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A Study on the Development of Social Capital Scale and Validation

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Abstract

Background/Objectives: Social capital operates as a foundation for influencing the social quality and as a basis or social stability of the people and social development. The purpose of this study is to develop a quantified social capital scale for measuring and comparing the level of social capital of the communities and to verify the developed scale
Methods/Statistical analysis: For these, we define the multidimensional nature of social capital through the analysis of comparative studies and then formulate the preliminary questions that can be measured in each component after specifying the dimensions as trust, relations, common norms, safety and social participation. Focus group interviews were conducted to examine the preliminary questions, the concept of social capital, and the face and content validity of the dimensions that make up social capital. Consequently this study are as the following.

Findings: First, the preliminary factor analysis of social capital scale consisting of 20 items was conducted. Second, the final social capital scale was developed consisting of 16 items including five items in the relationship, three items in the trust, 3 items in the common norm, 2 items in the safety, and 3 items in the social participation. The results of the validity verification on the final social capital scale proved convergent validity and discriminant validity.

Improvements/Applications: A questionnaire consisting of 21 questions for the development of the social capital scale was distributed to a randomly selected population over the age of 19 with total 1500 copies, of which 1,054 were used for research.

***Keywords*:** social capital, collective social capital, individual social capital, social capital scale, validity

1. Introduction

Social capital is, unlike human capital or economic capital, a norm for the integration of individuals, groups, organizations and societies, community consciousness and the desirable direction for the good society. In addition, social capital is a strong cognitive foundation that guides the realization of social value that avoids social discrimination, exclusion and conflict and lives well together. Members of society that make up a welfare society must establish and realize the collective norm or social value of understanding the community through the participation of various meetings or organizations, network activities, and community involvement through volunteer work, and shared efforts to establish and share the values of each other. To this end, the degree of social capital based on trust, mutual understanding and social participation plays a very decisive role in community or society. Increased sharing of vision for society's pursuit and increase of relations formed among the people are all components that form social capital that makes society healthy.

Because social capital includes the subjects such as mutual behavior of individuals or groups, the density and quantity of relations and mutual feelings about their sense of belonging, beliefs based on common values or norms, belonging sense, and solidarity based on internal integration of society, social capital is seen as the most fundamental foundation for social inclusion and social development [16], [21], [24], [37]. In particular, Hou and Neely (2014) emphasize the possibility of pursuing more stable economic development and reducing social spending by increasing social capital. Their emphasis is that the guarantee of a stable life for the people through social expenditures leads to the improvement of social capital, which means that it works as a material foundation for economic development.

Despite the importance of social capital, it is known that social capital is very difficult to be conceptualized and measuring the degree of social capital due to the abstract and multidimensional nature of social capital. Since the emphasis on the importance of social capital in the 1990s, many scholars and researchers have tried to define and measure social capital, but there is no social capital measurement tool objectively used in all states. In order to utilize social capital for social development, social capital should be measured and quantified.

In order to measure social capital, the concept and the components of social capital should be clearly presented. The measuring of social capital has been done by measuring the various components presented by the researchers. Although social

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capital has a multidimensional nature, social capital is a concept that includes both the level of individual and the unified social capital.

The purpose of this study is to develop a social capital scale for the relative comparison and analysis of social capital and to verify the validity of the developed scale. In particular, this study seeks to develop social capital question items which are perceived by the people rather than analyzing the social indicators that indirectly demonstrate the degree of social capital in the development of the social capital scale. Although social capital scale or index to measure the perceptions of the people have already been done by some researchers as mentioned above, this study is based on the recognition that the developed scales mostly have limitations that has not reflect the multidimensional and objective quantified scales of social capital, so will have tried to develop quantified subjective social capital scale.

2. Theoretical Background

2.1. The concept of social capital

Social capital is perceived as a concept representing multidimensional and complex nature and intangible value and attitude [1]. In other words, it is a framework that governs the thinking and perception of human beings that cannot be seen and touched. However, social capital does not simply represent knowledge or thinking, and social capital also includes human behavior that is influenced by cognition or thought. Thus, social capital is a very abstract concept in thinking or perception that changes or leads to human behavior, and it is justified to be interpreted at a multidimensional level that encompasses social organizations and institutions that influence human behavior and the entire social environment. Social capital is a process and a result. The process of social capital means that the actions of human individuals are important to form and strengthen social capital. The result of social capital is that trust and common values are built by actors in social relations and networks. In other words, it is emphasized that the behavior for trust should be built in social relations or networks to promote social development and social welfare and to improve social quality.

