of the level of governance between central and local governments concerning EMSs and disaster response. For instance, we measured the public perception of how the central government collaborates with the local government to communicate, reach a consensus, or perform joint business for regional emergency and disaster response activities. We hypothesise the following:

H4: Public perception of the level of governance between central and local governments affects the relationship between EMS functions and brand meaning of the public health system.

Four additional sub-hypotheses were constructed for each EMS function.

H4-1: Public perception of the level of governance between central and local governments affects the relationship between rescue/first-aid and transfer activities and the brand meaning of the public health system.

H4-2: Public perception of the level of governance between central and local governments affects the relationship between disaster prevention, preparation, and response activities and the brand meaning of the public health system.



<Figure 1> The Research Model

H4-3: Public perception of the level of governance between central and local governments affects the relationship between educational activities in urgent situations and the brand meaning of the public health system.

H4-4: Public perception of the level of governance between central and local governments affects the relationship between medical treatments in ERs and the brand meaning of the public health system.

Based on the aforementioned hypotheses, our research model is illustrated in <Figure 1>.

3. Method

3.1 Development of the Instrument

We developed the survey questionnaires for four functions of EMS as no papers have measured them. We adopted the approach by Secchi et al. [58] to develop the constructs' operational definitions and survey items. First, we conducted a comprehensive literature review and explored existing operational definitions to build the constructs. Next, we determined the conceptual dimensions for each construct. We refined their operational definitions and selected related items from scales used in previous studies in public health policy and marketing. We created additional items that might fit the construct definitions. When items were not available, we developed new items from public health laws, team members' work experience, and interviews with other healthcare professionals on EMS's role in South Korea. We did not perform Q-sort to measure reliability and validity of the initial survey items; however, we performed the interviews to check face validity. We reviewed them with two healthcare professionals in a local hospital and a marketing faculty member at a university in South Korea to ensure the validity of the constructs and the basic adequacy of the sample items addressing each construct. Separate interviews were conducted via conference calls and face-to-face meetings between the university and the local hospital. Through the interviews, construct definitions and items were refined, and the gaps were resolved.

We reworded the survey items used in existing literature [42] to measure the governance coordination between central and local governments. Additionally, we used the CBBE process in the previous papers [8, 34] to measure the brand equity of the public health system. CBBE is divided into four stages: 1) brand identity (Step 1) is concerned with the role of organizations; 2) brand meaning (Step 2) shows the images and beliefs regarding organizations; 3) brand response (Step 3) is built by the public's trust, belief in the system's sincerity, and feelings; and 4) brand relationship (Step 4) is built by cumulative interactions between the brand and the public.

Last, the operational definitions of the constructs developed for this study are based on a consensus between healthcare practitioners and academic professionals.

3.2 Survey Procedure and Sampling

We conducted the survey at two universities (one national and one private) in South Korea using a paper-based collection method, which allowed us to control for bias arising from different formats and settings of the questionnaires [20]. We then surveyed university students who had experience with the EMS provided by the public health system in South Korea to understand how they perceived the public health system. The participating university students were appropriate for our research, as understanding the purpose of our study did not require any work experience or expertise in public health.

All the subjects were informed about the research and agreed to participate in the survey. Of the approximately 180 questionnaires that were distributed, 150 were used for our analysis after excluding those with missing data. The demographic characteristics of the survey respondents are summarized in <Table 3>.

<Table 3> Characteristics of Survey Respondents

Type		Fre-quency (%)	Type		Fre-quency (%)
Gender	Male	103 (68.7)	Residential Area	Metropolitan Seoul/Gyeonggi-do province	85 (56.7)
	Female	47 (31.3)		Gangwon-do province	55 (36.7)
				Gyeongsang-do province	3 (2.0)
Level of Education	Undergra duate	114 (76.0)		Jeonla-do province	3 (2.0)
	Graduate	36 (24.0)		Chungcheong-do province	3 (2.0)
				Other	1 (0.6)

We adopted several approaches to address sources of bias that might affect the results of the survey. First, we adopted the approach by Secchi et al. [58] to address and resolve common method variance (CMV). The survey instrument was developed based on feedback from several academic experts and practicians regarding wording problems and clarity [16, 46]. To prevent social desirability bias, which might affect the responses of the survey, the respondents were assured of confidentiality. They were provided with the contact information of the university's Institutional Review Board [58]. Further, if CMV occurs, it implies that items from different constructs are highly intercorrelated and load together [50]. We performed statistical methods such as factor analysis to identify whether CMV was present, which revealed that the items were not artificially correlated with each other. Therefore, CMV was not a significant problem.

Another threat to validity is bias due to differences between respondents and non-respondents [3]. However, when we performed the paper-based survey in a classroom, the bias did not affect our survey results.

4. Results

4.1 Reliability and Validation of Survey Questionnaires

After developing the questionnaires to measure the four functions of EMS and brand identity, brand image, brand response, and brand relationship of the public health system, we checked the questionnaires' reliability and validity. First, we conducted exploratory factor analysis. Initially, we had a total of 13 items under 'Four functions of EMS'. Our criteria for factor extraction were as follows: eigenvalue $\geq$ 1, factor loading $\geq$ 0.5, and communality $\geq$ 0.5 [26]. Each of the 13 items had independent explanatory power, as shown in <Table 4>. All four factors were then given suitable labels:

<Table 4> Exploratory Factor Analysis for the Four Functions of Emergency Medical Services

	Communality	Factor 1 (First-aid activities)	Factor 2 (Disaster preparation and response activities)	Factor 3 (Educational activities)	Factor 4 (Medical treatment in emergency rooms)
1	.784	.129	.145	.863	.041
2	.770	.050	.122	.859	.122
3	.706	.099	.325	.766	.055
4	.851	.873	.173	.021	.241
5	.895	.912	.147	.035	.200
6	.826	.791	.131	.253	.344
7	.772	.771	.208	.165	.327
8	.858	.410	.266	.043	.785
9	.821	.419	.089	.065	.734
10	.791	.266	.233	.150	.802
11	.761	.171	.789	.220	.248
12	.871	.156	.884	.176	.186
13	.753	.177	.817	.217	.086
KMO; Bartlett Sphericity Test		.866; 1421.532(.000)			
Accumulated Variance (%)		24.439	45.342	63.163	80.440
Eigenvalue		3.437	2.457	2.317	2.246

Note. Loadings $\geq$ .5 are shaded.

