

Articles

# Moving Luther Gulick to Asia: Span of Control and Performance in Korean Quasi-Governmental Organizations

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In the early era of the study of public management, Luther Gulick (1937) argued that span of control determines organizational performance. Theoretically, span of control has a non-linear relationship with performance as its marginal benefit diminishes due to transaction costs. Meier and Bohte (2000) revisited this argument and showed empirical evidence that an optimal span of control enhances organizational performance using hundreds school districts in the United States. However, it is necessary to expand the scope of study to examine whether Gulick's theory can be generalizable to public service organizations in non-western countries. Using Korean quasi-governmental organizations, this study explores how span of control affects performance and whether the effect differs depending on structural levels and performance indicators (archival performance scores by the government and customer satisfaction). Four years pooled data for 101 Korean quasi-governmental organizations were analyzed using multivariate models. The findings show that a wider span of control at top-level management is positively associated with the government's performance scores, but it is negatively associated at mid-level management. On the other hand, span of control has no significant relationship with customer satisfaction. The findings of this study contribute to the generalizability of Gulick's theory in a new context, and highlight that the impact of span of control on performance can differ based on structural levels and who evaluates organizations.

## INTRODUCTION

Span of control – the number of subordinates that one manager oversees – is one of the most important organizational structure characteristics viewed to affect performance. It reflects not only the human relations between managers and subordinates, but also relates to transaction costs within organizations. If an organization has a wide span of control, it gives more managerial discretion to subordinates and changes its methods of communication from face-to-face-based to paper- or electronic-based. On the other hand, if an organization has a narrow span of control, it has to hire more mid-level managers to closely oversee subordinates, which results in higher transaction costs. Therefore, Gulick (1937) argues that it is necessary to examine how span of control affects performance, and under what circumstances span of control enhances performance. Other scholars also contend that span of control needs to be examined related to transaction costs, managerial strategies, and organizational performance (Alchian & Demsetz,

1972; Brehm & Gates, 1997; Fama, 1980; McGregor, 1960; Williamson, 1975).

Yet, there is a lack of empirical studies on how span of control affects performance. Among few studies, Meier and Bohte (2000) explored the relationship between spans of control and performance using hundreds school districts in the United States. This study provided empirical evidence that the impact of span of control differed depending on organizational levels, and there were optimal spans of control for enhancing performance. This present study seeks the scope of the studies and explores how span of control affects performance in various public service organizations in the non-western country. Public agencies, which have various goals, functions, and tasks to respond to the demands of the public, could have more complicated mechanisms associated with the linkage of span of control and performance.

Using Korean quasi-governmental organizations, this study explores the impact of spans of control on organizational performance by using two different performance

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indicators: the archival performance scores evaluated by the central government and customer satisfaction. Korean quasi-governmental organizations report their work process to central government agencies and get feedback based on their evaluation every year. Through such top-down control process, the government can ensure whether quasi-governmental organizations are performing well and responding to democratic values. On the other hand, as policy implementing agencies, quasi-governmental organizations are also evaluated by their policy clients. Citizens evaluate whether quasi-governmental organizations are responding to their demands from a bottom-up perspective. These two performance indicators are important for quasi-governmental organizations regardless of functions and tasks. These indicators also allow us to examine how span of control is associated with external stakeholders' evaluations. By bringing various quasi-governmental organizations with two distinctive performance indicators in the non-western country, this study will examine whether Gulick's theory can be generalizable in a new context.

### SPAN OF CONTROL AND PERFORMANCE: THEORETICAL EXPLANATIONS

Span of control refers to the number of subordinates under the control of one manager (Meier & Bohte, 2003). If a manager oversees many subordinates, the organization has a wide span of control; if a manager controls a small number of subordinates, then the organization has a narrow span of control. Gulick (1937) argued that span of control is a key determinant of organizational performance, so more precise empirical studies on span of control and performance were needed. As antecedents of span of control, he suggested that organizational stability, diversity, size, and space determine spans of control within an organization. Under these conditions, specialized divisions of labor and spans of control are associated with optimal organizational performance, especially related to mechanical efficiency (Gulick, 1937; Hammond, 2007; Meier & Bohte, 2000).

Span of control theory indicates that span of control has a non-linear relationship with organizational performance. Gulick (1937) argued that 'division of labor' derived from spans of control allows subordinates to improve their working skills in producing a particular outcome. Given the division of labor, a wider span of control is associated with better performance because more production workers are involved in that division relative to an executive, if other things are equal. The effect of span of control on performance, however, is subject to diminishing marginal returns, and at some point, the additional subordinates may result in reduced overall performance due to the lack of control. Thus, the relationship between span of control and performance can be an inverted U-shape quadratic form (Meier & Bohte, 2000). Urwick (1956) also contended along with this argument that six subordinates under the control of one superior are the maximum for enhancing performance. If

spans of control are greater than this, the transaction costs of monitoring the behavior of subordinates increase. Gulick (1937), however, thought the optimal span of control would vary by task, technology, and space.

