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Revisions

An Investigation of the Effects of Information System Literacy and Business Process Management on Organizational Performance

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Abstract

Information systems bring about many innovation opportunities for organizations. However, there are also several factors affecting these opportunities that need to be investigated. Therefore, taking this necessity as a starting point, the present study was conducted to provide an insight into the associations between Information Systems Literacy (ISL), and the analytical approach, as well as Business Process Management (BPM) usage and organization performance. To this end, a structural model has been developed to define the link between design, methodology and approach structures and study the mediating effect on the relationship between ISL, analytical approach, BPM, and organization performance. A questionnaire was developed and a total of 404 usable surveys were collected from civil servants employed in various public bodies in Turkey. Using structural equation modeling, the model and the proposed hypotheses were tested. Results showed ISL has a significant and positive effect on BPM and organization performance whereas there is no positive correlation between neither the analytical approach and BPM nor organization performance. Moreover, the success of the employees with a bachelor's degree or score above 67.8% appears to be linked with the success of the model investigating the association between BPM usage, ISL, and analytical approach affecting organization performance.

Keywords: ISL, analytical approach, civil servant, BPM, success model, SEM

Introduction

States or governments provide their citizens with a number of services, one of which is the information and communications technology practices which produce a considerable effect on the overall performance of the government, perception of its citizens, and the success of the most critical policies implemented. One of these practices is the e-government application which is not only one of the alternative channels for the states to provide service to citizens, but also it is gradually becoming the most outstanding channel of service. For this very reason, the successes and failures in an e-government application might lead to effects that can resonate in a democratic system (Sharma et al., 2018).

Contemporary societies require capable and accountable states, identification of the goals, and assessment of the results. Studies conducted to date have been limited to theoretical and empirical research as there is a limited possibility to apprehend the complexity of public bodies. Nevertheless, there is an ongoing debate on how to measure the efficiency of public services (Da

Cruz & Marques, 2014; Hood, 1991; Osborne, 2006) as important state structures need to be supervised more frequently (Goel et al., 2017).

Along with the recent increase in the size and complexity of the public sector, both internal and external groups within a country have increased their expectations from the performance of public bodies. Developed to satisfy such expectations to an extent, the e-government application stands out when addressing all aspects of the issue. The relevant literature puts forward two definitions of the 'e-government' concept. According to the United Nations Economic and Social Council, the e-government, developed with the aim of increasing productivity, enhancing state transparency, reducing financial constraints, raising the quality of public policies, establishing good relations between government, society and citizens, improving the quality of public services, and ensuring broad social participation, is a method of government management based on intense and strategic implementation of information and communications technologies. On the other hand, the World Bank suggests that government agencies wishing to alter their relationships with citizens and businesses employ e-government which is based on information technologies. In fact, information technologies can be used for various aims such as rendering government services more efficiently, developing relationships with businesses, improving civil rights, and improving state efficiency. Furthermore, reducing corruption, increasing the transparency of state decisions, making government services accessible, increasing profits, and reducing operating costs can be listed as some of the advantages of information technologies (Song & Guan, 2015). However, it is important to note that as the e-government application becomes more developed, the capacity of states also gains importance (Stier, 2015).

In the present study, some theoretical and conceptual models have been employed with the aim of assessing the performance of states, the extent to which citizens are satisfied with this performance, and the impact of citizens on trust (Sharma et al., 2018). However, the model in our study is based solely on a survey by government employees, so there is no real measure of citizen satisfaction. Considering the growing importance of providing all kinds of state services, it would be a good idea to investigate the variety and effects of the information systems used in the sector, especially in developing countries. The impact of these information systems, whether within the state or intranet, on the performance of the state need to be evaluated since the performance of government agencies can play a role in ensuring citizens' trust. Moreover, this performance has a direct effect on the employee's satisfaction and business performance. To date, various models have been proposed for government performance and the relationship between e-government, citizens' satisfaction and citizens' trust (Da Cruz & Marques, 2014; Goel et al., 2017; Shmueli & Koppius, 2011; Song & Guan, 2015). However, we believe that it is too late to propose models to determine the effect of process management information systems used to monitor the business processes of government employees on the performance of organizations. Because, especially in developing countries, BPM usage is far behind compared to private sectors in the same countries due to the management information systems. However, it is obvious that the state should be a guide in these matters.

