Comparing Government Performance Indicators: A Fuzzy-set Analysis*

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Abstract: National governments rely on global performance indicators to measure where they stand and to build future strategies. However, no previous study has compiled various indices to investigate pathways to government performance. We use fuzzy-set analysis to investigate what role each of five determinants of government performance—trait competitiveness, change-oriented citizenship behavior, public service motivation, organizational identification, and corruption tolerance—play in three representative government performance indicators—"Government Effectiveness", "Government Efficiency", and "Throughput". The results indicate that government performance as measured by these three indicators is commonly tied to strongly public-service-motivated employees. These three indicators are distinguished from one another with regard to the number of factors that contribute to the construction of sufficient configurations, the role of innovation-inclined factors, and the role of corruption tolerance.

Keywords: government performance, performance indicators, fuzzy-set analysis

INTRODUCTION

With the rapid advance of globalization, countries are competing with each other more fiercely. In pursuit of greater competitiveness, governments have sought to improve their performance. Governments have not only introduced domestic

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performance management systems inspired by the new public management approach but have also begun to rely on international performance comparison. In response to a growing interest on the part of governments and researchers in international comparisons of government performance, many global institutions have elaborated various indices to measure government performance. National governments monitor to fluctuations in their ranking in "Government Effectiveness" (Worldwide Governance Indicators), "Government Efficiency" (Global Competitiveness Index; World Competitiveness Rankings), "Throughput" (Government Competitiveness Index), and "Quality of Government" (Quality of Governance Institute Dataset).

Yet these government performance indicators are based on multiple factors that can result in different rankings for the same national government. This is mainly due to differences in how "performance" is defined that in turn is tied to different understandings of the role of government. The index of government efficiency is based on Michael Porter's diamond model that defines government's role as "acting as a catalyst and challenger; it is to encourage—or even push—companies to raise their aspirations and move to higher levels of competitive performance" (Porter, 1990). Throughput as a driver of government competitiveness, by contrast, is described as "the power of government, in light of various constraints, to take resources from inside and outside of the country, for the purpose of improving social, economic and cultural conditions of the nation aimed at sustainably enhancing respective citizen's quality of life" (Ho & Im, 2012). From the standpoint of throughput, active engagement in social development is an element of government performance while that is not the case for the government efficiency index.

The construction of government performance indices is an increasingly hotly debated topic in academia (Ko & Park, 2012; Cho et al., 2013; Im et al., 2015), but there has not yet been an empirical study on the varying emphasis of each indicator. There is a gap in the existing literature regarding how governments can perform better and how performance indices can be distinguished from each other. Thus, in this paper, we investigate the role of organizational determinants of government performance scores with organizational behavioral factors, which are trait competitiveness, change-oriented citizenship behavior, public service motivation, organizational identification, and corruption tolerance. These explanatory variables are popularly applied measures in the analysis of pathways to organizational performance. Variables are collected from 2017 Government Competitiveness Global Survey, and employees' survey scores are averaged to obtain a score for the country unit. We chose three-year average scores of government effectiveness, government efficiency, and throughput as our dependent variables to compare with one

another and fuzzy-set qualitative analysis as a way to determine the necessary and sufficient conditions for a given outcome.

We limit our scope of analysis to developing nations, distinguished by OECD membership, to set appropriate conditions for comparison among samples. We also do not engage with the theoretical arguments on constructs of indices because our interest lies in which combination of organizational behavioral factors contribute to each performance score. We try to determine each indicator's own take on the role of government by empirically investigating the conditions that are sufficient for a country achieving a high performance mark for a given indicator rather than by approaching the matter theoretically.

The remainder of this article is divided into several parts. First, we summarize studies on the five determinants of government performance we consider in this article. In this part, we discuss the public administrative context of each of these constructs and then examine both their positive and negative impact on government performance. In the following part, we introduce the data that we derive our variables from and outline why fuzzy-set qualitative analysis is an appropriate method for our study. Finally, we describe the results from the empirical analysis and then wrap up by exploring the implications of the different sufficient conditions of the indicators that lead to high marks for a given government's performance.

LITERATURE REVIEW

Government Performance

Recent attempts to implement administrative reforms and to make managerial innovations successful have been mostly related to improving government performance (Coggburn & Schneider, 2003). Governments across the world have put performance management systems in place and a considerable amount of research has been conducted regarding the factors contributing to strong performance (O'Toole & Donaldson, 2000; Ingraham & Donahue, 2000). Despite the vast amount of literature focusing on public management and its impact on government performance, the concept of performance remains nebulous.

The new public management has focused on developing a performance measurement system like the U.S. Program Assessment Rating Tool. However, as Trivedi (2017) has pointed out, even though the performance of a country's government is a key determinant of its competitiveness, it is still an open question how to measure performance. Measurement of performance within a country is important,

but comparable indicators are also needed to assess the competitiveness of a nation. Thus, international indices that intend to measure government performance ought to be considered.