Yet, is this theory uniformly applied to different structure levels in public organizations? This study expands this theoretical argument on span of control and performance by adding new explanations of how the effect of span of control differs across structural levels. Following Mintzberg (1979)'s five types of decentralized organizations,<sup>1</sup> this study contends that limited vertical decentralization – an organizational structure that is divided into divisions with decisions delegated to its managers – is associated with optimal spans of control in top-level management for increasing performance. In general, the chief executives of public organizations are appointed by political representatives or elected by the public, so they are frequently changed and highly influenced by the political environment, which results in a lack of managerial skills for their organizations. However, the mid-level managers, such as department heads, are positioned based on merit systems in which more skilled and experienced managers are given specific tasks and functions. So, if an executive has many mid-level managers who mainly control the work process of production workers, such a wide span of control at mid-level may be beneficial to ensure compliance and goal attainment from production workers by enhancing effective communications.

On the contrary, if an organization has many production workers at the street-level relative to a small number of control managers, it lends a wide level of freedom to production workers, which may lead to bureaucratic shirking (Brehm & Gates, 1997; Calvert et al., 1989). Moreover, public organizations have ambiguous goals and intangible outcomes which need managers to closely oversee the work process of production workers with specific rules and laws (Rainey, 1993; Wilson, 1989). If a manager in a public organization has many production workers (a wide span of control), it could increase inefficient communications and transaction costs, which leads to worse performance. Meier and Bohte (2000) also provided empirical evidence that a wider span of control in top-level management is associated with high performance, whereas a wider span of control in mid-level management is related to low performance. Thus, in public service organizations, a wide span of control can be beneficial in top-level management, but not in mid-level management.

*H1-1: A wide span of control is associated with high performance in the top-level (executive-department heads) management.*

*H1-2: A wide span of control is associated with low performance in the mid-level (department head-street level employees) management.*

<sup>1</sup> He categorized the various decentralization as five types: 1) vertical and horizontal centralization, b) limited horizontal decentralization, 3) limited vertical decentralization, 4) selective vertical and horizontal decentralization, 5) vertical and horizontal decentralization

## SPAN OF CONTROL AND MULTIPLE PERFORMANCE DIMENSIONS IN A NEW CONTEXT: KOREAN QUASI-GOVERNMENTAL ORGANIZATIONS

Research into the effect of span of control on performance produces a rich set of theoretical propositions, but empirical studies on these theoretical perspectives are sparse and focus on a few types of organizations in Western countries. Meier and Bohte (2000) showed empirical evidence that span of control is highly associated with organizational performance and optimal span of control differs depending on structural levels using Texas school districts in the United States. Topp and Desjardins (2011) conducted a case study to examine the effect of span of control on organizational effectiveness and found that span of control is wider when organizations have a less complex environment to optimize the number of direct reporting individuals. Using U.S. school districts, Theobald and Nicholson-Crotty (2005) also tested to test whether the optimal span of control can be applied to multiple performance dimensions and found that the optimal span of control for one goal is not applied to other goals. These empirical studies call for further studies using various public service organizations in non-western contexts to test the generalizability of Gulick's theory.

This study contends that Korean quasi-governmental organizations provide a good empirical context which allows us to see the links between span of control and performance in a new context. As the pursuit of democratic governance has accelerated with the rise of new policy implementation institutions, quasi-governmental organizations have increased across countries. Quasi-governmental organizations are policy implementing organizations that receive public subsidies but maintain independence from the government in their decision-making (Flinders & Smith, 1999). With these characteristics, quasi-governmental organizations have more flexibility in policy implementation relative to governmental agencies; however, they also have an obligation to report what they achieve and how they perform to the central government. Some scholars contended that the devolution of authority from central government to quasi-governmental organizations is good for raising efficiency in delivering public goods (Borins, 1995; Manning, 2001). However, other scholars argued that it adds a degree of distance from elected political leaders, which can result in potential hazards and inefficiency (Barberis, 1998; Behn, 1998). Despite the controversy, quasi-governmental organizations are obviously growing. In the New Public Management paradigm, central governments in many countries tend to reduce their size by delegating authority and accountability to quasi-governmental organizations. South Korea is no exception. In 1999, the Korean government established laws for quasi-governmental organizations and created 16 organizations; the number increased to 286 quasi-governmental organizations in 2010<sup>2</sup>, and now the number reaches 350 in 2021.

