

**A study on the relationship between organizational structure
and organizational effectiveness:
The case of the Korea Water Resources Corporation (K-water)**

By

LEE, Changwook

CAPSTONE PROJECT

Submitted to

KDI School of Public Policy and Management

In Partial Fulfillment of the Requirements

For the Degree of

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Approval as of December, 2020

ABSTRACT

Every organization strives to achieve its goal efficiently for their survival and development. Among a number of measures to improve an organization's effectiveness, reorganization is being used by many companies as an effective and active means. Reorganization has been inevitable in terms of internal and external environmental changes in the organizational operation. In particular, in public institutions, reorganization has been carried out to support changes in government policies and to enhance management efficiency actively. Moreover, public institutions are controlled annually by governments on budgets and the size of their workforce. Therefore, designing an organization by efficiently distributing limited resources continues to be one of the essential management processes. In the case of Korea, K-water reorganizes its organizational system annually in major and minor ways to efficiently use a limited workforce. K-water has tried to realize the integrated water resource management (IWRM) in each basin to more efficiently and systematically manage national water resources, introducing a regional head office system based on the river basin in January 2017. However, despite the large-scale reorganization in 2017, no empirical and objective research has been conducted on the reorganization results and effectiveness. Therefore, this study analyzes the relationship between the organizational structure and organizational effectiveness in K-water. As a result, it shows that the higher the formalization awareness, the higher the job satisfaction and organizational commitment increases. Besides, this study maintains that decentralization has a positive relationship with job satisfaction and organizational commitment. The findings could be a reference to employees responsible for designing their organizations in the future.

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1. Introduction

Reorganization is inevitable in terms of internal and external environmental changes in many organizations' operation. In particular, reorganization is carried out in public institutions to actively support changes in government policies and to enhance management efficiency. Public institutions are controlled by governments in terms of budget and workforce size; therefore, designing an organization by efficiently distributing limited resources remains as one of the most essential management processes. In this research, efficiency increase and productivity growth are mainly focused in the context of K-water in order to devise a way to increase job satisfaction and organizational commitment.

K-water annually reorganizes its organizational system in different ways to make more efficient use of limited resources (budget \$ 4 billion, employees 4,856, as of 2018). Accordingly, K-water has tried to realize the integrated water resource management (IWRM) in each basin to better manage national water resources in a more efficient and systematic manner, introducing a regional head office system based on the river basin in January 2017. In the past, K-water was composed of three business divisions (water supply, water resources management, and waterfront development) in the main headquarters and seven regional head offices centering on local administrative units. With the introduction of the new organizational structure system, the main headquarters has been restructured into two business divisions (business management and business development), and the seven regional head offices have been reorganized into three river basin head offices. However, despite the large-scale reorganization in 2017, no empirical and objective research has been conducted on its result and effectiveness.

It has been argued that organizational structure has an impact on organizational effectiveness. This is accepted as the central argument of the modern organizational theory

that designing an organization's structure according to the characteristics and circumstances is important to enhance organizational effectiveness (Kwon, 1989; Kim et al., 2012). Especially, existing research conducted by Kim (2016) claims that it is natural for public managers to pay attention to the organizational structure to improve organizational performance as public organizations lack a proper incentive system compared to private companies.

Previous studies have mainly focused on administrative or private organizations. Therefore, it is difficult to generalize the results due to the limited number of studies on public institutions. Consequently, it remains significant that this research expands the research scope on organizational structure and effectiveness by studying public institutions. Besides, in terms of analyzing the effect of organizational structure changes within an organization on organizational effectiveness, this study carries out a distinct analysis from many previous studies, which were conducted only by comparing multiple organizations.

This research starts with the question of what kind of organizational design is desirable to make members of public institutions have a positive job attitude. For the empirical analysis, K-water employees were analyzed on the effect of organizational structure on organizational effectiveness. To precisely measure the organizational structure awareness, concepts of formalization, decentralization, and complexity were used, which many scholars mentioned in organizational structure characteristics. Moreover, job satisfaction and organizational commitment were added to measure organizational effectiveness. By analyzing the relationships between these factors, this study attempts to find the effect of organizational structure on organizational effectiveness.

This research paper is divided as follows: The first section discusses the background and current status of K-water. The second part examines the concepts of organizational structure and organizational effectiveness, and discusses each subcomponent through a

literature review. Third, a research model is designed by setting up some hypotheses from variables. Then, the influential relationship among variables is analyzed along with the interpretation of the research results. Finally, I summarize the findings and suggest future research directions with some implications.

2. Literature review

2.1. Characteristics of organizational structure

2.1.1. Concept of organizational structure

To examine the perception of organizational effectiveness, it is necessary to know organizational structure itself. Organizational structure is the most fundamental concept and a core element of an organization. Most organizations are made up of organizational members who work through cooperation and coordination. Then, to achieve organizational goals, actions become systematized, and an organizational structure is formed in the process (Min, 2014).

The definition of organizational structure varies from researcher to researcher. Scholars who defined organizational structure primarily discuss it in static and dynamic aspects. First, scholars who emphasize organizational structure from a static perspective view it as a system of operations and authority. Mintzberg (1983) defines organizational structure as the degree of division and integration. Robbins (1990) presents organizational structure as differentiation of business and a warning system of authority. Moreover, Jones (1995) addresses organizational structure as an official system of rules, duties, and authorities that coordinate people and control resources to achieve organizational goals. According to Osborne, (1980) organizational structure is understood as the official role and relationship of people and groups within a single system.

Second, scholars who emphasize organizational structure in dynamic aspect understand it as an interaction between organizational members. Oh (2005) and Kast and Rosenzweig (1974) define organizational structure as a patterned organizational member interaction. Members of an organization frequently interact to achieve the organization's goals. In this kind of interaction, the members' behavior becomes standardized or categorized, and this is the organization structure.