Bhandari and Yasunobu (2009) emphasize the significance of social capital as a tool for social norms, values, beliefs, trusts, obligations, relationships, networks, friends, members, civil society participation, information flow, and contributions to economic and social development. They define social capital as "collective asset as a type of shared norms, trusts, social relations, networks, and institutions that promote cooperation and collective action for mutual benefits. Robinson and colleagues (2002) pointed out that social capital could be used to treat other people or groups who can think more than they expect in an exchange relationship, and be individual or group feelings toward other people or groups that can generate potential benefits.

The international organizations such as the OECD and the World Bank have also defined their own definitions of social capital. The OECD (2001) extended the concept of social capital beyond the personal level to the organizational level by defining social capital as a network of shared norms, values, and interests that facilitate cooperation within and between groups. The World Bank (2007) presented a broader concept of social capital than the OECD. According to the World Bank, social capital is a system, relation and norm that regulates the quantity and quality of social interactions in society, and social capital is not merely a system that supports society, but glue that allows society to be together. This view of international institutions' social capital is a definition that encompasses both organizational and institutional aspects of social capital.

Coleman (1988) defined social capital as an information channel, institution, and social structure that promotes collective behavior. According to him, social capital encourages collective action, cooperation and alliance between individuals and groups. Coleman concluded that clear and certain social norms or sanctions undermine motives for crime. Individuals who feel safe in their communities due to certain social norms or sanctions can become more intimate with others. In addition, effective norms have the advantage of promoting exchanges, lowering transaction costs, reducing information costs, enabling transactions to be carried out without contracts, thereby enhancing citizens' sense of responsibility and enabling collective management of resources [36].

Putnam (2000) emphasized the importance of networks in particular, emphasizing that social capital is a form of social organization such as 'networks, norms and social trust that facilitate joint coordination and collaboration for mutual benefit'. According to him, personal networks bring benefits to society, and a strong network of partnerships between individuals and groups supports trust, stability, government efficiency and economic growth [30]. Bourdieu (1986) also defined social capital as 'the sum of real and potential resources associated with the possession of networks that maintain the institutional relationship of mutual understanding and mutual recognition'. He also saw that social capital consists of social duties that can be transformed into economic capital under certain circumstances. His view of social capital, which emphasizes the transition to economic capital, differs from Putnam's emphasis on a network of personal aspects of social capital in that social capital is viewed in relation to economic capital. In Bourdieu's view, certain groups can guarantee class positions by maintaining resources through social capital, which means that social capital can be used as a tool for stability. The view of social capital, which emphasizes Bourdieu's economic aspect, influenced Lin to view social capital as a social relationship that expects returns or returns from market.

Lin (2001) 's view of social capital as an embedded resource in social relationships or social networks in relation to market can be understood as a development of Putnam' s definition and also influenced by Bourdieu emphasizing networks. In other words, in terms of emphasizing social networks, the relationship between social networks and markets has been linked to social capital beyond individual level of social capital, which emphasizes the relationships among individuals, families and groups. It

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can be understood as pointing out the institutional level relationship. Lin also manipulated social capital as "resources inherent in the social network being used and accessed by the actors of action." In the end, Lin's definition of social capital is as the followings: First, social capital represents resources inherent in social relations rather than personal. Second, such resources are used and approached by actors in charge of social relations. .

Olson (1982) believes that social cooperating organizations such as professional organizations, trade unions, lobby groups, and political parties do not raise the social pie for the society as a whole, but try to have a pie for their own benefit. This is a social hurdle. To overcome it, he emphasized that cooperating organizations should make efforts. In particular, Olson considered participation in these cooperating organizations as important for social development. This implies that Olson's view of social capital is viewed at an organizational or collective level rather than at the individual level, and has a political meaning. In particular, Olson's view of social participation emphasizes that political participation, party affiliation and trade union participation are important components of social capital. In the end, it is the result of Olson's involvement that the researchers expanded their involvement from participation in local organizations to participation in politics and professional interest groups and included them in social capital components.