Despite the growing number of quasi-governmental organizations, theoretical and empirical studies of quasi-governmental organizations have not kept up. Moreover, studies of the structural characteristics of quasi-governmental organizations are difficult to find. Similar to studies on the performance of public or private organizations, it is important to study the characteristics of quasi-governmental organizations in terms of policy evaluation and organizational performance. Among the characteristics, studies on 'span of control' are crucial for building managerial strategies and effective structure.

Quasi-governmental organizations have multiple performance goals. The one main goal of quasi-governmental organizations is delivering public services according to political representatives' decisions and upper bureaucracies' guidelines, so the archival performance scores evaluated by the central government are the most important performance indicators of quasi-governmental organizations. In addition to that, customer satisfaction is also important to evaluate their performance from the perspective of bottom-up democracy. If customers are not satisfied with their work, quasi-governmental organizations are indirectly punished by political actors, such as Congress. Many studies explore the effect of span of control on performance in terms of effectiveness (Pabst, 1993), employee satisfaction and engagement (Cathcart et al., 2004), job satisfaction (Davison, 2003; Kwan et al., 2015; Lee & Cummings, 2008; Morash et al., 2005), job demands (Wallin et al., 2014), turnover (Moon & Park, 2019) and safety (Hechanova-Alampay & Beehr, 2001). However, there is a lack of empirical studies on how span of control affects both upper-level agency's evaluation scores and customer satisfaction and whether there is any difference. These performance indicators may allow us to see how external actors evaluate quasi-governmental organizations in terms of their structure. By examining the effect of span of control on the multiple performance indicators in Korean quasi-governmental organizations, the findings of this study will contribute to the generalizability of Gulick's theory by expanding performance perspectives from efficiency to democratic responsiveness, and from western decentralized bureaucracies to more centralized non-western organizations.

Korean quasi-governmental organizations have department heads who directly report to chief executives. Thus, span of control can be explicitly divided into two structural levels based on the department heads: top-level management (executive-department heads) and mid-level management (department head-street level employees). The executives of quasi-governmental organizations are mainly appointed by political leaders whereas department heads are positioned based on the merit system. Thus, if an executive has many department heads who have learned specific skills and organizational cultures over many years, it allows the executive to ensure better performance by controlling production workers more effectively which results in high archival performance scores and customer satisfaction. However, if an organization has many production

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<sup>2</sup> Appendix B shows the list of total Korean quasi-governmental organizations in 2010.

workers relative to a small number of department heads, it leads to inefficient communications between department heads and production workers at the street level with high transaction costs, which may decrease the archival performance scores and customer satisfaction.

*H2-1: A wide span of control in the top-level (executive-department heads) management increases both archival performance scores and customer satisfaction.*

*H2-2: A wide span of control in the mid-level (department head-street level employees) management decreases both archival performance scores and customer satisfaction.*

## DATA AND METHOD

### Data

To test the hypotheses, this study uses organization-level data on 101 Korean quasi-governmental organizations from 2006 to 2009. These quasi-governmental organizations represent all Korean quasi-governmental organizations that were evaluated by the Korean Ministry of Strategy and Finance in 2010.<sup>3</sup> This study does not include other public institutions (185 among 286 total Korean quasi-governmental organizations in 2010) because they do not publicly report performance scores evaluated by the central government. The data were collected from the Korean quasi-governmental organization database, All Public Information in One (ALIO)<sup>4</sup> and were merged as pooled data to conduct multivariate analysis.

### Dependent Variables: Performance Scores and Customer Satisfaction

This study uses two performance indicators: the archival performance scores evaluated by the central government agency and customer satisfaction, considering the unique political environment of quasi-governmental organizations. As a policy-implementing institution, quasi-governmental organizations have an essential role in delivering public services. Unlike business firms, policy implementing institutions operate within a set of laws, government authorities, and processes that profoundly influence their management system (Rainey, 1997). Also, customer satisfaction is essential to the successful delivery of the public interest and enhancement of democratic values. The Korean government requires all quasi-governmental organizations which are under the control of the Korean Ministry of Strategy and Finance to submit annual performance reports. Based on those reports, the central government evaluates each organization's performance from E (lowest, 1) to A (highest, 5). The intervals between each grade are rela-

tively equal because the evaluation system is based on the total scores of the performance dimensions. The mean of archival performance scores is 3.62 with a standard deviation of 0.96. In terms of customer satisfaction, the central government conducts annual surveys to the public to evaluate each quasi-governmental organization's performance. Based on these surveys, the customer satisfaction score is measured in the range of 0-100. The customer satisfaction ranges from 63.30 to 98.94, with a mean of 85.10 and a standard deviation of 6.65.<sup>5</sup>