Increased efficiency in all institutions yields many potential benefits in the end user's informatics relationship. Nevertheless, the introduction of technology into the workplaces appears not to cause an increase in the productivity of white-collar workers (DeLone, 1988; Gerrity & Rockart, 1986), which may be associated with the insufficient importance placed to computer literacy to help the end user become efficient and effective. Many studies (Bostrom et al., 1990; Winter et al., 1997)

have indeed demonstrated the relationship between an adequate insight into the information systems and realizing the full potential of end-user computing.

The present study takes as a starting point the concept of ISL and its effect on usage because of the gaps in the literature. Moreover, it has been aimed to develop an insight into the effects of business process management (BPM) practices applied in public bodies on organizational performance. BPM has been considered a factor in the concept of analytical approach (Sebetci & Aksu, 2014). We believe that investigation of the impacts of a new model study on the performance of ISL will eliminate the relevant gap in the literature. As stated above, we hope that the outcomes of this present study would likely have a significant effect on performance, particularly in developing countries.

Hence, the present study has been conducted to achieve the following three primary purposes: (a) to identify the concepts of ISL, analytical approach, and explore the effects of BPM on civil servants; (b) to examine the effects of BPM systems on the performance of the state; (c) to develop a new model with this structure. Despite the high level of explanatory power indicated by the results of the present study, conducting similar studies in the international arena is of paramount importance. We hope that the results and criteria will elucidate the subject of the modeling approach while analyzing and estimating with such data.

Literature and Theoretical Background

This study first investigates the impact of ISL and analytical approaches on BPM. Afterward, the extent to which organizational performance is affected by the usage of BPM is explored. Following that, to determine the impact of these relations on the performance results of the factors and public institutions in particular; a new structural model is put forward. The basic structures of this model are also studied to foresee the effectiveness and organizational performance of public institutions and demonstrate the theoretical foundations that support the relationships it contains.

Information System Literacy (ISL)

The concept of *literacy,* which dates back thousands of years, has evolved over time and, besides its literal meaning (*the ability to read and write*), it is now used to define various types of knowledge (i.e., computer literacy, environmental literacy, economics literacy, graphic literacy, legal literacy, library literacy, financial literacy, political literacy, technology literacy, consumer literacy, media literacy, critical literacy, civic literacy, and web literacy). With each passing day, new terms are derived by adding the word *literacy* to the end of a word (Snavely & Cooper, 1997). UNESCO defines literacy as "the ability to identify, understand, interpret, collect, communicate and calculate different types of written sources" (Horton 2008, p. 63). grouped the literacy skills that he deems vital for the 21st century under six categories: functional literacy, computer literacy, media literacy, distance learning and e-learning, cultural literacy, and information literacy.

Among these, *computer literacy* refers to the skill of using computers and computer software effectively. A computer literate person can perform primary operations on a computer such as turning it on/off, memory saving, copying, and printing, as well as use application software such as word processors, tabulation software and databases (Bawden, 2001; Horton, 2008). Computer literacy is usually confused with information literacy, which is frequently used to refer to both

types of literacy. However, although computer literacy implies only basic skills with regards to computer use, information literacy is a more comprehensive concept that subsumes computer literacy. On the other hand, knowledge literacy is identified as the ability to find and use the information required to solve issues and take decisions (Pinto et al., 2010; Zurkowski, 1974). In today's age, we are direly in need of computer technologies to store, access, and use, convey and share information. For this reason, if one wants to be information literate, one need to have computer literacy, which is a part of and even a prerequisite for information literacy (Kurbanoğlu, 2010). In this study, the previously developed ISL scale, analytical approach to events and the impact of BPM on organizational performance were used (Sebetci, 2019).

With the advent of advanced software-machine relationships such as artificial intelligence and deep learning, today, computer and information literacy, the two fundamental concepts in the literature, are combined into one single concept: *Information Systems Literacy (ISL).* ISL suggests that information systems software (web, mobile, pc, etc.) can be used separately. Therefore, any ISS (information systems software) can be opened even though it has not been used before, menus can be accessed, and records can be added and read. A database management system will also be running in the background; so, the ability to understand the logic of web-mobile-cloud broadcast is the expansion of the presence of ISL.