There are several international institutions that measure governments' performance at the country level every year. The World Bank, the World Economic Forum, the Government Competitiveness Center, the Quality of Government Institute, the International Institute for Management Development, and the World Justice Project are the most well-known examples. The World Bank's Worldwide Governance Indicators describe government effectiveness as perceptions of the quality of a government's public services, the quality of its civil service and the degree of its independence from political pressure, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies (Worldwide Governance Indicators, 2018). The level of government spending, the extent of regulatory burdens, and the degree of transparency in policy making are used to measure government efficiency (World Economic Forum, 2018). Throughput, an element of David Easton's system theory, is the combination of human capacity and the management capacity of a government that reflects its current competitiveness and its potential for growth (Government Competitiveness Center, 2018). Quality of government is a subcategory that uses almost 70 indicators to address the question of how to create and maintain high quality government institutions (Quality of Government, 2018). The International Institute for Management Development publishes the "World Competitiveness Rankings" that gauges a country's capacity to create desirable environment for doing business, using government efficiency as subindicator to measure government performance. The World Justice Project measures constraints on government powers and the degree of openness of a government that reflect to what extent a government is ruling by law (World Justice Project, 2018). The indices differ from one another in their core assumption as to what features make up government performance. In the light of existing multiple performance indicators, we try to compare the aspects that have been emphasized by each index.

We limit the scope of our analysis to developing countries that are distinguished from developed nations by OECD membership for several reasons. First, it is essential to measure differences between government performance indices of similar samples, especially given that the more developed nations are now moving on to distribution policies while most developing countries are still focusing on increasing total wealth, which means that an indicator could be relevant to the government performance of developed nations but not to that of developing nations. Second, analyzing which organizational factors positively affect performance is of

special interest to developing countries because typically only the central government of developing countries possesses the administrative power to implement development policies (Im, 2017). Moreover, the government performance in a developing country has a more direct impact on society than it does in a developed nation (Im, 2017).

Five Critical Determinants of Government Performance

A number of scholars have shed light on what allows how groups to secure better organizational performance (Likert, 1967). Sangmook Kim, quoting Mark Popovich, argues that high-performing governments, like other organizations, consist in "groups of employees who produce desired goods or services at higher quality with the same or fewer resources" (2004, p.245). Yet the impact of individual-level variables on government performance has not been acknowledged with the exception of a few studies (Kim, 2004; Ritz, 2009; Petrovsky & Ritz, 2014). The focus of the literature on institutional variables and their relationship to government performance makes sense in light of the fact that one of academia's duties is to provide operable policy recommendations. Notwithstanding that, however, this one-sided and output-oriented approach that does not take public employees' attitudes into account has been criticized (Ritz, 2009). It should be noted that governments, like other organizations, need workers who are competitive, committed, motivated, and not corrupt to enhance performance or to successfully implement human resource management tools that can improve performance. Hence, we employ five critical determinants observed at the individual level but known to contribute to organizational performance: trait competitiveness, change-oriented organizational citizenship behavior, public service motivation, organizational identification, and corruption tolerance.

Trait Competitiveness

Some people love competition and dive into it, while others try to avoid competition altogether. Whether competition motivates people or not largely correlates with the trait of competitiveness, which is stable over time and which a person tends to show in all areas of life (Connelly, Tihanyi, Crook et al., 2014; Mudrack, Bloodgood, & Turnley, 2012). Klein and Newby (2014) break trait competitiveness down into four kinds: general competitiveness, dominance, competitive effectivity, and personal enhancement.

The literature on trait competitiveness in particular is not that large yet, as the

term is relatively new. Earlier studies that the current literature on trait competitiveness draws on are grounded in similar concepts that were introduced by Norman Triplett in 1987, including a competitive instinct, a certain kind of mental attitude during performance, and an intense desire to win. Researchers have sought to determine multiple dimensions of competitiveness (Houston, Harris, McIntire et al., 2002; Klein & Newby, 2014). In contrast to early studies of trait competitiveness that emphasize an idea of competition that is based on a person comparing herself to others, recent work has proposed a new dimension of competitiveness in which person compares herself to herself (In, 2017; Choi, Jung, & Im, 2018). Personal development competitiveness focuses on a person's self-satisfaction, a feeling of fulfillment that a person experiences when he achieves the goals he set for himself.

The relationship between trait competitiveness and organizational performance has not yet been determined. However, as trait competitiveness is defined as "desire to win" or "desire to perform well" (Franken & Brown, 1995, p.178) and "competing to win" or "competing to excel" (Hibbard & Buhrmester, 2010, p.413), it seems natural to connect these attributes to performance. A number of hypotheses have been proposed regarding the impact of trait competitiveness on variables related to organizational performance. For instance, it has been argued that it can affect job motivation in either a positive way (Epstein & Harackiewicz, 1992; Choi, Jung, & Im, 2018) or negative way (Deci, Schwartz, Sheinman et al., 1981; Vallerand, Gauvin, & Halliwell, 1986; Amabile, 1982). Personal development competitiveness has also been reported to decrease corruption tolerance, while interpersonal competitiveness showed the opposite effect, although this effect was moderated in a performance-oriented climate (Mudrack, Bloodgood, & Turnley, 2012; Choi, Jung, & Im, 2018).