### Independent Variable: Span of Control

A quasi-governmental organization is financed by the government (in whole or part) but is independent from the government. This ambiguous definition makes it difficult to figure out a common measurement to classify the organization's structure. Considering the characteristics of quasi-government organizations, this study measures a mid-level manager as a direct-reporting manager. Though quasi-governmental organizations have different managers in different structural levels, they all have mid-level managers such as department heads who have to directly report to their executives regardless of their organizational size. Thus, the measurement of mid-level managers can be applied to all quasi-governmental organizations commonly. To examine the different effects of span of control on different structural levels, this study divides the span of control into two levels: top-level management (executive-department heads) and mid-level management (department head-street level employees). The top-level management span of control ranges from 1 to 18, with a mean of 5.91 and a standard deviation of 3.36. The mid-level management span of control has a wide range and a high positive skewness, so it is necessary to adjust by dividing its original value by 1000. The adjusted mid-level management ranges from 0.01 to 1.24, with a mean of 0.19 and a standard deviation of 0.25.

### Control Variables

Quasi-governmental organizations vary in terms of the personnel systems in areas such as employee characteristics, manager characteristics, work characteristics, and organizational characteristics. These characteristics can affect both span of control and performance, so this study controls for the organizational characteristics of quasi-governmental organizations based on the existing literature (Bohte & Meier, 2001; Meier & Bohte, 2000, p. 2002; Rainey, 1997; Topp & Desjardins, 2011).

*Publicness.* One of the difficulties in studying public organizations is defining a 'public' organization. Daft (2001)

<sup>3</sup> To set common standards for performance criteria, this study selected 101 organizations including public enterprises and quasi-governmental organizations which are controlled by the Korean Ministry of Strategy and Finance. These organizations are evaluated by the central government annually and report their performance based on the same standards. These standards make it easier to measure their annual performance scores and select quasi-governmental organizations that more closely resemble public organizations.

<sup>4</sup> It is the online database for Korean quasi-governmental organizations created by Korean Ministry of Strategy and Finance. It includes the basic information such as size, structure, age and annual performance scores and so on.

<sup>5</sup> The Appendix A shows the descriptive analysis for all variables in the models

contends that there is no distinction between public and private organizations based on general organization theory. Haas, Hall, and Johnson (1966) also argue that the distinctiveness of public organizations is derived not by their 'publicness' characteristics, but by their functions and structures. Many studies that analyzed various types of organizations to develop taxonomies have failed to find evidence of a strict distinction between public and private organizations. However, some scholars have argued that public organizations have fundamental characteristics compared to private organizations (Bozeman, 1987; Bozeman & Brettschneider, 1994; Meyer, 1979; Rainey et al., 1976). Rainey (1997) argues that public organizations are highly influenced by external authorities on the basis of political and economic theory. Also, public organizations are more likely to have goal ambiguity and unobservable outcomes, so they need more rules and laws to control the work process (Chun & Rainey, 2005a). These competing arguments led scholars to develop typologies of public organizations, but they are still ambiguous to examine. Quasi-governmental organizations are representative of hybrid forms between public and private sectors, which have both business-like characteristics and public-like characteristics. These characteristics of quasi-governmental organizations are intended to help to enhance efficiency in delivering public goods, but simultaneously touch the heart of democratic values by raising problems of accountability (Moe, 2001). This study adopts Bozeman (1987)'s definition of "public" that indicates ownership, funding, and political control as criteria to divide between public and private organizations. Ownership is measured as the percentage of the government's stake in each organization. Financial publicness is measured as the percentage of the annual revenue that comes from government subsidies in each organization. Political control is also measured as the number of articles in each organization's establishing law, which shows how much the central government regulates each organization's work process.

*Stability.* Gulick (1937) proposed that changes in production personnel affect the organization's span of control. Employees who work in a stable organization need less supervision because they are likely to have more opportunities to know their jobs, which allows wider spans of control. To measure stability of quasi-governmental organizations, organizational age is measured as the number of years that each organization has been established and the average tenure of all employees.

*Size.* Meier and Bohte (2003) examined size in two dimensions based on Gulick's propositions -total number of employees and spatial size. They used the total number of employees as a good indicator of size, and found that the more employees an organization has, the more likely it is that the organization will have wider spans of control, due to economies of scale. Spatial size also affects the communication channels of organizations as either face-based or paper-based (or electronic). If organizational employees are spread out across different buildings, they have to adopt a paper-based communication channel. Transaction cost theory argues that the top-level management span of control is positively associated with spatial size due to the increasing number of departments and buildings (Williamson, 1975).