However, some argue that such discussions emphasize only one aspect of organizational structure too much and that organizational structure essentially has both static and dynamic aspects at the same time. Min (2014) states that focusing on only one aspect of an organizational structure can constrain a complete understanding of organizational structure. At the same time, he defines organizational structure as "the dynamic shape of an organization in which the basic variables of the organizational structure, complexity, formality, and centralization are arranged (p.112)." As mentioned above, organizational structure has a polysemous aspect that cannot be defined by any single entity. Therefore, scholars use a variety of indicators to express the characteristics of organizational structure. Such metric generally uses the concepts of formalization, centralization, and complexity. However, it differs from one organization to another and from one scholar to another (Dalton et al., 1980; Hall, 1991).

2.1.2. Factors of organizational structure

2.1.2.1. Formalization

Formalization means that some rules and regulations specify who should perform duties, when, and how. In other words, formalization refers to the standardization of duties within an organization.

The level of formalization varies from organization to organization. While some organizations have detailed regulations on the standardization of their duties, others do not. An organization like the former is called an organization with a high formalization level. An organization like the latter is called an organization with a low formalization level. In general, members of an organization with a high formalization level have less discretion in their work. On the other hand, organizations with low formalization levels are relatively flexible in their work processing.

Formalization is measured by the degree of embodiment of job descriptions and regulations, the degree of supervision, the degree of discretion granted to subordinates or managers, the degree of standardization of work, and the degree of documentation (Yang, 1990). Specific measurement methods are investigated through structured questionnaires and identified directly through an organization's official documents, such as regulations (Jeong, 2011).

2.1.2.2. Centralization

Centralization means the degree to which a decision-making authority within an organization is concentrated in or delegated to a particular individual, class, or group.

If decision-making is concentrated in the top manager or an organization's upper echelons, the degree of power is high. Conversely, if an authority is delegated to the lower levels, the organization's governing is low, and in this case, decentralization is high. Although the concepts of centralization and decentralization are contradictory, it is desirable to see them as concepts that represent a continuous state, not a separate concept (Min, 2014).

A high degree of centralization allows organizations to easily integrate and coordinate tasks as well as process operations quickly. However, it structures the ills of bureaucracy, such as authoritarianism and formalism, and reduces the lower class' creativity. On the

contrary, decentralization has advantages, such as reducing the chief executive officer's burden and promoting the participation of the lower-level group. Nevertheless, the distributed authority would result in challenges to coordinate and integrate tasks.

2.1.2.3. Complexity

Complexity can be defined by the number of different occupational titles or activities in an organization (Payne & Mansfield, 1976; Pugh et al., 1968). Hage and Dewar (1973) define complexity as the number of different professional expertise. Additionally, the complexity of an organization can be measured by the degree of vertical and horizontal differentiation. On one hand, horizontal differentiation of an organization is measured by the number of sub-unit and the degree of personal specialization, and on the other hand, vertical differentiation is measured by the number of layers in the organization (Rainey, 1997). Horizontal division means a division of duties. It can be divided into subculture methods where work is carried out by groups of experts performing similar duties and subdivided by job-based specialization. Vertical differentiation means the depth of an organizational hierarchy. It measures the number of supervisory classes within the organization, the number of positions between the chief and lower managers, the average number of layers in the highest departments, and the number of layers in the organization. When vertical differentiation intensifies, the number of layers increases, and the command system becomes more complex (Hall, 1991).

2.2. Characteristics of organizational effectiveness

2.2.1. Concept of organizational effectiveness

Organizational effectiveness is generally a concept that refers to the degree to which organizational goals are achieved. The definition of organizational effectiveness is difficult to

generalize (Lee, 2006) as it is defined in various ways by scholars. Caplow (1964) argues that organizational effectiveness means organizational stability, unity, autonomy and achievement while Steers (1975) defines organizational effectiveness as an organization's ability to acquire and utilize scarce and valuable resources. Gibson et al. (1982) introduced time in the concept of effectiveness and divides it into the short, medium, and long term. They argue that organizational effectiveness means productivity, efficiency, and job satisfaction in the short term, adaptability and development potential in the medium term, and sustainability in the long-term. The main approaches to organizational effectiveness include approaches based on economic indicators, such as profitability, productivity, growth rate, and total sales and approaches based on psychological indicators, such as members' motivation, morale, job satisfaction, organizational commitment, and organizational civic behavior (Campbell, 1977; Dalton et al., 1980). Meanwhile, studies on organizational effectiveness have been conducted more on psychological indicators than economic indicators (Dalton et. al., 1980). Therefore, this study seeks to utilize job satisfaction and organizational commitment, which are psychological indicators of organizational effectiveness.

2.2.2. Factors of organizational effectiveness

2.2.2.1. Job satisfaction

Job satisfaction has been recognized as the most useful information to predict whether an organization functions properly (Roznowski & Hulin, 1992). It is closely related to individual abilities and qualities, adaptability to work being carried out, and various organizational environments. Therefore, it is not only an indicator of organizational effectiveness, but also an important role in integrating individual needs and organizational objectives (Park, 2008).

Locke (1976) defines job satisfaction as satisfaction or a pleasant and positive emotional state obtained from assessing the job or job experience and argues that it can only be seen and identified in the intrinsic process because it is an emotional response. According to Smith (1995), job satisfaction refers to an attitude resulting from all the likes and dislikes of each experience concerning one's duties or the balance of these emotions. Meanwhile, Wu and Norman (2006) argue that almost all aspects of work-life are factors that determine job satisfaction. According to them, promotions and salaries, working hours and benefits, and relationships with bosses and colleagues at work are also important job satisfaction factors.