Analytical Thinking and Analytical Approach

A critical constituent of visual thinking is analytical thinking which enables the individual to solve problems quickly and effectively. A step-by-step approach is fundamental in analytical thinking that provides the ability to divide complex problems into single and manageable parts. The process of analytical thinking contains stages such as collecting relevant information and identifying the underlying relevant issues. To this end, comparison of data sets from various sources, determination of possible cause-effect models and obtaining relevant results are necessary to achieve desired solutions (Li et al., 2016; Li et al., 2018). Analytical thinking, which is indeed a path for analyzing and understanding phenomena, defines a topic as a subset of the problem and criticizes the development process and each stage individually to show the connections therein. To put it another way, analytical thinking enables individuals to see the whole picture by looking at constituents. According to (Kurfiss, 1988), analytical thinking is a conscious orientation of mental processes in problem-solving and decision-making processes. A person with analytical thinking ability can distinguish situations, practices, problems, propositions, ideas, theories, claims, etc. (Chuah, 2004) argues that engineering students need analytical and logical thinking skills to make logical decisions about the fundamentals of engineering.

Analytical thinking is a step further than conventional thinking, and it requires more inquiries where there are explicit variables and outputs. While analytical thinking is required in analyzing an unclear problem, logical thinking is a fundamental element for problem-solving and analytical thinking (Robbins, 2011). An analytical thinker can solve problems by first identifying the stages, which are also defined as the sub-problems, and then quickly concluding each stage one by one (Umay & Arıol, 2011).

In today's world, people are expected to develop skills such as analytical thinking, synthesis, solving problems, and effective communication (Şentürk, 2009). To this end, i.e., to furnish the students with analytical and logical thinking skills starting from primary school, studies need to be

carried out. Such skills will also equip individuals with the ability to use information systems' software. A competent information system user is also expected to develop training, practice, and activities to improve analytical thinking and logical thinking skills. Lifelong learning theorists need to conduct studies in this field as analytical and logical thinking skills can be developed at any stage of life (Sebetci & Aksu, 2014). For the purpose of this study, analytical thinking is considered as part of analytical approaches. An analytical approach is the use of analytical thinking and individuals' other skills to solve the problems.

Business Process Management (BPM)

A process refers to all of the labor, equipment, materials, methods and environmental elements interacting with each other to produce a specific output (product or service). A process encompasses three main types of activities: a) activities that create value, b) activities that provide workflow between functional, divisional or organizational boundaries, and c) control activities. An organizational process, on the other hand, contains the beginning and end of the business. As a matter of fact, it is a cluster of sub-works and detailed works, i.e., the sum of the activities where one or more kinds of inputs are received, and an output is produced to complete a task or create value for the customer (Sebetci et al., 2018). Ensuing changes in states are analyzed to create processes. In other words, a series of activities wherein inputs are transformed into outputs through changes in the state of related entities build processes. Process management, on the other hand, aims at ensuring continuous and regular monitoring and development of processes. It is a cycle that involves constant assessment, analysis, and development for the design and maintenance of processes to satisfy customer needs in a more efficient manner (Benner & Tushman, 2003; da Silva et al., 2017). According to Cavusoglu (2019), information systems "offers an integrated solution for planning, executing, and controlling business processes horizontally across the value *chain*" (p. 52).

All management activities related to business processes are covered by BPM. At one time, process analysts, process managers, and process engineers used to perform BPM related activities in a labor-intensive manner. Moreover, they did not have any automated support other than the creation of a system configuration from the executable process model. Therefore, a number of techniques were created for them to employ at various stages of BPM (Mendling et al., 2017). BPM is not a one-off task, but an activity consistently in progress. It involves a permanent process of reengineering. BPM is not a technology; nevertheless, it includes automating tasks in any business process, and process improvements can happen without automation and technology (Hammer, 2007).

Considering the overall experience of numerous companies across the world, it can be inferred that each company can succeed with processes and process management at varying levels (some can perform it better than others). The underlying reasons for these varying levels of businesses can arise from the lack of any or all of four critical capabilities (i.e., leadership, business culture, company structure and expertise of the company and its employees) which are prerequisites to gathering the resources and determining the skills required for completing the processes. Without these capabilities, businesses will fail to succeed in the process. Therefore, efforts need to be made immediately by businesses to overcome the lack of these capabilities. Among them, the most important and challenging is the leadership skills, which usually requires the intervention of a catalyst that is a passionate advocate of a potential leader. It has to sabotage the candidate, process

concepts and gains. Unlike leadership, reshaping the culture of a business is not impossible. However, it requires time and energy. The other two (company structure and expertise of the company and its employees) are less compelling although they are usually ignored (Spanyi, 2010; Hammer, 2007).