Size is measured as the log of the total number of full-time employees and the spatial size is measured as the log of the total number of regional offices.

*Task Diversity.* If an organization has various functions and tasks, managers have to closely oversee subordinates for goal attainment (Meier & Bohte, 2000). Quasi-governmental organizations have relatively more functions and tasks than those in the private sector, so task diversity affects span of control as well as performance. In this study, task diversity is measured as the number of tasks and functions in each organization's rules.

*Managerial Quality.* Organizational performance is highly associated with managerial quality (Meier & O'Toole, 2002). If an organization is well-managed by allocating appropriate resources to each task and hiring well-trained employees, then managerial quality will enhance organizational performance. Meier and O'Toole (2002) suggest a new measure for managerial quality by using managers' salary differences. This study adopts this idea into the context of Korean quasi-governmental organizations by calculating a manager's incentive difference. Since 2006, the Korean central government has given incentives to high-performing managers and employees who contribute to high performance. In this context, the percentage of incentives relative to their average salary can reflect managerial quality in both top-level and mid-level management.

*The Percentage of Part-time Employees.* Woodward (1980) contends that the optimal span of control varies across the types of technology. Quasi-governmental organizations have various technologies based on their functions and tasks, so it is hard to obtain one standard measurement. This study follows Woodward's typology and measures the percentage of part-time employees among total employees based on the assumption that the high portion of part-time employees indicates simple technologies that are easy to do with less experience.

*Industry Type.* Korean quasi-governmental organizations vary in terms of tasks, markets, customers, and roles, which makes hard to categorize and evaluate them by one or two performance criteria. Chun and Rainey (2005b) argued that organizational structure characteristics, such as span of control, could be changed depending on industry type. For example, if the organization has a quantitative performance measurement or a results-oriented performance evaluation system, the managers tend to cut down on transaction costs by giving more discretion to their subordinates. In this study, industry type is measured based on each organization's establishing laws. The Korean Ministry of Strategy and Finance categorizes quasi-governmental organizations into four types under the Act on the Operation of Public Institutions: Public Enterprises (market-based), Quasi-public Enterprises (quasi-market-based), Fund-management-based Institutions, and Commissioned-service-based Institutions. These four types were included as dummy variables in the model.

## Methods

This study pooled 101 Korean quasi-governmental organizations at the organizational level from 2006 to 2009. Due to the fact that quasi-governmental organizations are

frequently mergers and acquisitions with other organizations, the pooled data were unbalanced. The empirical models were estimated using Ordinary Least Square (OLS) linear model specification with year fixed effects. The test for heteroskedasticity and multicollinearity showed no issues. However, in terms of span of control, three quasi-organizations were serious outliers,<sup>6</sup> so these organizations were treated as missing observations.

## FINDINGS

Table 1 shows the main finding on the effect of span of control on performance. At the top-level management, span of control has a positive linear relationship with governmental performance score ( $\beta=0.055$ ,  $p<0.05$ ). At the mid-level management, span of control also has a linear relationship with government performance score, but it is negatively associated ( $\beta=-1.209$ ,  $p<0.05$ ). This finding indicates that spans of control do not have an inversed U-shape quadratic forms with bureaucratic accountability for either top-level management or mid-level management. This supports Meier and Bohte (2000)'s argument that, in the real-world organization setting, span of control will fall between zero and the optimal span of control point because public managers do not want to expand span of control beyond the optimal point due to high transaction costs. In this context, span of control has a positive skewness and is not normally distributed, so it supports Meier and Bohte (2000)'s argument as well.

Though these findings reject the non-linear relationship theory, they support hypotheses 1-1 and 1-2. At the top-level management, adding more department heads enhances archival performance scores, whereas additional street-level employees lead to poor performance scores. This indicates that the effect of span of control on performance differs depending on structural levels: in the quasi-governmental organization context, the limited vertical decentralization with more department heads is beneficial for enhancing accountability as Hypothesis 1-1 proposed. At the mid-level management, however, adding more street-level employees requires more training and transaction costs, so marginal costs may be greater than marginal benefits. If span of control widens at the mid-level management, it indicates that department size is greater, so department heads have more difficulties overseeing subordinates' work process. Therefore, a wide span of control at mid-level management is negatively associated with bureaucratic accountability as Hypothesis 1-2 proposed.

In terms of other organizational characteristics, organizational size is only significant at the mid-level management model, which indicates that size is more likely to be related to department size. Executive managerial quality is significant and positively associated with performance at both structural levels. It shows that the incentive structure for top-level management is more likely to be associated

with bureaucratic accountability, especially in the limited vertical decentralization systems. But employee managerial quality is negatively associated with performance scores at the top-level management. More part-time employees (simple production) are also negatively related to archival performance scores at both structural levels.