Change-oriented Organizational Citizenship Behavior

Change-oriented organizational citizenship behavior can be defined as "constructive, extra-role efforts by individual retail boundary-spanning employees to identify and implement organizationally functional changes with respect to work methods, policies, and procedures within the context of their jobs, stores, or organizations" (Bettencourt, 2004, p. 165). Individual initiative is a distinctive aspect of the organizational change behavior model because the other aspects that make it up—helping, sportsmanship, organizational loyalty, compliance, civic virtue, self-development—emphasis more collaborative behavior (Podsakoff et al, 2000; Choi, 2007). Employees engaging in change-oriented citizenship behavior improve

organizational functioning by addressing inefficient working mechanisms (Campbell & Im, 2016; Bettencourt, 2004; Morrison & Phelps, 1999), although such interventions might undermine current work processes and even establish interpersonal networks. A distinguishing feature of change-oriented citizenship behavior is its voluntariness, which it shares with other citizen behaviors; formal job descriptions and official performance indicators hardly ever cover the behavior of employees driven by it.

Despite the fact that the concept of change-oriented citizenship behavior has garnered considerable attention in business management, it has not been much discussed in public administration (Campbell, 2015; Campbell & Im, 2016). This can partly be explained by the fact that there are varying perspectives regarding the role of administration. In the traditional view that posits a dichotomy between politics and administration, the role of public administrative employees is limited to implementing the politician's will. But a different view of public sector employees emphasizes the value of change-oriented behavior in tackling major criticisms bureaucracy faces, including its buck-passing culture, red tape, and unbendable procedures. Change-oriented citizenship behavior may help public employees to exceed citizens' expectations (Vigoda-Gabot & Beeri, 2012).

With regard to government performance, change-oriented citizenship behavior can play a major role in both positive and negative ways. First, it can serve as a catalyst for creatively transforming the bureaucratic structures of public organizations (Bernier & Hafsi, 2007). To elaborate, it encourages extra-role behavior by employees, who do not expect recognition or rewards, that leads to better performance for the whole organization. However, it is also possible that by seeking to change the organizational status quo, change-oriented citizenship behavior may create controversy over which procedures are more correct and has the potential to cause some unnecessary confusion that might interfere with performance.

Public Service Motivation

Public service motivation can be understood as "an individual's predisposition to respond to motives grounded primarily or uniquely in public institutions and organizations" (Perry & Wise, 1990, p. 368). The theory of public service motivation is based on three core assumptions; individuals with who are motivated this way seek membership in public organizations; in public organizations, such motivation is positively related to performance; and members of organizations motivated in this way are less interested in monetary rewards than those who are not so motivated (Perry & Wise, 1990, pp. 370-371; Perry, 2011). This theory has import-

ant practical implications regarding the limited utilitarian incentives of the private sector. In contrast to rational choice theories that assume that individuals are self-interested seekers, this theory proposes morally and socially motivated individuals who are willing to engage in producing public goods without much remuneration (Neumann & Ritz, 2015).

People who are motivated by public service work tend to perform better in public sector jobs that are characterized by higher task significance and higher social influence than are private sector jobs (Bellé, 2013). In other words, public service motivation can be a catalyst for transforming altruistic motives into prosocial behavior. However, empirical studies on the impact of such motivation on job performance have shown conflicting results. Naff and Crum (1999), using nearly 10,000 samples from U.S. federal employees' data, find a significant relationship between public service motivation and self-reported individual-level performance. Drawing on the very same data, Alonso and Lewis (2001) used two merit measures to test the impact of public service motivation. Their results varied according to the year of the data the researchers used, which led them to conclude that the relationship between public service motivation and performance is clearly not robust when one employs different measures of public service motivation or uses proxy measures of performance. In his study, Bright (2007) considers whether person-organization fit mediates the relationship between public service motivation and performance, finding that public service motivation had no direct impact on performance but only contributed to person-organization fit. Kim (2004) finds that public service motivation has a positive impact on organizational performance but that other individual factors such as job satisfaction, affective commitment, and organizational citizenship behavior showed stronger effects. In line with Kim's study, Vandenabeele (2009) also finds that Belgian civil servants with high public service motivation have better performance results. This relationship is also supported by the case of a Chinese public organization that used supervisor-rated performance data and employee-rated public service motivation to enhance performance (Miao, Schwarz, & Xu, 2018). Schott, Kleef, and Steen (2015) argue that these inconclusive findings may partially result from the fact that differences driven by varying individual understandings of the meaning of the phrase "serving the public" have not been taken into account.