Organization Performance

The fact that organizational performance is facilitated by the IT compliance of organizations has been revealed by various studies conducted to date. Nevertheless, the number of evidences put forward by theoretical and empirical studies related to the relationships between the providers and results of compliance between an organization and IT compliance is not sufficient (Reich & Benbasat, 2000; Sabherwal & Chan, 2001). Different approaches have been developed about organizational performance (Reschka et al., 2015). The most important thing to note is that for an organization to make a profit, have a competitive advantage, increase its market share, and achieve long-term survival, it needs to use appropriate organizational strategies and action plans. Taking into consideration ISL and analytical approaches of employees, the present study builds an organizational performance efficiency measurement model by using BPM.

Information is accepted as a very important concept in terms of process operation and strategic decisions for all organizations. In general, the importance of managing information in organizations and using information communication technology while managing information and data is gradually increasing. Studies covering disciplines of management, information management and information systems are observed in the literature. In his study, (Mutch, 2008) emphasized the importance of the following items while investigating information and managing information in organizations:

- Taking a process-based approach centered around the notion of 'information literacy'
- Giving more attention to issues of data and information than other texts
- Emphasizing the importance of technology while continuing to stress the centrality of social and organizational factors
- Placing issues of organizational and national culture in a broader politico-economic context. (p. i)

This contemporary approach has shed light on investigating the impact of ISL on organizational performance.

Key performance indicators such as performance measurement units are used as an internal measurement criterion in organizations. Also, investing in performance assessment systems will enable an organization to evaluate performance evaluation targets and strategic plans accurately. Usually, researchers use broad categories (i.e., efficiency, quality, profitability, and innovation quality) to measure organizational performance. On the other hand, high-performance organizations perform active measurements of individual performance and rather than target values set in advance, they prefer to measure progress within the organization. Thus, they continuously try to upgrade performance by improving performance elements as well as maintain a predefined level of performance (Oyemomi et al., 2019).

Research Model and Hypotheses

One compelling issue that organizations face is related to increasing organizational performance (Shanker et al., 2017). A thorough search of the relevant literature has yielded the finding that information management and process management processes are quite closely associated with organizational performance (Prajogo et al., 2018). On the other hand, the effectiveness of information security systems can be taken into consideration with social alignment and integrated knowledge (Moon et al., 2018). The extent to which organizational practices are linked with organizational performance has been investigated by previous studies, namely that of Moon et al. (2018). Oyemomi et al. (2019) noted that organizational culture and organizational goals are vital to perform successful business information processes and boost organizational performance.

In organizations, knowledge and knowledge management produce a substantial effect on organization performance. In other words, for an organization to improve its performance, it should prioritize creating, sharing, and having information. Furthermore, quality and knowledge management have been shown to be of utmost importance for the overall performance of organizations; thus, business sustainability. However, in developing countries, many organizations focus on the equipment and skills necessary to meet the volume and profit that the organization aims rather than quality and knowledge management (Muthuveloo et al., 2017).

Today, two important concepts stand out that significantly affect BPM: ISL and analytical approach. Especially over the last two decades, the concept of ISL has been coined to refer to the efficient use of information systems, services, and information quality. The present study suggests that both ISL and analytical approach have an impact on BPM, and thus BPM has a significant impact on the organization performance as reported in the literature. Regarding the fact that there have not been previous studies that examined the interconnected nature of these practices, in particular, the relations between them and robust performances, and the present study forms a research model in Figure 1 and proposes the following hypotheses.

Figure 1. Research Model and Hypotheses
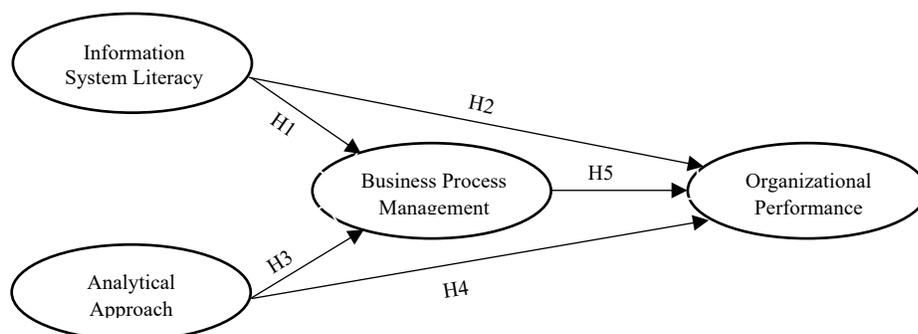
Hypotheses:

- H_1. The Information System Literacy (ISL) level will positively affect the use of Business Process Management (BPM).
- H_2. The ISL level will positively affect organizational performance.
- H_3. The analytical approach level will positively affect the use of BPM.
- H_4. The analytical approach level will positively affect organizational performance.
- H_5. The use of BPM will positively affect organizational performance.