'first-aid activities' (factor 1), 'disaster preparation and response activities' (factor 2), 'educational activities' (factor 3), and 'medical treatment in ERs' (factor 4).

Second, we conducted confirmatory factor analysis to check the validity of our measurement tool. Throughout this procedure, convergent and discriminant validity was tested by computing factor loading, construct reliability (CR), and average variance extracted (AVE). Cronbach's α ≥ 0.7, factor loading ≥ 0.5, CR ≥ 0.7, and AVE ≥ 0.5 are desirable [26]. As reported in <Table 5>, some AVEs are slightly below 0.5, while all other statistics are within the acceptable ranges. Thus, convergent validity holds for our variables because AVE is a more conservative index than CR. Fornell and Larcker [22] argued that researchers might use CR and factor loading instead to test convergent validity when AVE falls short of the base value. This was on the grounds that AVE leads to a more conservative result, although it is a working index for convergent validity as well as CR. In addition, the overall model fit was acceptable because χ^2 = 769.560, df = 461, χ^2/df = 1.669, Comparative Fit Index (CFI) = .923, Tucker-Lewis index (TLI) = .911, and Root Mean Square Error of Approximation (RMSEA) = .067 [26].

<Table 5> Reliability and Validity of Latent Variables

Variable	Measurement	Loading	Cronbach's alpha	CR	AVE
First-aid activities	First aid 1	.788	.828	.765	.520
	First aid 2	.762			
	First aid 3	.801			
Disaster response activities	Disaster 1	.791	.928	.771	.538
	Disaster 2	.826			
	Disaster 3	.909			
	Disaster 4	.874			
Educational activities	Education 1	.916	.880	.781	.547
	Education 2	.869			
	Education 3	.759			
Medical treatment in ERs	Medical treatment 1	.814	.869	.771	.530
	Medical treatment 2	.916			
	Medical treatment 3	.775			
Brand meaning	Function 1	.609	.923	.863	.443
	Function 2	.568			
	Integrity 1	.792			
	Integrity 2	.703			
	Consistency 1	.778			
	Consistency 2	.807			
	Clarity 1	.772			
	Clarity 2	.808			
Brand response	Expert Judgment 1	.695	.922	.878	.445
	Expert Judgment 2	.687			
	Trust 1	.865			
	Trust 2	.863			
	Sincerity 1	.760			
	Sincerity 2	.731			
	Sincerity 3	.733			
	Feeling 1	.668			
	Feeling 2	.712			
Brand relationship	Loyalty 1	.776	.849	.787	.554
	Loyalty 2	.935			
	Loyalty 3	.736			

4.2 Hypothesis Testing

A structural equation modelling path analysis was conducted to test the hypotheses. <Table 6> summarizes the results of hypothesis testing for the main effect. The functions of EMS significantly affect the brand meaning of the public health system. For instance, first-aid activities (M = 5.17, SD = 1.05) positively influenced the brand meaning (M = 4.30, SD = .96) of the public health system (H1-1) (.305; p < .01). When the public has a positive perception of first-aid activities (e.g. patient delivery, professional first-aid activities, and first-aid training) in EMS, they build a positive brand image involving functional performance, perceived integrity and consistency, and a clear image of the public health system. Education activities (M = 2.95, SD = 1.31) positively affected the brand meaning of the public health system (H1-3) (.245; p < .05). Positive public perceptions of medical education activities (e.g. education activities for severe diseases, natural disasters, and first aid equipment) result in a positive brand image of the public health system. Medical treatments in ERs (M = 4.12, SD = 1.25) positively affected brand meaning of the public health system (H1-4) (.374; p < .01). Similarly, a positive public perception of medical treatment in ERs (e.g. quick response to patients, systematic emergency operating system, and triage and emergency assessment) results in a positive brand image of the public health system. However, disaster response activities (M = 3.11, SD = 1.37) did not affect the brand meaning of the public health system (H1-2) (.165; p > .05). The perceptions of these activities (e.g. the emergency system for epidemics, quick response to epidemics, and emergency operating systems in major accidents) did not affect the public health system's brand image.

Brand meaning positively affected the brand response (M = 4.15, SD = .98) of the public health system (H2) (.826; p < .01). When the public has positive perceptions of the

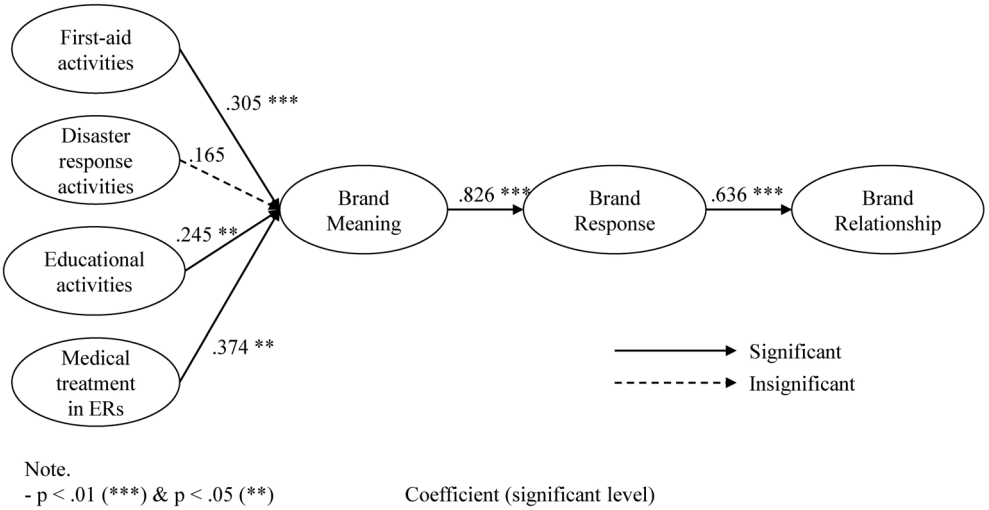
public health system's brand image, they build a positive brand response, including leadership, trust, sincerity, and emotion toward the public health system. Brand response positively affected the brand relationship (M = 4.12, SD = 1.14) of the public health system (H3) (.636; $p < .01$). When the public has positive perceptions of the public health system's brand response, they build a positive brand relationship that includes positive word-of-mouth communication, affection, and loyalty. The results for Hypotheses 1, 2, and 3 are illustrated in <Figure 2>.