In general, a member who feels a high level of job satisfaction has a more positive attitude toward his or her job than a member who does not. Furthermore, job satisfaction depends on how much an organization satisfies the essential physical and psychological needs for individuals' survival and well-being (Kim, 2008). Additionally, it can be said that smooth communication among members has a positive effect on job satisfaction (Kim, 2002).

2.2.2.2. Organizational commitment

Organizational commitment includes the will, loyalty, belongingness, and positive thinking of members passionate about achieving an organization's goals (Choi & Lee, 2009). It is more than a simple response to a job and is a concept that shows how much members of an organization are willing to devote themselves to the organization. In other words, the higher the degree of organizational commitment, the greater the performance of its members. For this reason, many studies have been conducted on organizational immersion among the variables that affect organizational outcomes. As a result, it has become clear in many studies that organizational commitment is a useful indicator of its effectiveness (Kim, 2008).

Hall (1991) defines organizational commitment as a process in which organizational goals are combined with individual goals. According to him, some variables (acceptance of

organizational goals, loyalty to the organization, willingness to work for the organization, etc.) are included in organizational commitment.

Mowday et al. (1979) subdivide organizational commitment into three parts. First, strong faith in and acceptance of the goals and values that an organization pursues. Second, considerable commitment to the organization. Third, a strong desire to remain a member of an organization. In other words, members with high organizational commitment are intensely immersed in their organization's goals and committed with considerable effort. Thus, to an observer, organizational commitment can be understood not only from individual beliefs and opinions but also from members' actions.

Scholl (1981) defines organizational commitment as a potential force that leads to membership, the appropriate performance of roles, and innovative and spontaneous behavior. According to O'Reilly and Chatman (1986), organizational commitment means a psychological attachment that an individual feels to an organization, to the extent that they accept or internalize its perspectives and characteristics.

Considering these definitions, organizational commitment is the psychological attachment that a member has to an organization. It can be said that members often try to identify themselves with their organization and devote themselves to their organization.

2.3. Relationship between organizational structure and organizational effectiveness

Previous studies on the relationship between organizational structure and organizational effects have varied, and the results are inconsistent.

2.3.1. Formalization and organizational effectiveness

According to Child (1974), formalization has a different effect on organizational effectiveness depending on the degree of change in the environment. Formalization positively

affects organizational effectiveness when an organizational environment is stable whereas it hurts organizational effectiveness when it is unstable.

Morris and Steers (1980) argue that formalization has a positive relationship to organizational commitment. Podsakoff et al. (1986) suggest that higher formalization increases organizational effectiveness and reduces alienation. According to Kim (2004), formalization at the individual and collective levels positively affect organizational effectiveness. In a study conducted by Rye et al. (2010), they also argue that formalization significantly affects organizational effectiveness.

Hypothesis 1. The degree of formalization has a positive effect on employee job satisfaction.

Hypothesis 2. The degree of formalization has a positive effect on organizational commitment.

2.3.2. Centralization and organizational effectiveness

Centralization means the extent to which the power of decision-making within an organization is concentrated or delegated to any particular individual, class, or group. In general, in an organizational structure where power is concentrated at the upper level has relatively low job satisfaction, morale, and organizational commitment among subordinates than the decentralized power structure (Park et al., 2002).

Lee (1987) presents that those who have more authority over their duties have higher job satisfaction than those around them, and Jang (1988) also argues in a study of domestic manufacturers that the higher the position and the greater the degree of decision-making, the higher the job satisfaction. According to Oh et al. (2001), as organizational structure becomes more powerful, the job satisfaction of those with more authority increases while those with less authority decreases relatively.

On the other hand, Kang (2011) presents that the lower the organization structure's power, the higher its concentration. However, Kim and Kwon (2002) argue that the organizational structure's power does not significantly impact organizational commitment.

Morris and Steers (1980) present a study showing that the higher the decentralization, the more positive the impact on organizational immersion. However, Stevens (1978), in a study of the U.S. federal officials, claims that centralization is not related to organizational commitment.

Hypothesis 3. The degree of decentralization has a positive effect on employee job satisfaction.

Hypothesis 4. The degree of decentralization has a positive effect on organizational commitment.

2.3.3. Complexity and organizational effectiveness

Robbins (1983) emphasizes that while job satisfaction is generally low when horizontal differentiation is high, job satisfaction due to vertical differentiation can be both positive and negative at the same time. Ivancevich and Donnelly (1991) also present that the higher the level of horizontal differentiation, the lower the job satisfaction level and that vertical differentiation shows both the positive and negative relationships.

Choi (1991) presents that the stronger the vertical differentiation, the more likely the job satisfaction increases. In a study on public servants by Joo (2004), complexity has a positive relationship between commitment in an organization and job satisfaction. Also, Lee's (2009) complexity research showed a positive relationship with both organizational commitment and job satisfaction.

Kim et al. (2012) present that complexity positively affects organizational commitment, but job satisfaction is not statistically significant. The organizational effectiveness and relationships, such as complexity and job satisfaction, commitment in the organization, and alienation, have been inconsistent. However, previous researches have mainly considered positive effects rather than the negative effects of complexity.