Methods

Measurement of Constructs

A quantitative approach has been used in this study to test the proposed model. The measurement has been achieved by using previously approved scales of BPM (Kim et al., 2012; Moon et al., 2018; Powell & Dent-Micallef, 1997; Tippins & Sohi, 2003) and organizational performance (Prajogo et al., 2018). Some of the items in these scales were adapted for the purpose of the current study. The structures, definitions, substances and sources of measurements used in this study are given in Appendix A. To determine the analytical skills of individuals, the *Integrative and Analytical Thinking in Problem Solving Scale* developed by (Umay, 2007) was employed. The original version of the scale contained items developed by Umay (2007) and (Umay & Arıol, 2011) to determine the views of prospective Mathematics teachers on their integrative and analytical thinking performances. For the ISL measurement, four items were adapted from the previous studies (Horton, 2008; Pinto et al., 2010; Sebetci, 2019; & Winter et al., 1997). All items in the scale were designed in the five-point Likert type. Many variables such as gender, age, and experience in using information systems, education level, and position in the institution have been included as control variables since it was thought that they might have an impact on organization performance.

Data Collection

The survey was uploaded to the e-government application to be distributed to the civil servants working at various institutions such as ministries, provincial directorates, and universities. A total of 527 surveys were sent, of which 123 were not returned or were sent incomplete. A total of 404 usable surveys were collected from October 2018 to November 2018. Demographic characteristics (gender, age, etc.) of the participants is shown in Table 1. Of the participants, 50.7% were male, and 49.3% were female, 66.6% were in the age range of 26-45, 40.3% have less than a decade of experience using information systems, 54.2% have a bachelor's degree, 13.6% have a graduate degree, 45.0% were holding a chief position, and 34.4% were civil servants.

Table 1. Profiles of Respondents

Item	Variable	Frequency	Percentage (%)
Gender	Male	205	50.7
	Female	199	49.3
Age	Under 25 years	11	2.7
	26–35 years	135	33.4
	36–45 years	134	33.2
	46–55 years	107	26.5
	Above 56 years	17	4.2
IS Use Experience	Less than 10 years	163	40.3
	11–20 years	133	32.9
	21–30 years	62	15.3
	31–40 years	41	10.1
	More than 40 years	5	1.2
Education	High School Diploma	39	9.7
	Junior College	91	22.5
	Bachelor's	219	54.2
	Master's or above	55	13.6
Workplace Position	Senior Executive	7	1.7
	Manager	67	16.6
	Chef	182	45.0
	Officer	139	34.4
	Worker	9	2.2

Data Analysis and Results

To assess the research model, we employed a multi-step approach wherein SPSS version 21, and Smart PLS version 3.0 (Ringle, 2019) were used. In the first phase, we studied the measurement model for the appropriate psychometric properties, and in the second phase, we checked the research model and hypotheses. The descriptive statistics are presented in Table 2. Exploratory factor analysis (EFA) was performed by using fundamental component analysis prior to analyzing the data. The results of factor analysis are shown in Table 3. To perform an empirical evaluation of the theoretical model, partial least squares (PLS) were used. To perform an empirical calculation of the standard errors and assess statistical significance, Smart PLS 3.0 (Ringle, 2019) and a boot sample were used (Gefen et al., 2011).

Table 2. Descriptive Statistics

Variable	Mean	STD	Min	Max
Information System Literacy	3.729	1.103	1	5
Analytical Approach	3.119	0.718	3	5
Business Process Management	3.510	1.144	3	5
Organizational Performance	3.436	0.931	3	5

Handling EFA and confirmatory factor analyses (CFA), construct validity was measured. EFA was first carried out with the ProMax rotation method and basic component analysis. The items in the survey were entered at the same time. Due to the large number of items and less than .40-factor loads that some of them showed, some items were cross-loaded and deleted. Eventually, four different factors were obtained as was expected. The eigenvalues of the four factors were greater than 1.0. To test the reliability of the structures, Cronbach Alpha (α) was calculated. The model showed an acceptable internal consistency as the reliability of the structures including the general ISL, analytical approach, BPM, and organization performance were satisfactory ($\alpha > .60$) (Hair et al., 2010). Afterward, using Smart PLS 3.0, CFA was used based on the output of EFA. Some items with less than .50-factor loads were deleted to improve model fit indices. The reliability and validity of the constructs are presented in Table 3.