After testing the hypotheses in the basic model, a multi-group comparison analysis was conducted to verify Hypothesis 4 that tested the moderating effect of the perceived level of governance (between the central and local governments) on the relationship between the four functions of EMS and the brand meaning of the public health system. The sample was sorted into two groups labelled 'High' (the group whose perception level of governance is higher than the sample mean) and 'Low' (the group whose perception level of governance is lower than the sample mean), using the mean-split method on the perception of level of governance (M = 4.00, SD = 1.04) in the public health system between the central and local governments. First, a hierarchical robustness test was conducted before analyzing the path difference between the two groups. In general, a base model with no constraints was used as a starting point, and then the robustness of factor loading between the groups and structural weights was checked [21, 26]. <Table 7> shows the robustness test results between the two groups divided by the perception level of governance and suitability to conduct comparative path analysis.

<Table 6> Results (Hypotheses 1 to 3) of the Structural Equation Model

Hypotheses	Path	Path Coefficient	t-value	Accept/Reject
1-1	Rescue/first-aid and transfer activities → Brand meaning	.305	3.661 (***)	accept
1-2	Disaster prevention, preparation, and response activities → Brand meaning	.165	1.646	reject
1-3	Educational activities in urgent situations → Brand meaning	.245	2.243 (**)	accept
1-4	Medical treatment in ERs → Brand meaning	.374	4.035 (***)	accept
2	Brand meaning → Brand response	.823	6.459 (***)	accept
3	Brand response → Brand relationship	.636	6.157 (***)	accept

Note. $^{***}p < .01$, $^{**}p < .05$.



<Figure 2> Results for Hypotheses 1 to 3

<Table 7> Multi-group Tests of Measurement Robustness

	1. No Constraints (Base Model)	2. Measurement Weights (Equal Lambda)	3. Structural Weights (Equal Gamma)
χ^2	1663.364	1693.588	1706.851
df	944	970	976
χ^2/df	1.742	1.746	1.749
CFI	.801	.800	.798
TLI	.778	.782	.782
RMSEA	.072	.071	.071
Nested Model	-	2-1	3-2
$\triangle\chi^2$	-	30.243	13.262
$\triangle df$	-	26	6
Significance Level	-	.258	.039(***)

<Table 8> shows the differences in the effects of brand identity on the perception of governance in EMS. Hypotheses 1, 2, and 3 were concerned with EMS's impact on loyalty to the public health system. However, the public is a beneficiary of the public health system and participates in its governance. Thus, even if public perception is positive regarding an individual EMS function, it is unlikely to imply strong support for the entire EMS system if the overall perception of EMS governance is poor. As expected, EMS functions (rescue/first-aid and transfer activities, educational activities in urgent situations, and medical treatment in the ERs) had a significant impact on the brand meaning of the public health system in the 'High' group, while there were a few functions (i.e. medical treatment in ERs) that affected its brand meaning in the 'Low' group. Thus, Hypothesis 4 was partially supported. Meanwhile, the impact of both the 'brand meaning to brand response' (High = .853; Low = .527) and 'brand response to brand relationship' (High = .543; Low = .453) paths was significant.

Finally, <Figure 3> illustrates the impact of the perception of governance between the four functions of EMS and the brand meaning of the public health system.

<Table 8> Results for high and low governance levels.

Path	High Governance Perception		Low Governance Perception	
	Path Coefficient	t-value	Path Coefficient	t-value
First-aid activities → Brand meaning	.433	2.788 (***)	.153	1.323
Disaster response activities → Brand meaning	.114	.850	.094	.596
Educational activities → Brand meaning	.268	1.753 (*)	.285	1.598
Medical treatment in ERs → Brand meaning	.333	2.283 (**)	.427	2.920 (***)

Note. $^{***}p < .01$, $^{**}p < .05$, $^{*}p < .1$.

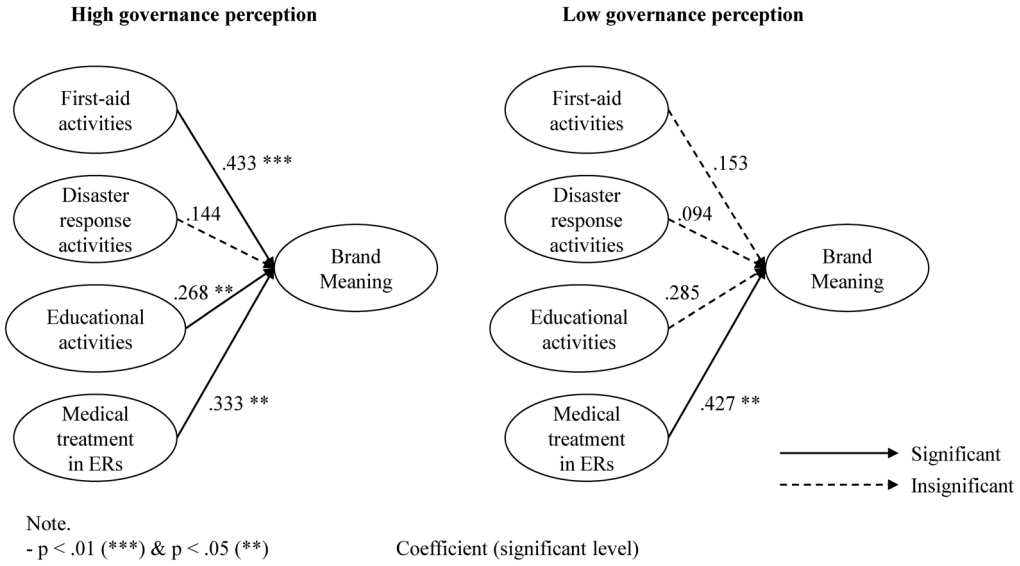


Figure 3. Results for the Structural Equation Model (Hypothesis 4) (multi-group comparison)

5. Conclusion

5.1 Discussion and Implications

We adopted customer-based brand equity (CBBE) to develop the measurement for four functions of EMS and brand meaning, brand response, brand relationship of the public health system. We examined how four functions of EMS builds brand identity and influence brand meaning of the public health service. We found how the perception of governance levels (low vs. high) between local and central government affects the relationship between four functions of EMS and brand meaning of the public health service. Then, our findings provide evidence that the public health system must be considered a part of the governance structure, as validated by research hypothesis 4. When the public perceives a high level of coordination between the central and local government, it accepts a user-centred approach where EMS is viewed as a subsystem of the public health system. Its performance is highly correlated with that of the public health system as a whole.