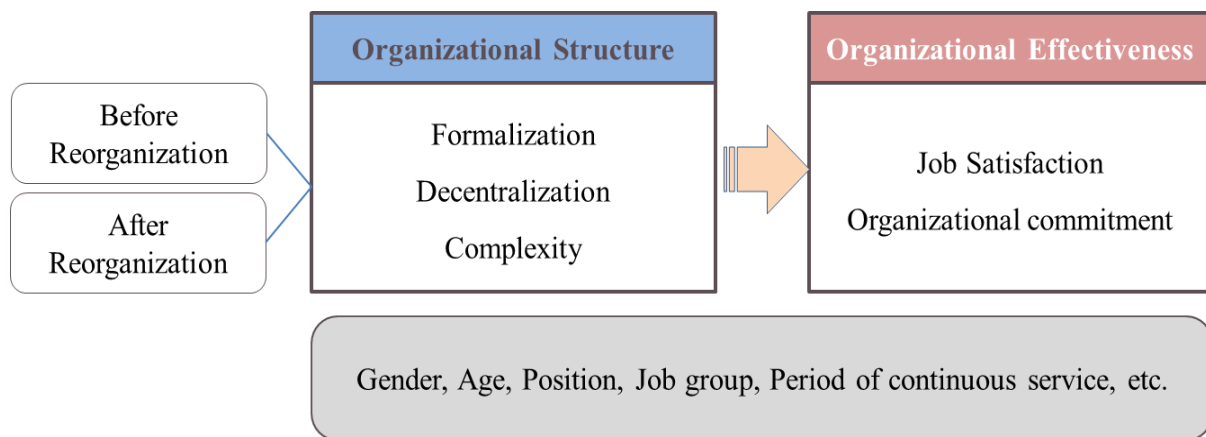
Hypothesis 5. The degree of complexity has a positive effect on employee job satisfaction.

Hypothesis 6. The degree of complexity has a positive effect on organizational commitment.

2.4. Research model

This study aims to identify the effect of organizational structure characteristics on job satisfaction and organizational commitment. To this end, I surveyed the organization members of K-water's Hangang River Regional Head Office and its branch offices on the characteristics of the organizational structure and the level of awareness of organizational effectiveness. Through the data analysis, I looked at the relationship between organizational structure and organizational effectiveness of the employees. In order to proceed with this study, the characteristics of the organizational structure were first set as formalization, decentralization, and complexity. Accordingly, job satisfaction and organizational commitment were used as indicators of organizational effectiveness. A schematic study model for conducting research is shown in Figure 1.

<Figure 1 Research Model>



3. Methodology

3.1. Operational definition of variables

3.1.1. Independent variable

In this study, organizational structure was set as an independent variable. Organizational structure generally uses the concepts of formalization, decentralization, and complexity (Dalton et al., 1980; Hall, 1991; James & Jones, 1976; Payne & Mansfield, 1976; Prien & Ronan, 1971; Pugh et al., 1969).

Formalization refers to the degree of standardization or documentation of work. It also means the extent to which rules and procedures are applied when carrying out a task. In this study, the questionnaires measured specific authority and responsibilities and the extent to which regulations and procedures are documented.

Decentralization means the extent to which an authority within an organization is dispersed in the lower levels. If decision-making is concentrated in the top manager or the organization's upper ranks, the degree of power is high. Conversely, if the authority is delegated to the lower or lower levels, the organization's governing is low, and in this case, decentralization is high. In this study, the degree of decentralization was measured through

the degree of delegation of major decision-making authority and task decision-making autonomy.

Complexity refers to the process or condition in which an organization is subdivided into subdivisions to its degree of differentiation. Clarity of the work division, stage of the approval process, and unit organizations' degree were organized into questionnaires.

3.1.2. Dependent variable

Organizational effectiveness was taken as a dependent variable in this study. Given that it is practically difficult for public organizations to use objective indicators like private companies, it is common to evaluate organizational effectiveness using subjective perceptions, such as job satisfaction and organizational immersion (Do, 2005).

Job satisfaction is the degree to which organization members meet their needs in the process of performing their duties. In this study, satisfaction with the job itself and a sense of accomplishment were measured.

Organizational commitment refers to the degree of unity that organizational members feel with the organization. The survey questions were composed of a sense of belonging to the organization and intimacy between employees.

3.2. Method of data collection and analysis

3.2.1. Analysis target selection

Based on existing theoretical and empirical studies, this research conducted a questionnaire with K-water's Hangang River Regional Head Office employees to analyze the effect of awareness on organizational effectiveness. The head office operates and manages 12 dams and reservoir facilities, including Soyang River Dam, five metropolitan waterworks,

and five local water supply facilities. In terms of the workforce size, it accounts for about 25 percent of K-water.

3.2.2. Survey content

In this study, a questionnaire was conducted to analyze the relationship between organizational structure and organizational effectiveness. Questionnaire items consist of 22 items in total, and questions about organizational structure and effectiveness were asked using a scale of 7 Likert points for each item. The questionnaire consisted of items related to formalization, decentralization, and complexity to measure the organizational structure's characteristics, which are independent variables. Also, items related to job satisfaction and organizational commitment were organized to measure organizational effectiveness as dependent variables. In the end, there are demographic analysis items and other comment items. The main breakdown of the survey is as follows:

<Table 1 Questionnaire Composition List >

Type	Variables	Questionnaire item
Independent variable	Formalization	Q1~Q3
	Decentralization	Q4~Q6
	Complexity	Q7~Q9
Dependent variable	Job satisfaction	Q10~Q12
	Organizational commitment	Q13~Q15
Demographic variable	Gender, age, etc.	Q16~Q20
Other opinions	-	Q21~Q22

3.2.3. Analysis Method

In this study, the SPSS Statistics program was used to identify the effect of organizational structure on organizational effectiveness. Specific analysis methods are as follows.

First, frequency analysis was conducted to examine the demographic distribution of the samples. Besides, descriptive statistics techniques were used to analyze the mean and standard deviation of each variable.

Second, the independent sample t-test and one-way ANOVA analysis were conducted to examine the differences in awareness according to respondents' demographic characteristics for variables.

Third, correlation analysis was performed to analyze the relationship between the variables. Correlation means the direction of change and intensity, such as how one variable changes as another variable changes due to the relationship between the variables.

Finally, multiple regression analysis was performed to verify the hypotheses established in this study.