Grootaert and Van Bastelare define social capital as "institutions, relationships, attitudes and values that contribute to economic and social development and govern mutual behavior among people." According to this definition, social capital is based on the mutual behaviors of people contributing to the development of society, and institutions, relationships, networks, attitudes and values influence mutual behaviors. In other words, for contributing to social development, as Putnam emphasizes coordination and co-operation are needed, and as Coleman emphasizes, trust and commitment channels, norms and effective sanctions are also needed. Newton (1997) defined social capital as 'a subjective phenomenon formed by values and attitudes that affect interactions.' This view on values and attitudes is also found in Fukuyama (2002), which looks at social capital as a shared norm or value that promotes social co-operation as evidenced by practical social relations.

Ultimately, taking into consideration the multidimensional and comprehensive view of social capital, social capital can be defined as "the degree of trust in others and organizations based on the increased trust among the people and the community consciousness, and the attitudes and values of cooperation that govern the behavior of individuals or groups".

2.2 The domain of social capital: individual social capital and collective social capital

Since society is composed of groups, organizations, families, and individuals, it is fair to encompass both individuals and groups in the domain of social capital. Explaining individual social capital, Bourdieu (1986) emphasizes that social capital is related to the potential of a person to effectively mobilize and operate a network of social relations based on symbolic and material exchange and based on mutual recognition. In other words, social capital is deeply related to individual cognition and potentiality. Efforts to mobilize resources belonging to individuals in an active social network are key actions to strengthen social capital.

The basic premise of looking at social capital at the individual level is that the individual gets the benefits from social capital, maintains profit and creates profit, and that individuals are the basic and natural unit for social capital observation and measurement [1]. Yang (2007) emphasized that stressing the personal attributes of social capital is because individuals use social capital as a means to achieve their goals. He also clarified that social capital emphasizes the individual's active role. In the end, the degree to which an individual accesses resources through social capital rely on the personal network or the relationship, especially the resources available for personal relations, It is emphasized that the ability of an individual to mobilize and actively influence the creation of social capital [33]. The above explanation of individual social capital reveals that individual social capital may have a deeper relationship with quality of individual life than social quality.

Collective social capital does not have individuality, but collective attributes [1]. Adler and Kwon (2002) emphasize that the source of social capital lies in the society or social structure to which the actor belongs. Coleman (1990) argued that social capital is not understood at the individual level but as a social structural element. Putnam (1993) and Fukuyama (1995) emphasize the need to emphasize collective or macroscopic behavior of social capital and view social capital at collective level. Supporters of collective social capital such as Granovetter (1985), Coleman (1990), Fukuyama (1995), Newton (2001), Bowels and Gintis (2002), Van der Gaag and Snijders (2003) have viewed social capital as having social attributes, which means that social capital is viewed as being related to the relationships and networks that make individuals cooperate and act collectively [28].

Collective social capital means a good, values or benefits that are collectively produced and collectively beneficial to the whole society. Therefore, collective social capital is more emphasized on social benefits than on individuals. The basic premise of collective social capital is possible to have at least two people, not one individual level. In other words, it is emphasized that more than two actors, rather than one, act to bring benefits to all actors and eventually return to the benefit of both individuals and groups. Therefore, collective social capital can be seen as representing the sum of the members interacting with each other in the network. This explains how Putnam typified social capital as bridge and bonding capital. In other words, bridge capital is needed for mutual action of the members, and it can be interpreted that bonding capital is necessary to maximize the total amount of resources by making mutual action more effective. At a collective level, social capital is expressed as trust, norms, and social cohesion [3]. This is because trust, norms, and values for social integration are all fundamental foundations for collective action, and networks and relationships are determined by elements of social capital, such as trust, norms, and social cohesion. Mutual trust, norms, and social integration in relationships and networks play an important role in allowing individuals to act collectively and collaborate. Therefore, the measure of collective social capital is possible by measuring the attributes such as trust or shared values or norms [1].