Further, our findings show that the public health system is not limited to an administrative system, but is a social service managed by the public's evaluation of public services. Our application of Keller's CBBE suggested that EMS plays a role to positively affect the entire governance of the public health system. For instance, EMS, especially first-aid activities, educational activities, and medical treatment in ERs, plays a significant role in brand equity for the public health system.

Our findings show the public perception of EMS, a subsystem of the public health system, partially affects the public health system's brand meaning. We find that 'disaster response activities' as a function of EMS are not directly linked to the establishment of the brand meaning of the public health system, while the other three functions are positively related. This does not mean that the importance of disaster response activities can be ignored. Rather, it is necessary to find the reasons for their insignificant effect on the public health system's brand image. First, the activities related to 'rescue/first-aid', 'educational activities', and 'medical treatment in ERs' are demonstrated more frequently and found at a closer distance than 'disaster prevention, preparation, and response activities'. This may affect the public's psychological distance, and the activities involved in evaluation since different attitudes and behaviours towards certain subjects or events often depend on temporal and spatial distance [67]. Second, disasters may be attributed to inevitable accidents but the public cannot be protected against them by the public health system's internal capabilities through contingency planning. Such situations are affected by the content of communication between the public and the media. For example, when an unavoidable accident occurs (e.g. oil spill), negative information on the organisations responsible for the accident leads the public to attribute the cause of the accident to internal institutional factors (e.g. mistakes by the organisations; [31]).

Our study holds three theoretical implications regarding the emerging importance of EMS. First, we extended the literature of public sector marketing with a set of developed measurement scales of four EMS functions (first-aid activities, disaster response activities, educational activities, and medical treatment in ERs) that build the brand identity of the public health system. Second, we extended the importance of brand equity to the public organizations. Our study found the empirical support for brand identity, brand image, brand responses, and brand relationship to understand the establishment of brand equity in the public health system. Lastly, we identified the impact of the public perception of EMS, a subsystem of the public health system, on building brand equity of the overall system. An organisation needs to recognise that customers' perception of its subsystem's service quality affects its parent organisation's brand equity, which can signal perceived service quality before customers experience its service [41].

We provide three practical implications. First, customers in the public health system can evaluate both EMS and the public health system as a whole, but they do not view it separately. It is thus not desirable to manage EMS and the public health system separately. Administrators in the public health system should make more significant efforts in first aid, education, and medical treatment in ERs to build strong public health system loyalty. This might help administrators establish a future vision and more pro-popular policies for the public health system. Second, our findings indicate that consumer satisfaction with EMS can affect the public health system's brand equity. It is interesting to note that the various EMS functions in this process independently influence the brand meaning formation of the public health system. Therefore, administrators should consider the details of what to do and how to improve satisfaction with EMS's various functions. To improve the overall level of satisfaction with EMS, it is necessary to investigate what needs to be done and how it could be implemented in the future. Third, EMS's impact on the brand image of the public health system is moderated by the public perception of the level of governance.

Administrators should pay close attention to managing an effective governance structure between the central and local governments to generate a favorable brand image and public loyalty towards the public health system. For instance, the central government should be openly willing to receive local governments' opinions and reach an agreement if there is a conflict between the two parties over policies or laws for emergency response systems. The central government must also ensure systematic cooperation with the local governments by supporting educational activities in ERs or monitoring the local governments' needs.

5.2 Limitation and Future Research

The limitations of our study are as follows. First, as our work was conducted in South Korea, the brand equity measurement needs to be extended to other countries to be valid. Second, EMS is an integral part of the public health system, but it is not the same as the public health system. In major developed countries, government agencies provide funding to private and public hospitals to maintain an adequate EMS quality. Although some private hospitals also offer EMS in Korea, EMS's policy direction and the corresponding budget support are led by the Ministry of Health and Welfare. This is the case in the US as well. However, there are some differences by state for example, in Maryland in the US, state governments have been leading the way in EMS by providing greater publicity than Korea regarding the role of EMS. Although EMS is not the only component of the public health system, we have empirically confirmed that the perceived level of public satisfaction with EMS can be an adequate indicator of their perception of the national public health system.

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References

[1] Aaker, J.L., Dimensions of brand personality, *Journal of Marketing Research*, 1997, Vol. 34, No. 3, pp. 347-356.

[2] Ahmad, A. and Thyagaraj, K.S., Brand personality and brand equity research: Past developments and future directions, *The IUP Journal of Brand Management*, 2014, Vol. 11, No. 3, pp. 19-56.

[3] Armstrong, J.S. and Overton, T.S., Estimating nonresponse bias in mail surveys, *Journal of Marketing Research*, 1977, Vol. 14, No. 3, pp. 396-402.

[4] Arnett, D.B., German, S.D., and Hunt, S.D., The identity salience model of relationship marketing success: The case of nonprofit marketing, *Journal of Marketing*, 2003, Vol. 67, No. 2, pp. 89-105.

[5] Assmuth, T. and Lyytimäki, J., Co-constructing inclusive knowledge within converging fields: Environmental governance and health care, *Environmental Science & Policy*, 2015, Vol. 51, pp. 338-350.

[6] Baalbaki, S. and Guzmán, F., A consumer-perceived consumer-based brand equity scale, *Journal of Brand Management*, 2016, Vol. 23, No. 3, pp. 229-251.

[7] Baldauf, A., Cravens, K.S., Diamantopoulos, A., and Zeugner-Roth, K.P., The impact of product-country image and marketing efforts on retailer-perceived brand equity: An empirical analysis, *Journal of Retailing*, 2009, Vol. 85, No. 4, pp. 437-452.

[8] Becker-Olsen, K.L. and Hill, R.P., The impact of sponsor fit on brand equity: The case of nonprofit service providers, *Journal of Service Research*, 2006, Vol. 9, No. 1, pp. 73-83.

[9] Berry, L.L., Cultivating service brand equity, *Journal of the Academy of Marketing Science*, 2000, Vol. 28, No. 1, pp. 128-137.

[10] Berry, L.L. and Seltman, K.D., Building a strong services brand: Lessons from Mayo Clinic, *Business Horizons*, 2007, Vol. 50, pp. 199-209.