3.2.4. Reliability analysis of measuring tools

I conducted a reliability analysis to ensure that the concepts I wanted to measure were measured accurately and consistently from the survey respondents. The Cronbach α value determined the results of the reliability analysis. Usually, a value of 0.6 or higher in social science is judged to be reliable. In this study, the reliability judgment criteria were set at Cronbach α value of 0.6 or higher.

<Table 2 Reliability Analysis of Measuring Tools>

Variables	Cronbach's alpha	N of Items
-----------	------------------	------------

Organizational structure	Formalization	.904	3
	Decentralization	.888	3
	Complexity	.877	3
Organizational effectiveness	Job satisfaction	.904	3
	Organizational commitment	.859	3

As a result of calculating the Cronbach α coefficient, the confidence of the major variables in this study was judged to be good with all higher than 0.6. Therefore, no further questions were assessed to impede reliability, and the analysis was conducted without removing them.

4. Empirical analysis result

4.1. Characteristics of respondents

The purpose of this study is to study the effect of awareness of organizational structure on organizational effectiveness. To this end, the hypotheses of the relationship between the awareness of organizational structure and organizational effectiveness were derived from prior research, and a structured questionnaire was used to verify it empirically. The subjects to the investigation were 250 copies distributed to 12 departments in the K-water Hangang River Regional Head Office (Investigation Period: November 18, 2019 ~ December 6, 2019). A total of 194 respondents responded, showing a 77.6% response rate.

The sample characteristics of this study are shown in Table 3. Of the 194 respondents, 154 (79.4%) were male, and 40 (20.6%) were female. Those in the 40s accounted for the largest group, followed by 25 in 20s (12.9%), 54 in 30s (27.8%), 82 in 40s (42.3%), and 33 in the 50s and older (17%). By position, there were 3 (1.5%) in Grade 2 or higher, 89 in Grade 3(45.9%), 75 in Grade 4 (38.7%), and 27 in Grade 5 or below (13.9%). By job group, the composition ratio is as follows: administrative group 58 (29.9 %); technical group (I) 66 (34 %); technical group (II) 63 (32.5 %); and seven (3.6 %) were in the technical group (III). The service period was tallied at 46 individuals (23.7%) for less than five years, 39 (20.1%) for more than 5 to 10 years (20.1%), 46 (23.7%) for more than 11 to 15 years, 18 (9.3%) for more than 16 to 20 years, 32 (16.5%) for more than 21 to 25 years, and 13 (6.7%) for more than 26 years.

< Table 3 Demographic characteristics of respondents >

Category		Frequency (persons)	Composition ratio (%)
Gender	Male	154	79.4
	Female	40	20.6
Age	20s	25	12.9
	30s	54	27.8
	40s	82	42.3
	Over 50s	33	17.0
Position	Grade 2 or higher	3	1.5
	Grade 3	89	45.9
	Grade 4	75	38.7
	Grade 5 or below	27	13.9

Number of years of continuous service	Below 5 years	46	23.7
	5~10 years	39	20.1
	11~15 years	46	23.7
	16~20 years	18	9.3
	21~25 years	32	16.5
	Over 26 years	13	6.7
Job group	Administrative	58	29.9
	Technical I*	66	34.0
	Technical II**	63	32.5
	Technical III***	7	3.6

* Technical I: Civil engineering, environmental engineering

** Technical II: Electrical engineering, electronics and telecommunications, mechanical engineering

*** Technical III: Architectural engineering, landscape architecture, computational engineering

4.2. Descriptive statistical analysis

The mean and standard deviation values of the variables used in this study after the reliability analysis are shown in Table 4. Overall, all variables were above average based on the median of 4. The subcomponents of the organizational structure showed decentralization, formulation, and complexity with the means of 4.457, 4.201, and 4.195, respectively. This presents that the perception of decentralization due to reorganization is greater than that of other variables. The dependent variables were organizational commitment (mean 4.249) and job satisfaction (mean 4.185) for organizational effectiveness.

<Table 4 Descriptive statistics for each variable >

Variables		Mean	Std. Deviation	Min.	Max.
Organization Structure	Formalization	4.201	1.243	1	7
	Decentralization	4.457	1.168	1	7
	Complexity	4.195	1.159	1	7
Organizational Effectiveness	Job satisfaction	4.185	1.065	1	7
	Organization commitment	4.249	1.021	1	7

* N=194

For these factors, this paper looked at the analysis of differences by factor based on the demographic statistics, such as gender, age, position, length of service, and job group. The independent sample t-test and one-way ANOVA analysis methods were used to analyze the factors according to the demographic statistics.

4.2.1. Analysis of differences by gender

The gender-specific perception differences showed that in most indicators, except formalization and complexity, women perceived them at a higher level than men.

<Table 5 Analysis of differences by gender>

Category	Mean		Std. Deviation		t	p
	Male	Female	Male	Female		
Formalization	4.244	4.033	1.272	1.122	.957	.340

Decentralization	4.452	4.475	1.176	1.149	-.109	.913
Complexity	4.225	4.083	1.162	1.157	.688	.492
Job satisfaction	4.184	4.191	1.074	1.040	-.041	.968
Organizational commitment	4.238	4.291	1.022	1.030	-.295	.768

4.2.2. Analysis by age group

Looking at the recognition level by age group, members in their 20s showed the highest recognition level of all variables except complexity. On the other hand, it was found that members in the 30s and 40s were less aware than those in the 20s and 50s.