Then, how does span of control affect democratic responsiveness? Table 2 shows the effect of span of control on customer satisfaction. The findings indicate that, for both top-level and mid-level management, span of control has no significant relationship with customer satisfaction (Hypotheses 2-1 and 2-2 are partially supported for only archival performance, not for customer satisfaction). The findings indicate that the effect of span of control on performance can differ depending on performance dimensions. In terms of other organizational characteristics, political control is negatively associated with customer satisfaction, as opposed to the results of the archival performance score model. It indicates that if an organization is heavily controlled by rules and laws, customers are less likely to be satisfied with organizational performance. Interestingly, spatial size is positively associated with customer satisfaction, so it can be inferred that more buildings and departments can reduce the distance between customers and managers, which may promote customer satisfaction. As opposed to the archival performance score model's results, employee managerial quality is positively associated with customer satisfaction, but executive managerial quality does not affect customer satisfaction. This indicates that qualified employees are more likely to respond to customers' demands and enhance customer satisfaction. This also shows that street-level employees are more important for improving customer satisfaction.

## DISCUSSION AND CONCLUSION

Gulick (1937) contended that span of control is a key determinant of organizational performance. This study supports Gulick's theory and provides theoretical implications that the effect of span of control can differ depending on structural levels and performance dimensions. The findings indicate that span of control is positively associated with performance at the top-level management, but it is negatively related at the mid-level management. The findings also reveal that span of control is significantly associated with archival performance scores, but has no relationship with customer satisfaction.

Using Korean quasi-governmental organizations, this study also highlights the unique context of policy implementation institutions which need to be carefully considered for evaluating the impact of span of control. The findings indicate that the effect of span of control on performance in quasi-governmental organizations is highly influenced by other organizational characteristics, such as size, space, managerial quality and publicness, so it is nec-

<sup>6</sup> The three organizations are Korea Electronic Power Corporation, Korea Expressway Corporation, and Korea Railroad Corporation. It was not possible to find the common organizational characteristics among only these organizations.

**Table 1. The Effect of Span of Control on Governmental Performance Scores**

DV: Archival Gov't Performance Scores	Top-level Model		Mid-level Model	
	linear	Non-linear	linear	Non-linear
	b/se	b/se	b/se	b/se
<i>Span of control</i>				
Top-level (executive-dept. heads)	0.055*	0.107		
	(0.02)	(0.06)		
Squared		-0.003		
		(0.00)		
Mid-level (dept. head-street employees)			-1.209*	-1.855
			(0.32)	(1.09)
Squared				0.521
				(0.84)
<i>Controls</i>				
Ownership	0.001	0.002	0.003	0.003
	(0.00)	(0.00)	(0.00)	(0.00)
Financial Publicness	-0.003	-0.003	-0.002	-0.002
	(0.00)	(0.00)	(0.00)	(0.00)
Political Control	-0.002	-0.001	-0.001	-0.001
	(0.00)	(0.00)	(0.00)	(0.00)
Age	-0.006	-0.006	-0.004	-0.004
	(0.00)	(0.00)	(0.00)	(0.00)
Tenure	-0.001	-0.000	-0.005	-0.006
	(0.02)	(0.02)	(0.02)	(0.02)
Size (logged)	0.075	0.063	0.691***	0.782***
	(0.16)	(0.16)	(0.20)	(0.25)
Space (logged)	0.199	0.208	0.167	0.165
	(0.12)	(0.12)	(0.12)	(0.12)
Task Diversity	0.014	0.015	0.020*	0.020*
	(0.01)	(0.01)	(0.01)	(0.01)
Executive Managerial Quality	0.006***	0.006***	0.005***	0.005***
	(0.00)	(0.00)	(0.00)	(0.00)
Employee Managerial Quality	-0.010*	-0.010*	-0.008	-0.008
	(0.00)	(0.00)	(0.00)	(0.00)
Part-time Employees (%)	-0.038*	-0.037*	-0.042**	-0.041**
	(0.02)	(0.02)	(0.02)	(0.02)
<i>Industry Type</i>				
: Public Enterprise	-0.735**	-0.710**	-0.616**	-0.643**
	(0.24)	(0.24)	(0.24)	(0.24)
: Quasi-public Enterprise	0.168	0.221	0.260	0.242
	(0.18)	(0.19)	(0.18)	(0.19)
: Fund-management-based Institution	0.282	0.293	0.336*	0.304
	(0.16)	(0.16)	(0.16)	(0.17)
year= 2007	0.066	0.064	0.032	0.033
	(0.15)	(0.15)	(0.15)	(0.15)
year= 2008	0.025	0.029	0.024	0.025
	(0.15)	(0.15)	(0.15)	(0.15)
year= 2009	0.296	0.299	0.269	0.274
	(0.16)	(0.16)	(0.15)	(0.15)
Constant	2.841***	2.599***	1.504**	1.351*