[11] Brakus, J.J., Schmitt, B.H., and Zarantonello, L., Brand experience: What is it? How is it measured? Does it affect loyalty? *Journal of Marketing*, 2009, Vol. 73, No. 3, pp. 52-68.

[12] Buil, I., Martínez, E., and de Chernatony, L., The influence of brand equity on consumer responses, *Journal of Consumer Marketing*, 2013, Vol. 30, No. 1, pp. 62-74.

[13] Buil, I., de Chernatony, L., and Martínez, E., Examining the role of advertising and sales promotions in brand equity creation, *Journal of Business Research*, 2013, Vol. 66, No. 1, pp. 115-122.

[14] Chang, H.H. and Liu, Y.M., The impact of brand equity on brand preference and purchase intentions in the service industries, *The Service Industries Journal*, 2009, Vol. 29, No. 2, pp. 1687-1706.

[15] Cho, E., Fiore, A.M., and Russell, D.W., Validation of a fashion brand image scale capturing cognitive, sensory,

and affective associations: Testing its role in an extended brand equity model, *Psychology & Marketing*, 2015, Vol. 32, No. 1, pp. 28-48.

[16] Churchill, G.A., A paradigm for developing better measures of marketing constructs, *Journal of Marketing Research*, 1979, Vol. 16, No. 1, pp. 64-73.

[17] Çifci, S., Ekinci, Y., Whyatt, G., Japutra, A., Molinillo, S., and Siala, H., A cross validation of consumer-based brand equity models: Driving customer equity in retail brands, *Journal of Business Research*, 2016, Vol. 69, No. 9, pp. 3740-3747.

[18] Cluzeau, F., Governance for health: Special issue commentary, *Public Health*, 2015, Vol. 129, No. 7, pp. 864-865.

[19] Davis, D.F. and Mentzer, J.T., Relational resources in interorganizational exchange: The effects of trade equity and brand equity, *Journal of Retailing*, 2008, Vol. 84, No. 4, pp. 435-448.

[20] Dommeyer, C.J., Baum, P., Chapman, K.S., and Hanna, R.W., Attitudes of business faculty towards two methods of collecting teaching evaluations: Paper vs. online, *Assessment and Evaluation in Higher Education*, 2002, Vol. 27, No. 5, pp. 455-462.

[21] Edwards, J.R. and Bagozzi, R.P., On the nature and direction of relationships between constructs and measures, *Psychological Methods*, 2000, Vol. 5, No. 2, pp. 155-174.

[22] Fornell, C. and Larcker, D.F., Evaluating structural equation models with unobservable variables and measurement error, *Journal of Marketing Research*, 1981, Vol. 18, No. 1, pp. 39-50.

[23] Gilson, L., Trust and the development of health care as a social institution, *Social Science & Medicine*, 2003, Vol. 56, No. 7, pp. 1453-1468.

[24] Gromark, J. and Melin, F., From market orientation to brand orientation in the public sector, *Journal of Marketing Management*, 2013, Vol. 29, No. 9-10, pp. 1099-1126.

[25] Gulland, A., Ebola crisis has alerted politicians to global health threats, debate hears, *British Medical Journal*, 2015, Vol. 350, p. 1096.

[26] Hair, J.F., Black, W.C., Babin, B.J., Anderson, R.E., and Tatham, R.L., *Multivariate data analysis* (6th ed.), 2006.

[27] He, H. and Li, Y., Key service drivers for high-tech service brand equity: The mediating role of overall service quality and perceived value, *Journal of Marketing Management*, 2010, Vol. 27, No. 1-2, pp. 77-99.

[28] Hilliard, V.G. and Kemp, N.D., Citizen participation indispensable to sustainable democratic governance and administration in South Africa, *International Review of Administrative Science*, 1999, Vol. 65, No. 3, pp. 353-370.

[29] Jacoby, J., Szybillo, G.J., and Busato-Schach, J., Information acquisition behavior in brand choice situation, *Journal of Consumer Research*, 1977, Vol. 3, No. 4, pp. 209-216.

[30] Jeong, H.S. and Lee, K., Efficiency of public hospitals and their social role, *Korean Journal of Health Policy & Administration*, 1996, Vol. 6, No. 2, pp. 1-13.

[31] Jeong, S.H., Public's responses to an oil spill accident: A test of the attribution theory and situational crisis communication theory, *Public Relations Review*, 2009, Vol. 35, No. 3, pp. 307-309.

[32] Jessop, B., The dynamics of partnership and governance failure. In G. Stoker (Ed.), The new politics of local governance in Britain (pp. 11-32), Macmillan, 1999.

[33] Jung, E.K. and Lee, H.J., Analysis of firefighters' recognition changes toward the emergency medical system after level 2 emergency medical technician training, *Korean Review of Crisis and Emergency Management*, 2014, Vol. 10, No. 5, pp. 69-81.

[34] Keller, K.L., Conceptualizing, measuring, and managing customer-based brand equity, *Journal of Marketing*, 1993, Vol. 57, No. 1, pp. 1-22.

[35] Keller, K.L., Building customer-based brand equity, *Marketing Management*, 2001, Vol. 10, No. 2, pp. 16-26.

[36] Keller, K.L., Advertising and brand equity. In G. J. Tellis & T. Ambler (Eds.), The SAGE handbook of advertising (pp. 54-70). SAGE, 2007.

[37] Kim, K.H., Kim, K.S., Kim, D.Y., Kim, J.H., and Kang, S.H., Brand equity in hospital marketing, *Journal of Business Research*, 2008, Vol. 61, No. 1, pp. 75-82.

[38] Kim, W.G. and Kim, H.B., Measuring customer-based restaurant brand equity, *Cornell Hotel and Restaurant Administration Quarterly*, 2004, Vol. 45, No. 2, pp. 115-131.

[39] Kim, Y.H., The reform of the emergency medical system based on disaster occurrence in Korea, *Korean Journal of National Crisis and Emergency Management*, 2011, Vol. 5, No. 2, pp. 105-125.

[40] Korkofingas, C. and Ang, L., Product recall, brand equity, and future choice, *Journal of Marketing Management*,

2011, Vol. 27, No. 9-10, pp. 959-975.