<Table 6 Analysis by age group>

Variables	Age	N	Mean	Std. Deviation	F	p
Formalization	20s	25	4.533	1.009	1.940	.124
	30s	54	3.914	1.335		
	40s	82	4.199	1.212		
	Over 50s	33	4.424	1.267		
Decentralization	20s	25	4.800	0.995	1.186	.316
	30s	54	4.309	1.233		
	40s	82	4.402	1.154		
	Over 50s	33	4.576	1.200		

Complexity	20s	25	4.280	0.980	1.917	.128
	30s	54	3.944	1.309		
	40s	82	4.195	1.139		
	Over 50s	33	4.546	1.013		
Job satisfaction	20s	25	4.480	0.967	1.121	.342
	30s	54	4.049	1.137		
	40s	82	4.138	1.081		
	Over 50s	33	4.303	0.959		
Organizational commitment	20s	25	4.493	1.089	0.908	.438
	30s	54	4.099	0.922		
	40s	82	4.248	1.082		
	Over 50s	33	4.313	0.972		

4.2.3. Analysis by job position

Looking at the awareness level by job position, the group of employees below Grade 5 showed the highest level among all variables.

<Table 7 Analysis by job position>

Variables	Position	N	Mean	Std. Deviation	F	p
Formalization	Grade 2 or higher	3	4.333	0.333	1.862	.137
	Grade 3	89	4.131	1.266		

	Grade 4	75	4.093	1.337		
	Grade 5 or below	27	4.716	0.788		
Decentralization	Grade 2 or higher	3	4.444	1.171	0.448	.719
	Grade 3	89	4.393	1.253		
	Grade 4	75	4.449	1.170		
	Grade 5 or below	27	4.691	0.862		
Complexity	Grade 2 or higher	3	3.667	0.667	1.077	.360
	Grade 3	89	4.176	1.161		
	Grade 4	75	4.120	1.203		
	Grade 5 or below	27	4.531	1.047		
Job satisfaction	Grade 2 or higher	3	3.667	0.577	1.553	.202
	Grade 3	89	4.124	1.113		
	Grade 4	75	4.142	1.037		
	Grade 5 or below	27	4.568	0.969		
Organizational commitment	Grade 2 or higher	3	4.111	1.072	2.521	.059
	Grade 3	89	4.146	1.108		
	Grade 4	75	4.200	0.873		
	Grade 5 or below	27	4.741	1.018		

4.2.4. Analysis by the number of years of continuous service

In terms of the perception over the number of years of continuous service, employees with less than 5 years of experience presented the highest level of awareness in all indicators except complexity.

<Table 8 Analysis by the number of years of continuous service >

Variables	Number of years	N	Mean	Std. Deviation	F	p
Formalization	below 5 years	46	4.457	1.055	0.716	0.612
	5~10 years	39	4.000	1.311		
	11~15 years	46	4.109	1.388		
	16~20 years	18	4.056	1.133		
	21~25 years	32	4.250	1.365		
	Over 26 years	13	4.308	0.957		
Decentralization	below 5 years	46	4.732	0.970	1.224	0.299
	5~10 years	39	4.444	1.101		
	11~15 years	46	4.304	1.402		
	16~20 years	18	4.037	0.956		
	21~25 years	32	4.448	1.321		
	Over 26 years	13	4.667	0.839		
Complexity	below 5 years	46	4.246	1.010	0.776	0.568
	5~10 years	39	4.111	1.222		
	11~15 years	46	4.000	1.309		
	16~20 years	18	4.111	1.278		

	21~25 years	32	4.458	1.053		
	Over 26 years	13	4.436	1.013		
Job satisfaction	below 5 years	46	4.420	1.031	0.840	0.523
	5~10 years	39	4.145	1.028		
	11~15 years	46	4.065	1.254		
	16~20 years	18	3.944	1.062		
	21~25 years	32	4.135	0.935		
	Over 26 years	13	4.359	0.866		
Organizational commitment	below 5 years	46	4.573	0.942	1.250	0.287
	5~10 years	39	4.111	0.835		
	11~15 years	46	4.181	1.243		
	16~20 years	18	4.185	1.055		
	21~25 years	32	4.115	1.029		
	Over 26 years	13	4.180	0.777		

4.2.5. Analysis by job group

From the analysis of the job groups, technical III was lower than the median value (4) in formalization, job satisfaction, and organizational immersion.

<Table 9 Analysis by job group>

Variables	Job group	N	Mean	Std. Deviation	F	p
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Formalization	Administrative	58	4.207	1.129	1.236	0.298
	Technical I	66	4.035	1.346		
	Technical II	63	4.413	1.244		
	Technical III	7	3.810	1.016		
Decentralization	Administrative	58	4.615	1.059	1.886	0.133
	Technical I	66	4.182	1.228		
	Technical II	63	4.582	1.130		
	Technical III	7	4.619	1.557		
Complexity	Administrative	58	4.218	1.035	2.258	0.083
	Technical I	66	3.939	1.240		
	Technical II	63	4.460	1.165		
	Technical III	7	4.048	0.951		
Job satisfaction	Administrative	58	4.310	1.046	0.450	0.718
	Technical I	66	4.131	1.141		
	Technical II	63	4.153	1.024		
	Technical III	7	3.952	0.932		
Organizational commitment	Administrative	58	4.385	0.993	0.763	0.516
	Technical I	66	4.147	0.998		
	Technical II	63	4.265	1.051		
	Technical III	7	3.952	1.268		

4.3. Correlation analysis between variables

Before the hypothesis test, correlation analysis was conducted to measure the correlation and directionality of effects between specific variables. Generally, a correlation coefficient of ± 0.2 to ± 0.4 is a low correlation; a higher correlation of 0.4 or higher or less than -0.4 is a high correlation. The correlation analysis in Table 10 shows that a significant correlation exists between variables.