Organizational Identification

Organizational identification is a construct from social identity theory (Ashforth & Mael, 1989) and can be defined as the "perception of oneness with or belonging-

ness to an organization" (Mael & Ashforth, 1992). Organizational identification makes individuals categorize themselves as members of their employing organizations and promotes positive responses to directions from higher-ups. Thus, members with high organizational identification willingly invest more time in their organization. This produces organizations with strong human capital that have knowledge and skills, that exert effort, and that establish a cooperative mode of operation, which not only leads to better individual performances but also contributes to organizational success (Carmeli, Gilat, & Waldman, 2007).

There is a vast amount of literature on organizational identification. The first detailed model was proposed by James March and Herbert Simon in 1958, and in recent decades, the concept has received a lot of attention (Ashforth & Mael, 1989). While most studies focus on its role in bringing beneficial outcomes to organizations (Likert, 1967; Mael & Ashforth, 1992), a considerable number maintain that it has the opposite effect. For instance, Dutton and Dukerich (1991) find evidence indicating that strong organizational identification leads to stress and depression among employees. Umphress, Bingham, and Mitchell (2010) reported that employees with high organizational identification may facilitate unethical behaviors within the organization. Brown (1969) shows that the relationship between organizational identification and group cohesiveness is negative, even his results are not statistically significant.

Although the literature generally suggests that the impact of organizational identification on organizational performance is positive, recent studies point out a possible link between it and lower performance. Specifically, organizational identification may be helpful when it comes to routine and noncreative tasks but can become a hindrance to assignments that call for innovative thinking (Madjar, Greenberg, & Chen, 2011). Hekman, Steensma, Bigley, and Hereford (2016) argue that members with strong organizational identification tend to closely follow organizational protocol, which might harm performance when a task calls for more creativity. Veltrop, Molleman, Hooghiemstra, and van Ees (2016) discuss how organizational identification moderates the relationship between tenure and task involvement in a negative way.

Corruption Tolerance

A corrupt act in a public organization refers to an undesirable use of power by public employees who receive a benefit from the exercise of such power in both direct and indirect ways (Im, 2018a). In this article, corruption tolerance is defined as public employees' perception of the acceptable extent of government corruption.

As government corruption is known to interfere with the equitable distribution of resources, prevalent corruption may ultimately hinder national competitiveness (Sandholz & Koetzle, 2000).

Even though corruption generally impedes performance, since one's self-interest is often at odds with organizational goals, a number of researchers suggest that corruption may contribute to "greasing the wheel" (Huntington, 1968) in the governments of developing countries, facilitating bureaucratic efficiency by allowing administrators to evade red tape. For example, when regulations are not optimal or are inefficient, corruption may function as a deregulating mechanism. Also, a corruption culture may enhance efficiency in developing countries because bureaucrats in such a culture are likely to be subject to bribes, so-called voluntary taxes (Blackburn & Forgues-Puccio, 2007). Yet most scholars consider corruption to be one of the most important obstacles to development, arguing that the alleged benefit of corruption is the exception rather than the rule.

METHOD AND ANALYSIS

Data

We collected our data on public employee's attributes and behaviors from the 2017 Government Competitiveness Global Survey, which was conducted by the Government Competitiveness Center, located in Graduate School of Public Administration at Seoul University. The survey posed questions intended to explore public employees' perceptions regarding various organization behavioral factors including trait competition, change-oriented citizenship behavior, public service motivation, organizational identification, and corruption tolerance (see the appendix for specifics). We adopted a snowball sampling approach for the survey, which was distributed via e-mail. Participants were asked to recommend other appropriate public employees to join the survey. We expected this method to be helpful in encouraging public employees from developing countries, who would be less likely to participate if they thought their answers would be considered official. In addition, we contacted 50 embassies and 4 consulates in South Korea, from which we obtaining 3 samples. The survey was translated into 13 languages, including the United Nation's official languages, so as to make it convenient for participants and thereby enhancing the credibility of the results. The final sample size of public servants was 482, covering 51 developing countries out of 62 countries that had been contacted. The characteristics of the participants are described in table 1 and the num-

ber of participants from each country is listed in table 5 along with fuzzy membership scores for three outcome variables.

Despite some countries having only a few participants, we decided to analyze these cases anyway given that only very few global data sources provide perceptions of public employees from developing countries. Further, the worldwide surveys that have been conducted like those by the Quality of Government Institute collect their samples from a limited number of reliable experts. We use average scores to transform the unit from an individual-level variable to a country-level variable, as that is the method widely adopted by many international surveys, including the World Values Survey and the World Happiness Report. All determinants went through factor analysis that was loaded for one single factor each.