[41] Krishnan, B.C. and Hartline, M.D., Brand equity: Is it more important in services? *Journal of Services Marketing*, 2001, Vol. 15, No. 5, pp. 328-342.

[42] Lee, J.W. and Kim, S.Y., A conception of the members of community welfare committees on the level of governance, *Korea Journal of Community Welfare*, 2012, Vol. 40, pp. 131-157.

[43] Lee, M.L., Lee, J., and Park, M., Risk-based Operational Planning and Scheduling Model for an Emergency Medical Center, *Journal of Society of Korea Industrial and Systems Engineering*, 2019, Vol. 42, No. 2, pp. 9-17.

[44] Lin, Y.H., Innovative brand experience's influence on brand equity and brand satisfaction, *Journal of Business Research*, 2015, Vol. 68, No. 11, pp. 2254-2259.

[45] Mathew, V., Thomas, S., and Injodey, J.I., Direct and indirect effect of brand credibility, brand commitment and loyalty intentions on brand equity, *Economic Review: Journal of Economics and Business*, 2012, Vol. 10, No. 2, pp. 73-82.

[46] Menor, L.J. and Roth, A.V., New service development competence in retail banking: Construct development and measurement validation, *Journal of Operations Management*, 2007, Vol. 25, No. 4, pp. 825-846.

[47] Moore, M.H., Managing for value: Organizational strategy in for-profit, nonprofit, and governmental organizations, *Nonprofit and Voluntary Sector Quarterly*, 2000, Vol. 29, No. 1, pp. 183-204.

[48] Mostafa, R.H.A., The impact of country of origin and country of manufacture of a brand on overall brand equity, *International Journal of Marketing Studies*, 2015, Vol. 7, No. 2, pp. 70-83.

[49] Murtiasih, S., Sucherly, S., and Siringoringo, H., Impact of country of origin and word of mouth on brand equity, *Marketing Intelligence & Planning*, 2014, Vol. 32, No. 5, pp. 616-629.

[50] Nah, F.F., Eschenbrenner, B., and DeWester, D., Enhancing brand equity through flow and telepresence: A comparison of 2D and 3D virtual worlds, *MIS Quarterly*, 2011, Vol. 35, No. 3, pp. 731-747.

[51] Nam, J., Ekinci, Y., and Whyatt, G., Brand equity, brand loyalty and consumer satisfaction, *Annals of Tourism Research*, 2011, Vol. 38, No. 3, pp. 1009-1030.

[52] Netemeyer, R.G., Krishnan, B., Pullig, C., Wang, G., Yagci, M., Dean, D., Ricks, J., and Wirth, F., Developing and validating measures of facets of customer-based brand equity, *Journal of Business Research*, 2004, Vol. 57, No. 2, pp. 209-224.

[53] Pappu, R., Quester, P.G., and Cooksey, R.W., Consumer-based brand equity: Improving the measurement-empirical evidence, *Journal of Product & Brand Management*, 2005, Vol. 14, No. 3, pp. 143-154.

[54] Rego, L.L., Billett, M.T., and Morgan, N.A., Consumer-based brand equity and firm risk, *Journal of Marketing*, 2009, Vol. 73, No. 6, pp. 47-60.

[55] Rhodes, R., Understanding governance: Ten years on, *Organization Studies*, 2007, Vol. 28, No. 8, pp. 1243-1264.

[56] Roh, S., A survey on prehospital emergency medical service for the improvement of acute coronary syndrome assessments—Focus on the Jecheon·Danyans area, *Journal of Korean Institute of Fire Science and Engineering*, 2008, Vol. 22, No. 2, pp. 293-299.

[57] Saramunee, K., Krska, J., Mackridge, A., Richards, J., Suttajit, S., and Phillips-Howard, P., How to enhance public health service utilization in community pharmacy? General public and health providers' perspective, *Research in Social and Administrative Pharmacy*, 2014, Vol. 10, No. 2, pp. 272-284.

[58] Secchi, E., Roth, A., and Verma, R., The impact of service improvisation competence on customer satisfaction: Evidence from the hospitality industry, *Production and Operations Management*, 2019, Vol. 28, No. 6, pp. 1329-1346.

[59] Shah, M.N., The formation of the emergency medical services system, *American Journal of Public Health*, 2006, Vol. 96, No. 3, pp. 414-423.

[60] Shahzad, K., Ahmad, I., and Gul, A., Mediating role of customer satisfaction between corporate social responsibility and customer-based brand equity, *Business & Economic Review*, 2019, Vol. 11, No. 1, pp. 123-144.

[61] Song, H. and Roh, S., A research of pre-hospital 119 emergency medical service for stroke patients, *Journal of Korean Institute of Fire Science and Engineering*, 2012, Vol. 26, No. 3, pp. 14-20.

[62] Stahl, F., Heitmann, M., Lehmann, D.R., and Neslin, S.A., The impact of brand equity on customer acquisition, retention and profit margin, *Journal of Marketing*, 2012, Vol. 76, No. 4, pp. 44-63.

[63] Stoker, G., Governance as theory: Five propositions, *International Social Science Journal*, 1998, Vol. 50, No.

155, pp. 17-28.

[64] Sun, H., Bang, W., and Sun, L., The role of internal marketing in Korea's public medical sector, *Journal of Marketing Management*, 2020, Vol. 8, No. 2, pp. 23-36.

[65] Taylor, C. and Benger, J.R., Patient satisfaction in emergency medicine, *Emergency Medicine Journal*, 2004, Vol. 21, pp. 528-532.

[66] Torres, A. and Tribó, J.A., Customer satisfaction and brand equity, *Journal of Business Research*, 2011, Vol. 64, pp. 1089-1096.

[67] Trope, Y., Liberman, N., and Wakslak, C., Construal levels and psychological distance: Effects on representation, prediction, evaluation, and behavior, *Journal of Consumer Psychology*, 2007, Vol. 17, No. 2, pp. 83-95.

[68] Vázquez, R., del Río, A.B., and Iglesias, V., Consumer-based brand equity: Development and validation of a measurement instrument, *Journal of Marketing Management*, 2002, Vol. 18, No. 1-2, pp. 27-48.

[69] Venable, B.T., Rose, G.M., Bush, V.D., and Gilbert, F.W., The role of brand personality in charitable giving: An assessment and validation, *Journal of the Academy of Marketing Science*, 2005, Vol. 33, No. 3, pp. 295-313.