<Table 10 Correlation Analysis between Variables>

Variables	1	2	3	4	5
1. Formalization	1				
2. Decentralization	.748***	1			
3. Complexity	.515***	.508***	1		
4. Job satisfaction	.727***	.735***	.477***	1	
5. Organizational commitment	.751***	.693***	.457***	.801***	1

*** $p < .001$

As a result, formalization showed a statistically significant correlation with decentralization ($r=.748$, $p<.001$), complexity ($r=.515$, $p<.001$), job satisfaction ($r=.727$, $p<.001$), and organizational commitment ($r=.751$, $p<.001$). Decentralization also showed a statistically significant correlation with complexity ($r=.508$, $p<.001$), job satisfaction ($r=.735$, $p<.001$), and organizational commitment ($r=.693$, $p<.001$). Complexity showed a significant definite (+) correlation with job satisfaction ($r=.477$, $p<.001$) and organizational commitment ($r=.457$, $p<.001$), and job satisfaction showed a statistically significant correlation with organizational commitment ($r=.801$, $p<.001$).

According to previous studies, the relationship between job satisfaction and organizational commitment differs from scholar to scholar in terms of formalization, decentralization, and complexity. The general view is that formalization has a positive effect and that centralization has a negative effect. However, positive and negative views are evenly distributed on complexity's impact on an organization's job satisfaction and commitment. This study showed that there was a significant amount of correlation at a significant level of 99%.

4.4. Verification of the research hypotheses

4.4.1. Effects of organizational structure on job satisfaction

The regression model was statistically significant ($F=101.086$, $p<.001$) as the regression model's explanatory power was approximately 61.5%. Meanwhile, the Durbin-Watson statistic was 1.778, close to 2, and this indicates that there was no problem with the independence assumption of the residuals. In addition, the variance inflation factor (VIF) was all less than 10, meaning there was no problem with multicollinearity. Formalization ($\beta=.380$, $p<.001$) and decentralization ($\beta=.415$, $p<.001$) have shown to have a significant positive effect on job satisfaction. However, complexity did not produce statistically significant results in its relationship to job satisfaction. Therefore, Hypothesis 1 and Hypothesis 3 were accepted while and Hypothesis 5 was rejected.

4.4.2. Effects of organizational structure on organization commitment

A multi-line analysis was conducted to verify the impact of formalization, decentralization, and complexity on organization commitment. As a result, the regression model was statistically significant ($F=96.797$, $p<.001$), and the accountability of the regression model was approximately 60.4% ($R^2=.604$). The Durbin-Watson statistic was

approximated to 2 at 1.804, and it was evaluated that there was no problem with the assumption of residual independence. Since the VIF was both smaller than 10, there showed no issues in terms of multiple collinearities.

Formalization ($\beta=.514$, $p<.001$) and decentralization ($\beta=.284$, $p<.001$) showed a positive (+) significant impact on organization commitment. Nevertheless, complexity did not show statistically meaningful results concerning organization commitment. Accordingly, Hypothesis 2 and, Hypothesis 4 were accepted while and Hypothesis 6 was rejected.

5. Conclusion

5.1. Summary and implications of research results

This research conducted an empirical analysis of the impact of awareness of organizational structure on organizational effectiveness among the employees of the K-water Hangang River Regional Head Office. The significance of this research, which can be derived from the analysis results, is as follows.

First, it was confirmed that the higher the awareness of formalization, the higher the job satisfaction and commitment increase to the organization among the characteristics of organization structure. This study showed that it is important to clarify each department's responsibilities and processing procedures when designing an organization structure. Also, it is judged that standardization and documentation of business operations will continue to be necessary to facilitate business operations for members of an organization.

Second, decentralization showed a positive relationship to job satisfaction and organizational immersion. K-water has maintained an organizational structure in which authority and resources are heavily concentrated at its headquarters. The reorganization's main objective for the basin-based water management was to properly delegate authority and

responsibility from the headquarters to the site. This study showed that decentralized organizational structures have a significant relationship to organizational effectiveness.

5.2. Limitation

This research is based on a questionnaire survey conducted exclusively on the K-water Hangang River Regional Head Office employees. Therefore, the headquarters and other regional head office employees' opinions and perceptions about the organization structure and effectiveness were not reflected.

However, studies on organizational environmental factors associated with organizational effectiveness have been conducted on various organizations. This study approached K-water's organizational effectiveness with a formal and official view of organizational structure. There is room for further studies of organizational effectiveness regarding members' recognition factors, such as organizational culture. Finally, it is expected that research on factors affecting organizational management and operation in K-water will enhance the acceptability of organizational design and organizational effectiveness.

References

- Do, O. (2005). The analysis of the research trends about the relationship between organizational culture and organizational effectiveness: Focusing on the field of public administration. *Korean Journal of Public Administration*, 43(3), 75-95.
- Hage, H. (1965). An axiomatic theory of organizations. *Administrative Science Quarterly*, 10(3).
- Hall, H. (1991). *Organizations: Structure regarding and outcomes*. Prentice-Hall: Englewood Cliffs, NJ.
- Ju, H. (2004). Analyzing the relation among organizational structure, organizational culture, and organizational effectiveness: Focusing on sub-departments by work patterns. *Korean Journal of Public Administration*, 42(2), 29-53.
- Park, M., & Lee, J. (2017). The effect of the full service and low-cost carrier flight attendants' organizational structure on organizational effectiveness and customer orientation. *Journal of Tourism and Leisure Research*, 29(3), 291-306.
- Kang, J. (2011). A structural relation among social welfare organization's structure, social worker's organizational commitment and turnover intention. *Academy of Korean Social Welfare Administration*, 13(3), 63-87.
- Kim, H. (2002). The effects of organizational culture on organizational commitment and job satisfaction in the public sector. *Korean Public Administration Review*, 36(4), 87-105.
- Kim, T. (2016). Organizational structure and organizational effectiveness: Relationships and reinterpretation. *Korean Journal of Public Administration*, 54(1), 1-29.
- Kim, Y., Ryu, E., & Liu, B. (2012). Impact of organizational environment and organizational structure on organizational effectiveness. *Journal of Korean Society for Public Personnel Administration*, 11(3), 185-215.