Table 1. Characteristics of Respondents

Gender		**Job Position Level**	
Female	175 (36.3%)	Upper	42 (8.7%)
Male	307 (63.7%)	Middle-high	133 (27.6%)
Region		Middle	258 (53.5%)
Africa	59 (12.2%)	Entry	49 (10.2%)
Asia	146 (30.3%)	**Age**	
Europe	91 (18.9%)	18-29	95 (19.7%)
Middle East Asia & North Africa	67 (13.9%)	30-39	196 (40.7%)
South America	119 (24.7%)	40-49	111 (23.0%)
		50 or older	80 (16.6%)
Total Observations	482 (100%)		

We used performance data from three indices: the World Bank Group's Worldwide Governance Indicators, the World Economic Forum's Global Competitiveness Index, and the Government Competitiveness Center's Government Competitiveness Index. Although other institutions like Quality of Government Institute and the World Justice Project provide robust indices, that assess concepts similar to that of government performance, we excluded these indices on the grounds that neither quality of government nor the rule of law measure effectiveness, efficiency, or competitiveness. Also we do not consider the International Institute for Management Development's Government Efficiency Index even though it pertains to what we study here because its definition of competitiveness is similar to that of World

Economic Forum, but the World Economic Forum's index covers over 140 countries while the International Institute for Management Development only covers 60 countries (International Institute for Management Development, 2014). We use sub-indicators derived from the indices of the aforementioned three institutions, which are government effectiveness, government efficiency, and throughput, respectively. The three indices overlap one another in certain respects, but each indicator can be discretely identified. Officially published major items for each indicator are shown in table 2 and the descriptive statistics of all variables can be found in table 3.[1]

Table 2. Major items of Government Performance Indicators

Indicator	Items
Government Effectiveness (WGI)	Adaptability of government policy to changes in the economy is high
	The Public Service is not independent from political interference
	Government decisions are effectively implemented
	Bureaucracy does not hinder business activity
	The distribution infrastructure of goods and services is generally efficient
	Policy direction is not consistent
Government Efficiency (GCI)	Wastefulness of government spending
	Burden of government regulation
	Efficiency of legal framework in settling disputes
	Efficiency of legal framework in challenging regulations
	Transparency of government policymaking
Throughput (GC)	Human capacity public officer's capacity, leadership, leader's commitment to achieving policy goals
	Financial capacity financial independence, efficiency of resource allocation, management of tax evasion
	Institutional capacity making rules and acts, level of decentralization, e-government, policy establishment and execution

1. Descriptions of major items are limited because not every single measure is publicly accessible.

Table 3. Descriptive Statistics

	Trait Competitiveness	CO-OCB*	PSM**	OI***	Corruption Tolerance	Government Effectiveness (WGI)	Government Efficiency (GCI)	Throughput (GC)
Mean	4.17	4.33	4.22	4.18	2.66	0.37	3.43	0.5
S.D.	0.53	0.71	0.66	0.57	0.68	0.13	0.7	0.08
Range	2.80-5.01	2.90-5.50	2.88-5.80	3.11-5.21	1.68-4.00	0.08-0.63	1.49-5.56	0.34-0.69

* Citizen-oriented Organizational Behavior, **Public Service Motivation, ***Organizational Identification

Methods

To test how our five determinants affect government performance, we utilized fuzzy-set qualitative comparative analysis, an increasingly popular set-theoretic strategy that researchers in various fields have started to use (Ragin, 1987; 2000). This method is distinguished from general quantitative analysis by the fact that it employs traditional Boolean logic to determine the complex causality of set of variables rather than estimating the net effects of single variables (Longest & Vaisey, 2008). At the same time, it answers the common criticism that qualitative analysis is subjective because it uses numeric scores in its analysis. This method is particularly suitable for analyzing the complex causality of a set of variables in analyses with a small number of cases.

In our study, the use of fuzzy-set qualitative analysis is appropriate for three reasons. First, the number of observations in our dataset is limited. The method requires the researcher to drop observations with missing data to avoid misinterpretation (Ragin, 2009), so our first step was to do that, which meant we were left with even a smaller number of cases. Although fuzzy-set analysis is relatively generous when it comes to sample size compared to other methods, we found that our three datasets were extremely unbalanced with regard to single-year data. Thus, we decided to deal with the problem of missing data by using average scores of data of each indicator for the period 2016-18 rather than by imputing a group mean, based on the assumption that government performance in the short term will retain certain characteristic features (Jung, 2003). We conducted a fuzzy-set qualitative analysis of 18 cases for government effectiveness, 49 cases for government efficiency and 50 cases for throughput (see table 5). Second, we tried to determine which combinations of certain individual's attributes and organizational behavior contributed to better government performance. In our analysis of the three indices, we aimed to identify not only which factors contribute to government performance but also

which factors receive more emphasis in each indicator. Third, although hard measures are most often used with fuzzy-set analyses, social science researchers have sometimes used soft measures with them, including government roles and performance (Kim & Park, 2013), quality of democracy (Altman & Pérez-Liñán, 2002), accessibility to unemployment benefits (Kvist, 2007), and executive-legislative relations (Im, 2018b).