[70] Wallace, E., Buil, I., and de Chernatony, L., Brand orientation and brand values in retail banking, *Journal of Marketing Management*, 2013, Vol. 29, No. 9/10, pp. 1007-1029.

[71] Wang, Y.C., Hsu, K.C., Hsu, S.H., and Hsieh, P.J., Constructing an index for brand equity: a hospital example, *The Service Industries Journal*, 2011, Vol. 31, No. 2, pp. 311-322.

[72] World Health Organization, Infection prevention and control of epidemic- and pandemic-prone acute respiratory diseases in health care. World Health Organization, 2014.

[73] World Health Organization, Infection prevention and control during health care for probable or confirmed cases of Middle East respiratory syndrome coronavirus, *Interim Guidance*, 2015a, Vol. 4, pp. 1-5.

[74] World Health Organization, Middle East respiratory syndrome coronavirus (MERS-CoV): Summary of current situation, literature update and risk assessment. Interim Guidance (WHO/MERS/RA/15.1), 2015b.

[75] Yoo, B. and Donthu, N., Developing and validating a multidimensional consumer-based brand equity scale, *Journal of Business Research*, 2001, Vol. 52, No. 1, pp. 1-14.

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〈Appendix 1〉 The Survey Scale Item

본 설문은 국가의 응급 및 재난대응 역할이 공공의료 브랜드 자산에 미치는 영향에 관한 연구를 위한 것입니다. 응답소요 시간은 약 10분이며, 기재하신 내용은 연구목적 이외에는 절대 사용되지 않습니다. 또한, 설문에는 정답이 없으므로 본인의 개인적인 생각을 솔직하게 생각나는 대로 기재해 주시면 됩니다. 조사결과 등 조사에 관 해서 문의가 있으신 분은 아래의 연락처로 연락하시기 바랍니다. 설문에 참여해 주셔서 매우 감사합니다.

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** 공공의료란, 공공성이 요구되는 의료로, 공공성은 사회적 가치관에 따라 달라질 수 있으며, 공익실현을 위해 정부의 개입이 필요한 영역이라 할 수 있습니다. 주요 역할로는, 공중보건, 질병예방, 보건교육, 국가적 재난・재해 대비 및 대응, 응급의료 등의 다양한 업무가 있습니다.

※ 관련 기관으로서는 지역 119소방과 병원의 응급실, 보건소, 지자체이다.

** 국가적 재난・재해・응급상황 대처는 중증환자, 신종 전염병, 대규모 사상자 발생 등의 각종 비상사태에 대비, 대응하는 활동을 말합니다.

** 중증환자란, 뇌졸중・심뇌혈관・중증 외상을 가진 환자를 말합니다.

※ 공공의료의 응급・ 재난 대응에 대한 인식에 관한 것입니다. (우리나라 공공의료는~)	전혀 그렇지 않다			보통 이다			매우 그렇다
1. 구급대원이 중증환자를 신속하고 적절한 병원으로 이송한다.	①	②	③	④	⑤	⑥	⑦
2. 구급대원이 중증환자에게 전문적인 응급처치를 한다.	①	②	③	④	⑤	⑥	⑦
3. 중증환자는 이송된 병원에서 전문가에게 적절한 처치를 받는다.	①	②	③	④	⑤	⑥	⑦
4. 응급환자에 대하여 구급대원과 이송병원 간의 의사소통이 원활하다.	①	②	③	④	⑤	⑥	⑦
5. 응급환자를 위해 119소방과 의료기관 간에 긴밀한 체계를 유지하고 있다.	①	②	③	④	⑤	⑥	⑦
6. 신종전염병에 대응하는 적절한 체계를 가지고 있다.	①	②	③	④	⑤	⑥	⑦
7. 신종전염병 확산 후에 신속하고 적절하게 대응한다.	①	②	③	④	⑤	⑥	⑦
8. 대형사고 발생에 대응하는 적절한 안전체계를 가지고 있다.	①	②	③	④	⑤	⑥	⑦
9. 대형사고 발생 후에 신속하고 적절하게 대응한다.	①	②	③	④	⑤	⑥	⑦
10. 중증환자에 대한 대국민 교육을 체계적으로 수행한다.	①	②	③	④	⑤	⑥	⑦
11. 재난 및 재해에 대한 대국민 교육을 체계적으로 수행한다.	①	②	③	④	⑤	⑥	⑦
12. 일반인의 응급처치기구(예: 자동제세동기(AED)) 사용에 대한 교육을 체계적으로 수행한다.	①	②	③	④	⑤	⑥	⑦
13. 응급실 내원환자를 신속하게 치료한다.	①	②	③	④	⑤	⑥	⑦
14. 체계적인 응급실 운영 시스템을 가지고 있다.	①	②	③	④	⑤	⑥	⑦
15. 응급실과 타 분과(외과, 내과, 소아과, 등)는 응급환자를 우선으로 대응한다.	①	②	③	④	⑤	⑥	⑦
16. 응급실의 위생 및 감염관리가 신뢰할 만하다.	①	②	③	④	⑤	⑥	⑦

※ 공공의료의 이미지에 관한 것입니다. (우리나라 공공의료는~)	전혀 그렇지 않다			보통 이다			매우 그렇다
1. 체계적인 의료서비스를 제공할 능력을 가지고 있다.	①	②	③	④	⑤	⑥	⑦
2. 체계적인 의료서비스를 제공할 지식을 가지고 있다.	①	②	③	④	⑤	⑥	⑦
3. 국민에게 체계적으로 필요한 혜택을 제공한다.	①	②	③	④	⑤	⑥	⑦
4. 국민과 국가를 체계적으로 돌본다.	①	②	③	④	⑤	⑥	⑦
5. 국가를 위해 체계적으로 좋은 활동을 한다.	①	②	③	④	⑤	⑥	⑦
6. 국가에게 필수적인 존재이다.	①	②	③	④	⑤	⑥	⑦
7. 국가에 긍정적인 영향을 미친다.	①	②	③	④	⑤	⑥	⑦
8. 모든 활동에 있어 일관성 있는 이미지를 보여준다.	①	②	③	④	⑤	⑥	⑦
9. 시간이 지나도 일관성 있는 이미지를 보여준다.	①	②	③	④	⑤	⑥	⑦
10. 분명한 기준을 가지고 있다.	①	②	③	④	⑤	⑥	⑦
11. 모든 활동에 대해 이해하기가 수월하다.	①	②	③	④	⑤	⑥	⑦