- Ko, S. (2018). The effect of organizational structure on job attitude: Focused on navy executives. [Master's dissertation, Yonsei Graduate School of Public Administration].
RISS.
http://www.riss.kr/search/detail/DetailView.do?p_mat_type=be54d9b8bc7cdb09&control_no=9a2fcc2cd7b421a5ffe0bdc3ef48d419&outLink=K
- Kwon, K. (1989). A study on the relationships between organizational structure and organizational Effectiveness. *Journal of Kwangwoon University*, 18, 269-288.
- Oldham, R. & Hackman, R. (1981). Relationships between organizational structure and employee reactions: Comparing alternative frameworks. *Administrative Science Quarterly* 26(1), 66-83.
- Pennings, J. (1973). Measures of organizational structure: A methodological note. *American Journal of Sociology*, 79(3), 686-704.
- Price, J. (1986). *Organizational effectiveness: An inventory of propositions*. Homewood, III. : Richard D. Irwin Inc.
- Robbins, S. (1983). *Organization theory: The structure and design of organization*. Prentice-Hall: Englewood Cliffs, NJ.
- Ryu, B. (2016). The multi-level analysis on the causal relationship among organizational structure, organizational culture, and organizational effectiveness. *Korean Association for Organizational Studies*, 13(1), 33-62.
- Zeitz, G. (1984). Bureaucratic role characteristics and member affective response in organizations. *The Sociological Quarterly*, 25(2), 301-318.

Appendix

Questionnaire for an Analysis of the Effects of Organizational Structure and Organizational Effectiveness

Hello and thank you for taking the time to cooperate with my research despite your heavy schedule. I am a student at the KDI School of Public Policy and Management and am carrying out a study on "the relationship between organizational structure and organizational effectiveness."

With regards to the reorganization of K-water (local headquarters system → river basin headquarters system) conducted in 2017, this study aims to analyze how the organizational structure affected organizational effectiveness and to suggest further implications for designing future organizational structure.

The collected survey materials will be used only as research materials, and the answers will be kept confidential in accordance with the Statistics Act.

Thank you again for answering the questionnaire.

November 2019

KDI School of Public Policy and Management

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Instruction

- The questionnaire is composed of 22 questions, and the estimated time required for each survey response is about 5 minutes.
- For each question, you can circle or V mark your opinion and corresponding information.
- When answering the survey questions, please select an answer that is close to your thoughts.
- If you have any questions, please contact me by e-mail at any time.

※ In this survey, “before the reorganization” refers to the local headquarters system, and “after the reorganization” refers to the river basin headquarters system.

I. Organizational Structure Characteristics

<Formalization>

	Much poorer Much better						
1. How has the clarity of departmental responsibilities changed since the reorganization?	①	②	③	④	⑤	⑥	⑦
2. How has the clarity of the work process changed since the reorganization?	①	②	③	④	⑤	⑥	⑦
3. How has the documentation level on work-related regulations and manuals changed since the reorganization?	①	②	③	④	⑤	⑥	⑦

<Decentralization>

	Much poorer Much better						
4. How has the degree of delegation changed since the reorganization?	①	②	③	④	⑤	⑥	⑦
5. How has the autonomy of business decisions changed since the reorganization?	①	②	③	④	⑤	⑥	⑦
6. How has the employee feedback on management activities changed since the reorganization?	①	②	③	④	⑤	⑥	⑦

<Complexity>

	Much poorer Much better						
7. How has the clarity of interdepartmental responsibilities and duties changed since the reorganization?	①	②	③	④	⑤	⑥	⑦
8. How has the complexity of the approval system changed since the reorganization?	①	②	③	④	⑤	⑥	⑦
9. How has the level of subdivision of unit organizations changed since the reorganization?	①	②	③	④	⑤	⑥	⑦

II. Organizational effectiveness

<Job satisfaction>

	Much poorer Much better						
10. How has your sense of accomplishment of your work changed since the reorganization?	①	②	③	④	⑤	⑥	⑦
11. How has the intensity of your work changed since the reorganization?	①	②	③	④	⑤	⑥	⑦
12. How has your overall satisfaction with your work changed since the reorganization?	①	②	③	④	⑤	⑥	⑦

<Organizational commitment>

	Much poorer Much better						

13. How has your sense of belonging and attachment to the organization changed since the reorganization?	①	②	③	④	⑤	⑥	⑦
14. How has your personal interest in organizational issues changed since the reorganization?	①	②	③	④	⑤	⑥	⑦
15. How has the intimacy between members of the organization changed since the reorganization?	①	②	③	④	⑤	⑥	⑦

III. Demographic questions

16. What is your gender?

- ① Male ② Female

17. What is your age group?

- ① 20s ② 30s ③ 40s ④ Over 50s

18. What is your position?

- ① Grade1 ② Grade2 ③ Grade3 ④ Grade4 ⑤ Grade5 or below

19. How many years have you been working for K-water?

- ① Less than 5 years ② 5 to 10 years ③ 11 to 15 years

- ④ 16 to 20 years ⑤ 21 to 25 years ⑥ Over 26 years

20. What is your job group?

- ① Administrative

- ② Technical I : Civil engineering, environmental engineering

③ Technical II: Electrical engineering, electronics and telecommunications, mechanical engineering

④ Technical III: Architectural engineering, landscape architecture, computational engineering

IV. Open-ended questions

21. Please state the most important points and reasons to consider when designing an organization in order to enhance organizational effectiveness.

22. If you have any suggestions or supplementary explanations regarding K-water's organizational structure, please write them down.

Thank you very much.