The process of fuzzy-set qualitative analysis is as follows. First, the outcome variable is constructed via fuzzy-set calibration. Calibration refers to dividing the governments of countries into groups and assigning a fuzzy-set value that ranges from full membership (1) to nonmembership (0). This membership score reflects the degree to which a government is in or out of a set (Ragin, 2009). After calibration, any case that has a threshold value (0.5) is excluded from the final analysis because it is neither in nor out of sets. We first normalized government effectiveness, government efficiency and throughput and then calibrated them with the threshold value of 0.5 (Paykani, Rafiey, & Sajjadi, 2018). We set fully-in cases to have a value exceeding 0.95 and set fully-out cases to have value less than 0.05 (Ragin, 2000). Fuzzy membership scores of countries for each indicator can be found in table 5. Second, we applied the same method to our five variables. We chose a threshold value of 0.5 because there are not many theories regarding how to decide the exact standard for these variables. We therefore defined two fuzzy-sets for each variable, governments with strongly public-service-motivated employees and governments with weakly public-service-motivated employees, for instance. We then calculated the fuzzy score for each government, a value that represents its partial membership to the set. Finally, with these calibrated variables, we constructed the truth table that illustrates which configuration of antecedent conditions each case meets (Fiss, 2011). Since we have five possible antecedents, our truth table has 32 rows (i.e., 2^5), which represent all possible combinations. By reducing the number of rows in the table with an algorithm using Boolean algebra, we determined which combinations of factors are considered sufficient to explain the outcome score of the three indices. We used the STATA 13 program to perform the whole process.

Empirical Results

In the following we briefly explain what fuzzy-set outcome scores are as well as the results with regard to necessary and sufficient conditions. There are two types of measurements to test the explanatory power of set relations: set-theoretic consistency and set-theoretic coverage. The consistency score represents the degree to

which cases sharing antecedent conditions show the same outcome. The generally accepted level of consistency for the test of necessity is 0.9 (Schneider, Schulze-Bentrop, Paunescu, 2010). On the other hand, an acceptable consistency score for a sufficient condition is 0.75 or 0.8 (Ragin, 2009). The coverage value reflects the empirical relevance of a solution. Given that there may be multiple paths to an outcome variable, a coverage value can be low despite a high consistency score. There are three kinds of coverage: raw, unique, and solution. The solution coverage refers to the total coverage of all the sufficient conditions of an outcome. Raw coverage refers to each term of the solution, while unique coverage means each individual solution.

First, we respectively test the necessary conditions for the fuzzy sets of governments with high performance scores in government effectiveness, government efficiency, and throughput. As can be seen in table 4, none of the conditions meet this standard. Yet four attribution factors— competitiveness, change-oriented citizenship behavior, public service motivation and organization identification—show high consistency scores (the average score being around 0.75), while scores of corruption tolerance are relatively low.

Table 4. Analysis of Necessary Conditions

	Trait Competitiveness	CO-OCB*	PSM**	OI***	Corruption Tolerance
Government Effectiveness (WGI)	0.855	0.847	0.872	0.837	0.598
Government Efficiency (GCI)	0.700	0.679	0.682	0.680	0.665
Throughput (GC)	0.806	0.750	0.742	0.728	0.561
Average	0.787	0.758	0.765	0.748	0.608

* Citizen-oriented Organizational Behavior, **Public Service Motivation, ***Organizational Identification

Table 5. The Number of Participants and Fuzzy Membership Scores for Developing Countries

	Independent Variable	Dependent Variables		
Countries	**Number of Participants**	**Government Effectiveness (WGI)**	**Government Efficiency (GCI)**	**Throughput (GC)**
Albania	4		0.638	0.551
Argentina	20		0.021	0.449
Bahrain	12		0.957	0.796
Bangladesh	4		0.213	0.082
Belarus	6			0.306
Bolivia	4		0.319	0.184
Brazil	23	0.059	0.064	0.837
Bulgaria	9	0.412	0.255	0.898
Cameroon	3		0.532	0.102
China	20	0.941	0.894	0.857
Colombia	20	0.294	0.277	0.714
Costa Rica	7		0.553	0.959
Croatia	11	0.118	0.043	0.918
Dominican Republic	7		0.340	0.286
Ecuador	3		0.170	0.571
Egypt	6		0.383	0.224
Ethiopia	3		0.468	0.122
Georgia	9		0.872	0.878
India	20	0.588	0.851	0.633
Indonesia	22	0.647	0.830	0.429
Jordan	5	0.706	0.936	0.612
Kazakhstan	3	0.882	0.766	0.408
Kenya	5		0.723	0.367
Kuwait	15		0.511	0.490
Lebanon	5		0.085	0.000
Liberia	5		0.745	0.531
Lithuania	14	0.824	0.447	1.000
Morocco	3		0.660	0.694
Nigeria	3		0.234	0.061
Pakistan	3		0.298	0.041
Paraguay	5		0.191	0.245
Peru	20	0.353	0.149	0.592
Philippines	23	0.471	0.426	0.510