※ 공공의료에 대한 소비자의 인지, 감정적 반응에 관한 것입니다. (우리나라 공공의료를 담당하는 공공의료기관들은~) 공공의료기관: *** 의료원(예: 국립중앙의료원 등 의료원명칭의 병원들을 칭함)	전혀 그렇지 않다			보통 이다			매우 그렇다
1. 국가 의료기관으로써 상당한 역할을 하고 있다.	①	②	③	④	⑤	⑥	⑦
2. 의료서비스에 있어 리더역할을 하고 있다.	①	②	③	④	⑤	⑥	⑦
3. 믿을 수 있다.	①	②	③	④	⑤	⑥	⑦
4. 신뢰할 수 있다.	①	②	③	④	⑤	⑥	⑦
5. 국민의 혜택을 최우선으로 한다.	①	②	③	④	⑤	⑥	⑦
6. 운영방식이 정직하다.	①	②	③	④	⑤	⑥	⑦
7. 진정성이 느껴진다.	①	②	③	④	⑤	⑥	⑦
8. 나는 우리나라 공공의료가 좋다.	①	②	③	④	⑤	⑥	⑦
9. 우리나라 공공의료기관은 유익한 조직이다.	①	②	③	④	⑤	⑥	⑦

※ 정부(보건복지부) - 지자체(도청 소방본부/보건국, 의료원, 보건소 등) 참여에 관한 문항입니다.	전혀 그렇지 않다			보통 이다			매우 그렇다
1. 지자체가 지역 응급 및 재난대응 활동에 참여하는 것은 지자체와 정부 모두에게 도움이 된다.	①	②	③	④	⑤	⑥	⑦
2. 지자체가 지역 응급 및 재난대응 활동에 참여하는 것은 우리가 속한 지역에 많은 도움이 된다.	①	②	③	④	⑤	⑥	⑦
3. 지자체의 입장에서 지역 응급 및 재난대응에 대한 정부의 정책이 불합리할 경우 자유롭게 반대의견을 개진할 수 있다.	①	②	③	④	⑤	⑥	⑦
4. 정부는 지역 응급 및 재난대응활동에 있어 지자체의 의견을 수렴하려고 한다.	①	②	③	④	⑤	⑥	⑦
5. 정부는 지역 응급 및 재난대응활동에 있어 지자체와 의견이 일치하지 않을 때 합의를 도출하려고 한다.	①	②	③	④	⑤	⑥	⑦
6. 정부는 지역 응급 및 재난대응활동 측면에서 지자체와 협력적 공동사업을 수행하고 있다.	①	②	③	④	⑤	⑥	⑦
7. 정부는 지역 응급 및 재난 대응활동을 위해 지자체와 협력하고 있다.	①	②	③	④	⑤	⑥	⑦
8. 정부는 지역 응급 및 재난 대응활동에 대해 지자체의 요구사항을 모니터링 한다.	①	②	③	④	⑤	⑥	⑦

※ 지자체(도청 소방본부/보건국, 의료원, 보건소 등) - 시민(혹은 민간기관[민간병원]) 거버넌스에 관한 문항입니다.	전혀 그렇지 않다			보통 이다			매우 그렇다
1. 지역 응급 및 재난대응 활동과 관련된 지자체 관련부서가 상호협력하는 것은 시민(혹은 민간기관) 모두에게 도움이 된다. (지자체 관련부서: 소방본부/보건국, 의료원, 보건소 등)	①	②	③	④	⑤	⑥	⑦
2. 지역 응급 및 재난대응 활동과 관련된 지자체 관련부서가 상호협력하는 것은 시민(혹은 민간기관)이 속한 지역에 많은 도움이 된다.	①	②	③	④	⑤	⑥	⑦
3. 지역 응급 및 재난대응에 대한 지자체의 정책이 불합리할 경우 시민(혹은 민간기관)은 자유롭게 반대의견을 개진할 수 있다.	①	②	③	④	⑤	⑥	⑦
4. 지자체는 지역 응급 및 재난대응활동에 있어 시민(혹은 민간기관)의 의견을 수렴하려고 한다.	①	②	③	④	⑤	⑥	⑦
5. 지자체는 지역 응급 및 재난대응활동에 있어 시민(혹은 민간기관)과의 의견이 일치하지 않을 때 서로 합의를 도출하려고 노력한다.	①	②	③	④	⑤	⑥	⑦
6. 지자체는 지역 응급 및 재난대응활동 측면에서 시민(혹은 민간기관)과 협력적 공동사업을 수행하고 있다.	①	②	③	④	⑤	⑥	⑦
7. 지자체는 지역 응급 및 재난 대응활동을 위해 시민(혹은 민간기관)과 협력하고 있다.	①	②	③	④	⑤	⑥	⑦
8. 지자체는 지역 응급 및 재난 대응활동에 대해 시민(혹은 민간기관)의 요구사항을 모니터링을 하고 있다.	①	②	③	④	⑤	⑥	⑦

※ 공공의료에 대한 로열티(관계)에 관한 것입니다.	전혀 그렇지 않다			보통 이다			매우 그렇다
1. 다른 사람에게 공공의료에 대해 좋은 점을 말할 것이다.	①	②	③	④	⑤	⑥	⑦
2. 나는 공공의료 활동에 애착이 간다.	①	②	③	④	⑤	⑥	⑦
3. 나는 공공의료를 어떤 방식으로든지 지원할 것이다.	①	②	③	④	⑤	⑥	⑦

※ 인구통계적 특성에 관한 질문입니다.	
1. 귀하의 성별은?	① 남성 ② 여성
2. 귀하의 연령은?	① 만20~29세 ② 만30~39세 ③ 만40~49세 ④ 만50~59세 ⑤ 만60~69세 ⑥ 만70세 이상
3. 귀하의 직업은?	① 학생 ② 전업주부 ③ 영업직 ④ 생산직 ⑤ 사무직 ⑥ 전문직 ⑦ 기타
4. 귀하의 학력은?	① 고졸 ② 대졸 ③ 대학원 졸업 이상
5. 거주지는?	① 서울/경기 ② 강원 ③ 경상도 ④ 전라도 ⑤ 충청도 ⑥ 기타

---------- 설문에 참여해 주셔서 감사합니다 ----------