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Personal level social capital, measured by the degree of social involvement in social networks and social participation, and collective social capital, measured by trust among individuals and shared values or norms, are an important two axes of social capital. In the end, the individuals can make up of society and create their own isolated society however, it is impossible for them to live solely and individually for their own benefit in that society, so that all members of society can interact with each other. It is natural that social capital is interpreted at the collective level in terms of making efforts to make a better society. Because it is difficult to build and mobilize social capital through self-efforts, and efforts and cooperation for realizing common interests are the driving forces for building the whole society into an abundant welfare society [1]. Finally, we can see that social capital is understood at the collective level as well as the personal level. Scrivens and Smith (2013) emphasize social capital as a "productive value for social relations," distinguishing between personal attributes and collective attributes, which include personal relationships, social networks, civil intervention, and trust and cooperative norms. In the end, the difficulty of establishing social capital with one-man effort, no matter how hard one sought to mobilize social capital, ultimately represents the mixed nature of the personal, macroscopic, or collective attributes of social capital [1].

2.3. Components of social capital

Measuring components of social capital are very difficult and diverse because of the abstract and multifaceted nature of the concept of social capital. Coleman (1988; 1990) suggested the components of social capital as trust, duty, information channel, norm or sanction, and Healy (2002) presented political participation, community involvement, trust, informal networks, and norms. Scrivens and Smith (2013) understood a concept of personal relationships, social networks, civic engagement and confidence and cooperative norms, and Forrest and Kearns (2001) presented empowerment, participation, organizational activities and common goals, mutual benefit and networks, collective norms and values, trust, security, and affiliation. Moreover, Grootaert, Natayan, Jones, & Woolcock (2004) found that social capital is more broadly influenced by factors such as group and network, trust and integrity, information and communication, collective action and cooperation, social cohesion and tolerance.

As a result of previous studies, the first, components of social capital include trust, which indicates the degree of trust in neighbors, friends, colleagues, other governmental organizations, etc. Second, Participation was also an important factor. Third, common values and norms that govern the actions and thoughts of the people were important factors. Fourth, the degree of relationship with family, friends, and neighbors was also an important factor. Fifth, the degree of safety that people perceive while conducting their daily life is also important constituent of social capital. This study considers the multifaceted and comprehensive view of social capital and in particular compiles social capital with the views of Coleman, Putnam, Olson, Grootaert and van Bastelare. Finally, we describe social capital as "the attitude and value of mutual cooperation that dominates interactions among individuals and groups" and present of components of it as trust, relationship, common norm, social participation, and safety.

2.4. The measurement of social capital

The CQL index developed by the CQL (The Council on Quality and Leadership) is a representative measurement of social capital through subjective perception of the people. The CQL index does not satisfy the multidimensional nature of social capital by dividing social capital into bridge capital and bonding capital by applying the components of Putnam's social capital as it is. World Survey Research also includes representative subjective social capital question items for comparing and analyzing the level of social capital at the pole level through question items about social capital, but this shows that the question items are confined to trust, safety and relationship only. In the "Society at a glance", OECD also classified social capital into measuring areas and presented items for measuring them. The OECD Social Capital Scale is a mixture of questionnaires from the Gallup World Poll along with official government social indicators. In addition, questions are confined to political participation, safety, and trust, and there is a limit to the extent that it is not sufficient to measure the overall social capital because the question consists of only one item per component.

In addition to the above studies, there are many studies of subjective social capital measures performed by researchers. Onyx and Bullen (2000) presented eight measurement domains measuring social capital and 34 social capital metrics in eight domains. The measuring areas they presented through the previous study were first, the participation in the community, second, activity in the social context, third, trust and safety, fourth, connection with neighbors, fifth, connection with friends and family, sixth, generosity to diversity, seventh, value of life and eighth, work connection. They surveyed total 68 potential metrics from the above eight areas and surveyed total 1,200 inhabitants in five different regions of Australia and presented total 34 metrics through factor analysis, But the social capital components presented by them are very broad. Some items such as tolerance on diversity include measurement of social inclusion or social integration, and the value of life corresponds to life satisfaction, it has a limit of exceeding of level of measuring of social capital.