	(0.45)	(0.52)	(0.56)	(0.61)
R-squared	0.276	0.275	0.290	0.288
N	258	258	258	258

Note: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001  
 Among industry types, commissioned-service-based institution was used as a baseline

essary to consider these characteristics in the linkage of span of control and performance. Moreover, policy implementation institutions are required to achieve bureaucratic accountability and democratic responsibility, as well as efficiency (Epstein & O’Halloran, 1994). As policy implementation institutions, quasi-governmental organizations are also rewarded or punished on the basis of archival performance scores and customer satisfaction, not based on the market system. This unique context provides empirical evidence that the optimal span of control for one performance dimension may not work for other performance dimensions.

This study provides practical implications on how to design organizational structures so as to enhance organizational performance. Executives should differentiate the main functions of employees by whether they are control managers or production workers, and consider their marginal benefits and costs differently. Control managers, such as department heads, may have high marginal costs for hiring, but they can give necessary guidelines to street-level employees by clarifying the division of labor within organizations. On the other hand, production workers may have fewer marginal costs for hiring, but they require closer control by middle managers for ensuring outcomes. Thus, executives should analyze the marginal costs and benefits across structural levels, and find the optimal span of control at each level for enhancing performance.

Although New Public Management brings innovative organizational structure and governance, Gulick’s classic theory still provides an important lens to view the future of public administration (Meier, 2010). Using Korean quasi-governmental organizations, this study contributes to the generalizability of Gulick’s theory by shifting the context from western decentralized organizations to non-western centralized organizations. Compared to school districts in the United States, Korean quasi-governmental organizations have relatively centralized structures, Confucian organizational culture, and diverse functions that cannot be easily evaluated. Also, each quasi-governmental organization varies in terms of goal ambiguity, financial publicness, technologies, and stability. Despite the unique characteristics of Korean quasi-governmental organizations, this study shows that Gulick’s theory can be applied and provide a meaningful lens to design span of control for better performance.

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**Table 2. The Effect of Span of Control on Customer Satisfaction**

DV: Customer Satisfaction	Top-level Model		Mid-level Model	
	linear	Non-linear	linear	Non-linear
	b/se	b/se	b/se	b/se
<i>Span of control</i>				
Top-level (executive-dept. heads)	0.088 (0.11)	-0.452 (0.36)		
Squared		0.032 (0.02)		
Mid-level (dept. head-street employees)			-2.985 (1.96)	2.500 (6.74)
Squared				-4.401 (5.17)
<i>Controls</i>				
Ownership	-0.030* (0.01)	-0.037* (0.02)	-0.025 (0.02)	-0.024 (0.02)
Financial Publicness	-0.006 (0.01)	-0.008 (0.01)	-0.003 (0.01)	-0.003 (0.01)
Political Control	-0.015* (0.01)	-0.015* (0.01)	-0.013* (0.01)	-0.013* (0.01)
Age	-0.027 (0.03)	-0.027 (0.03)	-0.024 (0.03)	-0.022 (0.03)
Tenure	0.011 (0.11)	-0.022 (0.11)	-0.019 (0.11)	-0.015 (0.11)
Size (logged)	0.641 (1.01)	0.751 (1.01)	2.056 (1.24)	1.265 (1.55)
Space (logged)	1.554* (0.71)	1.472** (0.71)	1.456* (0.71)	1.487* (0.72)
Task Diversity	-0.054 (0.06)	-0.064 (0.06)	-0.039 (0.06)	-0.038 (0.06)
Executive managerial quality	0.015 (0.01)	0.016 (0.01)	0.012 (0.01)	0.011 (0.01)
Employee managerial quality	0.061* (0.03)	0.062* (0.03)	0.065* (0.03)	0.066* (0.03)
Part-time Employees (%)	0.125 (0.10)	0.116 (0.10)	0.120 (0.09)	0.115 (0.09)
<i>Industry Type</i>				
: Public Enterprise	2.780 (1.47)	2.534 (1.48)	2.980* (1.45)	3.229* (1.48)
: Quasi-public Enterprise	1.271 (1.13)	0.728 (1.17)	1.533 (1.14)	1.706 (1.16)
: Fund-management-based Institution	-4.592*** (0.98)	-4.718*** (0.98)	-4.479*** (0.98)	-4.199*** (1.03)
year= 2007	5.155*** (0.91)	5.182*** (0.91)	5.066*** (0.91)	5.079*** (0.91)
year= 2008	6.669*** (0.93)	6.635*** (0.92)	6.667*** (0.92)	6.672*** (0.91)
year= 2009	9.775*** (0.95)	9.762*** (0.95)	9.715*** (0.95)	9.685*** (0.95)
Constant	79.810***	82.311***	76.525***	77.823***