Qatar	15	1.000	1.000	0.980
Russian Federation	20	0.529	0.362	0.673
Rwanda	5		0.979	0.816
Senegal	3		0.787	0.347
Servia	5		0.106	0.388
South Africa	22	0.176	0.915	0.755
Sri Lanka	4		0.702	0.776
Tanzania	3		0.617	0.143
Thailand	23	0.765	0.489	0.735
Tunisia	6		0.574	0.469
Uganda	3		0.596	0.163
Ukraine	13	0.235	0.128	0.265
Uruguay	7		0.681	0.939
Uzbekistan	3			0.204
Venezuela	3	0.000	0.000	0.020
Vietnam	21		0.404	0.653
Zambia	3		0.809	0.327

For the next step, we explored which set of sufficient conditions lead governments to receive a higher score for each indicator. Full circles (●) indicate the presence of a condition (i.e., governments that fall into a set with high public service motivation) and empty circles (○) indicate the absence of it (i.e. governments fall into a set with low public service motivation). Blank cells indicate ambiguous conditions. We set the consistency value at 0.75 to test configurations of sufficient conditions. Table 6 shows varying results for our five possible variables depending on each indicator. This proves our point that each government performance indicator has different sufficient conditions under which a given country can secure a higher score.

Government effectiveness has two sets of sufficient conditions to which all five variables contribute. Lower trait competitiveness and lower corruption tolerance with higher change-oriented citizenship behavior, higher public service motivation, higher organizational identification are likely to lead to better performance. In the second configuration, the role of trait competitiveness replaces that of change-oriented citizenship behavior. Corruption tolerance plays a negative role in both set relations, while public service motivation and organizational identification constantly show the opposite effect. At the same time, the results regarding the roles of trait competitiveness and change-oriented citizenship behavior are not conclusive. The consistency score is set over 0.8 for both cases and the total solution consisten-

cy is over 0.9. The total coverage is less than 0.5.

Government efficiency also has two configurations with sufficient conditions. The first configuration is very similar to that of government effectiveness except for the ambiguous role of public service motivation. In the second configuration, it is notable that higher corruption tolerance combined with higher trait competitiveness, higher public service motivation, and higher organizational identification can lead to higher performance. As discussed in the literature review, corruption tolerance is believed to have positive effects on economic advancement in the developing countries under certain conditions. It should be noted that the unique coverage of the second configuration is almost two times higher than that of the first one. The consistency scores are over 0.8 for both set combinations. The total coverage and solution consistency are at the same level as those of government effectiveness.

Table 6. Sufficient Configurations of Antecedent Conditions for Government Performance

Indicator	Antecedent Conditions					Raw coverage	Unique coverage	Consistency
	Trait Competitiveness	CO-OCB*	PSM**	OI***	Corruption Tolerance			
Government Effectiveness (WGI)	○	●	●	●	○	0.355	0.039	0.893
	●	○	●	●	○	0.401	0.084	0.904
							Total coverage: 0.439	
							Solution consistency: 0.911	
Government Efficiency (GCI)	●	○		●	○	0.345	0.061	0.868
	●		●	●	●	0.394	0.110	0.846
							Total coverage: 0.455	
							Solution consistency: 0.845	
Throughput (GC)			●	○	○	0.427	0.002	0.893
		●		○		0.439	0.007	0.868
	●					0.806	0.339	0.806
							Total coverage: 0.821	
							Solution consistency: 0.786	

* Citizen-oriented Organizational Behavior, **Public Service Motivation, ***Organizational Identification

Throughput has three configurations of sufficient conditions that are much simpler compared that of government efficiency and government effectiveness. Higher public service motivation combined with lower organizational identification and lower corruption tolerance are sufficient conditions for better performance. Additionally, higher change-oriented citizenship behavior with lower organizational identification can lead to a higher throughput score. The role of organizational identification, we might point out, differs from other indicators. In our third configuration, higher competitiveness by itself has a raw coverage value of 0.806, which is even higher than the total coverage of other indicators. However, the combination of the presence of public service motivation and the absence of organizational identification and corruption tolerance show a higher consistency than competitiveness as a sole determinant. The total coverage is almost double that of other indicators whereas solution consistency is the lowest.

CONCLUSION

Governments of developing countries rely on performance indicators produced by several global institutions to assess their status and to decide how and where to invest their limited resources. Understanding the different determinants of various performance indicators would help governments to better manage their resource distribution. Framing public employees' attributional and behavior factors as sufficient conditions is also helpful, as one of the most important performance strategies concerns how to manage human resources in public organizations.

This study investigates the relationship between three well-known performance indicators (government effectiveness, government efficiency, and throughput) and five critical determinants (trait competitiveness, change-oriented citizenship behavior, public service motivation, organization identification, and corruption tolerance) with the use of fuzzy-set qualitative analysis in order to find common determinants that enhance government performance and to explore the different sufficient conditions of each of the government performance indicators. There are several interesting findings of this research.