Forrest and Kearns (2001) present total eight components of social capital. The areas of social capital that they presented consisted of eight questions in total: empowerment, participation, organizational activity and common purpose, mutual benefit and network, collective norms and values, trust, safety, and affiliation. And that these measures are relatively few to measure the relative multiple of social capital. In addition, Rodriguez and Berlepsch (2014) conducted a survey of 48,583 people living in European countries on the relationship between social capital and happiness. Based on the research by Coleman, Putnam and Olson, they used the components of social capital as a measure of trust, interactions, norms and sanctions. They distinguished trust in particular from institutional trust and social trust. The specific question items by social capital measure they presented

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are 14 questions. However, many of these questions contain different levels of measurement. However, among these items, there is a limitation that it is not enough to obtain validity of the scale because many questions are included in the different level of measurement, not the question of measuring an individual's level of awareness such as the number of meetings.

3. Research and method

3.1 The process of Social Capital Scale Development

The purpose of this study is to develop a subjective social capital measurement, which can measure the degree of social capital through question items on the components of social capital directly to the society members. To this end, the theories of social capital and the measurement components for measuring and embodying the abstract concept of social capital derived through previous studies are presented as trust, relationship, common norm, social participation, and safety. In order to measure the level of social capital perceptions, social capital questions developed by Knack and Keefer (1997), Lochner and colleagues (1999), Onyx and Bullen (2000), Forrest and Kearns (2001), and CQL are referenced and finally have developed a preliminary scale of social capital consisting of 30 questions in 5 areas in table-1.

Table-1: Original scale of the factors that make up social capital

Sort	Original Scale
Trust	Knack & Keefer, 1997, Onyx & Bullen, 2000
Relationship	Lochner et al., 1999
Common norm	Forrest & Kearns, 2001
Social Participation	Forrest & Kearns, 2001
Safety	Putnam, 1993

For content adequacy assessment, the study of face and content validity of the generated items of the preliminary scale of social capital was made through two in - depth interviews with academic and field experts. In the first interview consisting of five professors in the department of social welfare, 4 items were deleted and 6 items were revised, resulting in a scale consisting of 26 items. In the focus group interview with seven field experts, total of 5 questions were deleted and 4 questions were revised. The deleted 5 questions were asked in the FGI on the questions of inadequacy, redundancy and ambiguity of the question. Finally, a modified preliminary scale consisting of 21 out of 5 areas was derived.

3.2 Data Analysis

There are 21 questions on the preliminary social capital scale consisting of five dimensions of trust, relationship, common norm, safety, and social participation. The scale was measured on the 7 point Likert scale (where 1 = ‘strongly disagree’ 50 7 = ‘strongly agree’). For the development of the social capital scale, the total 1,500 copies were distributed to randomly selected people over 19 years of age in Korea. 1,062 questionnaires were collected and 1,054 copies of the questionnaires were used for. In order to develop the social capital scale that measures the level of perception of social capital such as the degree of trust in society, and to verify the validity of data, SPSS 20.0 and AMOS 21.0 statistical programs were used.

Factor analysis is distinguished into exploratory factor analysis and confirmatory factor analysis according to research purpose. Exploratory factor analysis is an analytical method with an exploratory purpose in order to grasp the direction of theoretical systematization or undetermined research. Confirmatory factor analysis is a method of analyzing factors with the relationship between variables set in advance based on the theoretical background. In other words, it is common to perform confirmatory factor analysis rather than exploratory factor analysis when verifying validity of the face value through previous research and verifying the content validity of each constituent factor and each factor through theoretical background and expert review. Therefore, confirmatory factor analysis can be applied to the case that the form of measurement structure is strongly hypothesized by theoretical discussion or the factor structure is already confirmed through the construct validity test. In this case, if necessary, confirmatory factor analysis is performed immediately without exploratory process. That is, based on the theoretical foundation, we use confirmatory factor analysis to establish an existing relationship between variables and to use the factor analysis to demonstrate whether the relationship is or can be established [18].