	(2.69)	(3.12)	(3.41)	(3.74)
R-squared	0.451	0.455	0.455	0.455
N	252	252	252	252

Note: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001

Among industry types, commissioned-service-based institution was used as a baseline



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**Appendix A. Descriptive Analysis of Key Variables**

Variable	N	Mean	Std. Dev.	Min	Max
<i>Dependent Variable: Performance</i>					
Archival Government's Performance Score	258	3.628	0.963	1	5
Customer Satisfaction	252	85.100	6.653	63.300	98.944
<i>Independent Variable: Span of Control</i>					
Top-level Span of Control	258	5.911	3.364	1.00	18.00
Mid-level Span of Control	258	0.192	0.256	0.010	1.241
<i>Control Variable</i>					
Ownership	258	86.536	30.527	0	100
Financial Publicness	258	16.158	28.154	0	100
Political Control	258	62.391	65.003	17.00	449.00
Age	258	28.891	15.655	2.00	62.00
Tenure	258	12.523	3.671	2.34	21.60
Size (logged)	258	2.728	0.535	0.74	4.05
Space (logged)	258	0.847	0.700	0.00	2.26
Task Diversity	258	7.112	6.124	1.00	38.00
Part-time Employees (%)	258	2.340	3.829	0.00	23.37
Executive Managerial Quality	258	38.459	44.113	0	200
Employee Managerial Quality	258	8.569	13.340	0	100
Industry Type:					
: Public Enterprise	258	0.066	0.249	0	1
: Quasi-public Enterprise	258	0.198	0.399	0	1
: Fund-management-based Institution	258	0.171	0.377	0	1
: Commissioned-service-based Institution	258	0.566	0.497	0	1
Year	258	2007.5	1.110	2006	2009

**Appendix B. List of Korean Quasi-governmental Organizations**

Type	Number	Examples of organizations
Public Enterprise	6	Busan Port Authority, Incheon International Airport Corporation, Incheon Port Authority, Korea Gas Corporation, Korea Airports Corporation, Korea Electronic Power Corporation
Quasi-public Enterprise	18	Korea Resources Corporation, Korea Coal Corporation, Korea National Housing Corporation, Korea Housing Guarantee Co., Ltd, Jeju Free International City Development Center, Korea Appraisal Board, Korea Tourism Organization, Korea Expressway Corporation, Korea Racing Authority, Korea Broadcast Advertising Corporation, K-Medi, Korea National Oil Corporation, Korea Water Resources Corporation, Korea Minting, Security Printing & ID Card Operating Corporation(KOMSCO), Korea District Heating Corporation, Korea Railroad Corporation, Korea Container Terminal Authority, Korea Land Corporation
Fund-management-based Institution	14	Government Employees Pension Service, National Pension Service, Korea Sports Promotion Foundation, Korea Worker's Compensation & Welfare Service, Korea Technology Credit Guarantee Fund, Pension for Private School Teachers and Staff Management Corporation, Korea Credit Guarantee Fund, Korean Film Council, Korea Deposit Insurance Corporation, Institute for Information Technology Advancement, Arts Council Korea, Korea Export Insurance Corporation, Korea Asset Management Corporation, Korea Housing Finance Corporation
Commissioned-service-based Institution	63	Health Insurance Review & Assessment Service, Korea Transportation Safety Authority, Korea National Park Service, National Health Insurance Corporation, Korea International Broadcasting Foundation (Arirang TV), Mine Reclamation Corporation, Korea Agro-Fisheries Trade Corporation, Korea Trade-Investment Promotion Agency, Korea Cadastral Survey Corporation, Road Traffic Safety Association, The Independence Hall of Korea, Korea Ship Safety Technology Authority Korea Energy Management Corporation, Korea Institute of Ceramic Engineering and Technology, Korea Postal Logistics, Postal Savings & Insurance Associate Corporation, Korea Securities Depository, Korea Institute for Animal Products Quality Evaluation, Korea Gas Safety Corporation, Korea Institute of Construction & Transportation Technology Evaluation and Planning, Korea Employment Information Service, Korea Foundation for the Advancement of Science and Creativity (KOFAC), Korea Science and Engineering Foundation, etc.
Total	101	