First, higher public service motivation always positively contributes to the three government performance indicators. Public service motivation features in at least one causal recipe with respect to each performance indicator irrespective of the number of determinants. This supports Perry and Wise's proposition that public service motivation is "positively related to performance" in public organizations (1990, p. 370). Despite conflicting results regarding the relationship between pub-

lic service motivation and organizational performance in the literature, this finding suggests that public service motivation is the most constant sufficient condition to high national-level government performance scores.

Second, the number of attributional factors that figure in the causal recipes varies between the three performance indices. For instance, each of the five attributional factors make a contribution to the government effectiveness score. Nonetheless, throughput has the simplest sufficient condition sets, which feature trait competitiveness as the sole determinant with raw coverage and a consistency score of 0.806. The fact that throughput focuses on a government's human and managerial capacity specifically, while the other two indices assess a government's performance in general, may account for this more parsimonious result. Also, it should be noted that Government Competitiveness Center has underlined the importance of this trait for years even though the results of the 2017 Government Competitiveness Global Survey are not included as subindicators yet.

Third, combined with other factors, innovation-inclined attributional factors such as trait competitiveness and change-oriented citizenship behavior make a negative or inconclusive contribution to government effectiveness and government efficiency, but that is not the case for throughput. Trait competitiveness is associated with winning strategies and active engagement (In, 2017). Also, change-oriented citizenship behavior is known for encouraging innovation and for supporting creative organizations (Vigoda-Gabot & Beeri, 2012; Bernier & Hafsi, 2007). Therefore, this deviation concerning the roles of innovation-inclined attributional factors in government effectiveness and government efficiency indicators can be partially explained by the fact of a perception that government should focus more on policy implementation rather than policy determination. Such a hypothesis is further supported by the findings for organization identification, a possible obstacle to higher performance in innovative organizations (Hekman et al., 2016), which shows a negative contribution only in throughput.

Finally, it is notable that only government efficiency generates sufficient configurations in cases in which corruption tolerance has a positive effect. The possibility that corruption may have a positive impact on economic development in developing countries under certain conditions may account for this result (Huntington, 1968). Despite the well-accepted detrimental effects of corruption, some scholars argue that corruption may function as a deregulating mechanism as well as a source of "voluntary taxes," motivating the infusion of human resources into the public sector. In this regard, a sufficient configuration that shows the positive role of corruption tolerance can be explained by the fact that the government efficiency indicator puts a lot of emphasis on the economic aspect of performance while taking

the managerial contexts of public organizations less into account (Han, 2014; Im et al., 2015).

Our principal purpose here is to argue that government performance indicator share common ground but that each one also has a specific emphasis that makes it different from the other indices. Through comparison, we have found that government effectiveness has the largest number of sufficient conditions in one causal recipe and that government efficiency emphasizes economic advancement, while throughput is more inclined to center on innovation and competitiveness than other indicators. Finally, public service motivation is one common ground that all three indicators have as a sufficient condition in their causal recipe.

The limitations of this study are as follows. First, even though the use of the average score is a popular method, it may distort results concerning the unit of analysis. Also, we consider five determinants altogether as they are widely discussed contributors to organizational performance, but many researchers determine each of them in different model stages. Yet it is one advantage of fuzzy-set qualitative analysis that the effects of explaining variables are estimated using a simpler process. Lastly, fuzzy-set qualitative analysis has an analytical benefit in explaining sets of variables in way that produces pathways to the outcome. Therefore, some may find our interpretation of individual factors less convincing. Future research should attempt to obtain datasets collected at organizational level that can be used to construct more sophisticated behavioral models and to further investigate the in-between relationship of explaining variables in one causal recipe.

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APPENDIX: MEASURES FOR ANTECEDENTS

	Items*
Competitiveness	When in a competition, I would like to win because that means I performed better than other people.
	When I am competing for an award or a promotion, I mostly focus on my own qualifications, rather than comparing myself with other applicants or candidates.
	During competitions, I tend to focus on how much better or worse the other candidates performed than myself.
	It is more important for me to achieve excellence than to win others.
	There's a lot of competition among public servants in my country.
Change-oriented Organizational Citizenship Behavior	I try to change work processes to increase efficiency.
	I try to make suggestions to improve daily operations of the organization.
	I try to fix unnecessary or faulty procedures.
	I try to introduce new processes to increase organizational effectiveness.
Public Service Motivation	I feel very responsible for the society that I belong to.
	I consider public service as my civic duty.
	I think public service is more meaningful way of vocation than pursuing my own self-interest.
	I willingly take my own losses to help others.
	I think social contribution is more important than personal achievement.
Organizational Identification	When somebody criticizes my department, it feels like a personal insult (or, I feel bad).
	My department's successes are equivalent to my own successes.
	Working in my department helps me understand who I am.
Corruption Tolerance	It is acceptable that a central government official gives a job to someone from his family who does not have adequate qualifications.
	It is acceptable that a central government official demands a favor or an additional payment for some service that is part of his job.
	It is acceptable that a central government official decides to locate a development project in an area where his friends and supporters live.

*Items are measured in five point Likert Scale