Based on this background, we developed the social capital scale based on the theoretical background and the previous studies and extracted the questions based on a few significant variables of the factors that constitute the social capital. The variables that are difficult to classify into any of the factors extracted from the analysis or those that hinder the fitness are eliminated. As a result, the number of common factors in the social capital scale has been extracted from the theoretical background and the search process through the analysis of the previous research. Therefore, the factors of social capital were decided in advance, without exploratory factor analysis.

To verify the validity of the social capital scale, social capital preliminary scale derived through a slight revision and supplementation of the question items according to the actual situation of the people. The data analysis process is as follows.

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First, in order to verify the internal consistency of each factor, reliability analysis was conducted through Cronbach's α value.

Second, we analyzed the correlations among the factors in the result of factor analysis.

Third, confirmatory factor analysis was conducted using the Maximum Likelihood method to confirm the explanatory power and the fitness index of the question items.

Fourth, the convergent validity of the scale was verified by using the convergent reliability (CR) value. The validity of the discriminant validity was evaluated two standard error interval estimates.

4. Verification of Social Capital Scale

4.1 Correlation

The results of the correlation analysis between the five factors are shown in Table-2. First, the mean of the relationship was 5.38, the standard deviation was 1.05, the mean of confidence was 5.16, the standard deviation was 1.02, the mean of the common norm was 5.71, the standard deviation was 1.06, the deviation was 1.06, the average of social participation was 5.28, and the standard deviation was 1.08. As a result of the correlation analysis, it was statistically significant (p <.01) between five factors of social capital scale preliminary question. (P <.01), and the relationships and common norms were .512 (p <.01). Relationships and safety were .406 (p <.01) (P <.01), trust and social norms were .523 (p <.01), trust and safety were .434 (P <.01), and the common norm and social participation was .397 (p <.01), and safety and social participation was .407 (p <.01).

Table-2: Social capital scale preliminary item correlation analysis result

(N=1,054)

Variable	Mean (M)	standard deviation (SD)	Relationship	Trust	Common Norm	Safety	Social Participation
Relationship	5.38	1.05	1				
Trust	5.16	1.02	.523**	1			
Common Norm	5.71	1.06	.512**	.523**	1		
Safety	4.87	1.06	.406**	.434**	.406**	1	
Social Participation	5.28	1.08	.397**	.441**	.397**	.407**	1

4.2 Reliability

In order to verify the internal consistency of 21 items, the reliability analysis was conducted. The results are shown in Table-3. Cronbach's alpha of trust was .871, Cronbach's α of trust was .686, Cronbach's α of common norm was .785, Cronbach's α of security was .629, and Cronbach's α of social participation was .721. In general, if Cronbach's α coefficient is more than .60, reliability is secured. Therefore, the reliability of 20 items of five factors was secured. Question Q16 of the safety factor was deleted because the reliability was not secured.

Table-3: Social capital scale preliminary item reliability analysis result

(N=1,054)

Factor	Question number	Cronbach's α		items
		each factor	total	
Relationship	Q1	.842	.871	5
	Q2	.855		
	Q3	.835		
	Q4	.852		
	Q5	.838		
Trust	Q6	.588	.686	4
	Q7	.764		

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	Q8	.569		
	Q9	.556		
Common norm	Q10	.786	.785	5
	Q11	.777		
	Q12	.720		
	Q13	.720		
	Q14	.730		
Safety	Q15	.643	.629	2
	Q17	.615		
Social Participation	Q18	.748	.721	4
	Q19	.579		
	Q20	.655		
	Q21	.634		

4.3 Confirmatory factor analysis

Confirmatory factor analysis is used to verify the validity of the factor structure for the extracted social capital scale preliminary items using AMOS 21.0 statistical package. In general, it is important to secure a single dimensionality because the variables used in the research model are mostly multi items. Confirmatory factor analysis is an analytical method in which the goal of securing a single dimension is to specify the items to be measured, and to load only those factors. Figure-1 shows the final model analyzed using the structural equation model.

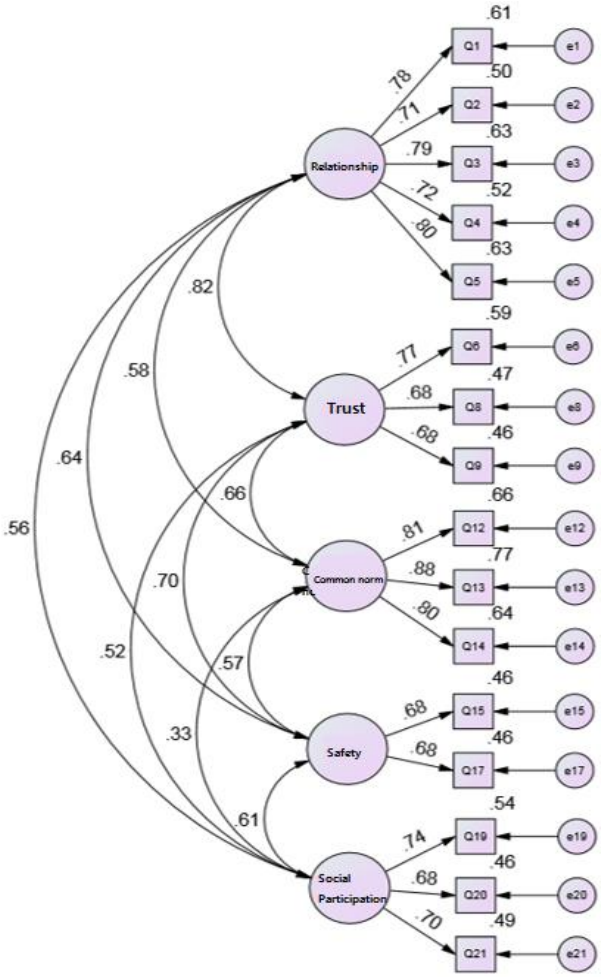

Figure-1: Social Capital Scale Confirmatory Factor Analysis Model

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Table-4 shows the results of confirmatory factor analysis for 20 items of five factors. Four items with low explanatory power (trust: Q7, co-norm: Q10, Q11, Q18) were removed from 20 items and finally 16 items were used for confirmatory factor analysis. The absolute fit index was $\chi 2 = 624.901$ (df = 94), p = .000, GFI = .929, and RMSEA = .073. Absolute fit indices showed that $\chi 2$ test and RMSEA, GFI, and AGFI values were all appropriate. The RMSEA should be less than .08 and the closer the GFI is to 1, the better the fit (Browne and Cudneck, 1992). Incremental Fit Indices were found to be better than the overall fit because of the. IFI = .933, TLI = .914, and CFI = .933. In general, when the model fit is examined, the fit of the measurement model is generally good, and it can be interpreted that the measurement model fits well with the data.

Table-4: Social Capital Scale Model Fit

(N=1,054)

Absolute Fit Indices	χ^2(df)	624.901(94) (p=.000)
	GFI	.929
	RMSEA	.073
Incremental Fit Indices	IFI	.933
	TLI	.914
	CFI	.933

The results of the final research model are shown in Table-5. In the final model, both standardized regression coefficients and covariance between measured variables and factors were statistically significant (p <.001). In addition, the standardized regression coefficient was over .50.

Table-5: Social Capital Scale Final Model Factor Analysis

(N=1,054)

			Estimate	S.E.	C.R.	P
Q1	←···		1.000			
Q2	←···		.996	.043	23.430	***
Q3	←···	Relationship	1.042	.039	26.709	
Q4	←···		.957	.040	24.097	***
Q5	←···		1.017	.038	26.891	***
Q6	←···		1.000			
Q8	←···	Trust	.911	.044	20.840	***
Q9	←···		.952	.046	20.613	***
Q12	←···	Common norm	1.000			
Q13	←···		1.047	.035	30.319	***
Q14	←···		1.016	.036	27.964	***
Q15	←···	Safety	1.000			
Q17	←···		.958	.062	15.463	***
Q19	←···	Social Participation	1.000			
Q20	←···		1.080	.061	17.824	***
Q21	←···		1.088	.060	18.089	***

***p<.001

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4.4 Validity verification

4.4.1 Convergent validity

Convergent validity, also called intensified validity, indicates that there must be a high correlation between measured values in different ways to measure the same concept. In this study, we used the standardized regression weights as the basis for verifying the convergent validity. If the standardized regression coefficient is 0.5 or more, it is interpreted as having convergent validity [34]. The reliability of the potential factors presented in this study is as follows: the standardized regression coefficients of the relationship are .779, .707, .792, .724, .796, .766, .685, .677, .80, safety .678, .678, social participation .737, .682, .700, respectively. The convergence validity was secured because the value was above 0.5.

4.4.2 Discriminant validity

Discriminant validity is based on the premise that there should be a clear difference in measurements between different variables. In other words, if the correlation between factor(variable) and another is low, it can be said that the discriminant validity is secured.

In this study, 'Two standard error interval estimates' were used to validate discriminant validity. In addition, we need to find out if we can reject the hypothesis that the two variables are the same because the correlation between two variables is low enough to guarantee the discriminant validity using two standard error interval estimates [8].

$$\text{Two standard error interval estimates} = \text{correlation coefficient} \pm (2 \times \text{standard error}) \neq 1$$

The coefficient of correlation and confidence was .820 and the corresponding standard error (S.E) was .051. The coefficient of correlation and confidence of .820 and corresponding standard error of .051 were calculated and the result was .922, .718 ≠ 1. In other words, the hypothesis that the variables are the same is rejected and the validity is confirmed.

$$.820 + (2 \times .051) = .922 \neq 1$$
$$.820 - (2 \times .051) = .718 \neq 1$$

The final item of the social capital scale was a total of 16 items including 5 items of relationship, 3 items of trust, 3 items of common norm, 2 items of safety, and 3 items of social participation through factor analysis and validity test, as shown in Table-6. A reliability analysis based on the final question revealed Cronbach's α =. 871 in relationship, Cronbach's α =. 764 in trust, Cronbach's α =. .865 for common norm, Cronbach's α for safety = .629, Cronbach's α for social participation respectively. Finally, 5 items in social capital scale, 3 items in trust, and 3 items in common norm, 2 items in safety, and 3 items in social participation are secured.

The development stage of the social capital scale is shown in Table-6 through the process of confirmatory factor analysis and the validity test. The social capital scale preliminary question was 21 questions, and one item (Q16) was removed as a result of reliability analysis. Based on the 20 items, four items were removed. Finally, the social capital scale consists of 16 items and is divided into 5 factors.

Table-6: Social Capital Scale Development Stage

Sort	Preliminary Questions	Confirmatory Factor Analysis	Final Questions
Scale Questions	21	16	16
Eliminated Questions	1	4	-
Number of factors	5	5	5

5. Conclusion and Implications

The aim of this study was to develop a scale to measure the degree of quantitative and objective social capital perceived by the members of society and to verify the validity of the developed scale. In order to develop the social capital measure, this study describe social capital as "the attitude and value of mutual cooperation that dominates the interactions between individuals or groups" through comparative literature review. In addition, Trust, relationships, common norms, social participation, and safety

are the factors that constitute social capital. Social value such as social participation of the members of society, efforts to realize common norms such as volunteer activities, improvement of mutual trust among residents, improvement of trust based on mutual understanding between government and various organizations and generations is a component of forming social capital that can be manifested to the people who make society healthy, such as increasing sharing of vision and increasing relationship formed among citizens.

After setting up 30 measurable preliminary questions for each component of social capital, we conducted two focus group interviews with academics and field experts to examine the concept of preliminary questions for social capital and the factors that constitute social capital, and content validity was verified. As a result of the verification, there was no revision to the measurement area (dimensions) of social capital, the revised and supplemented question items were derived from the measurement areas, and 21 revised preliminary measures of the final 5 areas were derived. One question was deleted through the reliability test of the preliminary social capital scale, and a confirmatory factor analysis of the preliminary social capital scale consisting of 20 items was conducted to verify the final scale. Finally, the fit of the factor structure was verified the validity of the final social capital scale was verified.

Finally, the Social Capital Scale, which is verified by the validated social members, can measures the level of social capital that self-perceived members of the local community and the nation, analyzes the degree of social capital measured by regions and communities. In other words, it can secure a bridgehead for policy development and policy realization for social capital depending on the test results by communities. Furthermore, this measure can be utilized as a benchmark for state comparisons because it allows comparative comparisons that can measure the level of social capital by states.

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