Table 3. Reliability and Validity of the Constructs

Construct	Item no	Loadings EFA	Loadings CFA	Cronbach's α	Composite reliability
Information System Literacy				.859	.866
(ISL)	ISL1	.853	.967		
	ISL2	.643	.749		
	ISL3	.601	.637		
Analytical Approach (AA)				.788	.810
	AA1	.880	.974		
	AA2	.527	.691		
	AA3	.502	.522		
Business Process Management				.906	.920
(BPM)	BPM1	.840	.927		
	BPM2	.820	.848		
	BPM3	.704	.752		
Organizational Performance				.864	.887
(OP)	OP1	.874	.917		
	OP2	.836	.902		
	OP3	.560	.597		

Note. $X^2 = 502.335$; $df = 268$; $X^2/df = 1.874$; $GFI = .921$; $CFI = .931$; $NFI = .902$; $NNFI = .924$; $RMR = .047$; and $RMSEA = .041$

Compliance indicators of the final model using first order structures indicated satisfactory levels ($X^2 = 502.335$; $df = 268$; $X^2/df = 1.874$; $GFI = .921$; $CFI = .931$; $NFI = .902$; $NNFI = .924$; $RMR = .047$ and $RMSEA = .041$). The 1.871 normed chi-square was below the maximum of 3.0 (Bollen, K.A., 1989). Eligibility index (*GFI*), comparative conformity index (*CFI*), normed fit index (*NFI*),

and non-normative index (*NNFI*) were above the recommended minimum value of 0.90 (Garver & Mentzer, 1999). Root mean square residues (*RMR*) were .047 and the root mean square approximation approach error (*RMSEA*) indicated a satisfactory uniformity level and convergent validity of .041 (Garver & Mentzer, 1999; Hu & Bentler, 1999). Appendix B includes the results of structural equation modeling (SEM).

Besides, beta coefficients (standardized coefficients) for all the items were found to be more than twice the standard errors, which points to additional support for convergence validity (Anderson & Gerbing, 1988). Factor loadings of all items were greater than .50, and the average variance extracted (AVE) for all measurement scales are higher than .50 which suggests additional evidence for convergent validity (Fornell & Larcker, 1981). Moreover, a satisfactory reliability level was achieved as the compound reliability of all scales was greater than .70 (Fornell & Larcker, 1981; Garver & Mentzer, 1999). Also, these indices demonstrated acceptable uniformity and convergent validity. Table 3 presents the standardized factor loads of EFA and CFA, Cronbach's α values, and the combined reliability of structures. The differential validity was assessed by making sure that the square root of each AVE value was greater than the absolute correlation value between that scale and other scales. This criterion was met by all the constructs, which proves sufficient validity (Fornell & Larcker, 1981). We obtained discriminate validity as AVE was greater than the maximum shared squared variance (MSV) and average shared square variance (ASV) values (Hair et al.,1998; Hair et al. 2010). The results of the model can be seen in Table 4.

Table 4. Means, Standard Deviations, AVE, MSV, ASV and Correlation Matrix of Reflective Constructs

Construct	Mean	SD	AVE	MSV	ASV	1	2	3	4
1. ISL	3.729	1.103	0.577	0.334	0.212	0.759			
2. AA	3.119	0.718	0.588	0.323	0.273	0.544	0.766		
3. BPM	3.510	1.144	0.641	0.321	0.197	0.511	0.430	0.801	
4. OP	3.421	0.931	0.620	0.310	0.206	0.531	0.381	0.560	0.787

Note. Information Systems Literacy = ISL; Analytical Approach = AA; Business Process Management = BPM; Organization Performance = OP

To test the hypotheses proposed in the study, SEM, which permits the synchronous testing of all hypotheses, bearing direct and indirect effects, was performed using Smart PLS 3.0. SEM also enables the Bootstrap Method that is excellent to the touch defined by (Baron & Kenny, 1986) since the normal deploy esteem of indirect effect is not required, and the truth of the results is not touched by the sample model (Hayes, 2009). Like Hayes (2013) suggested, five thousand initial instances were selected in the study with 99% bias-corrected confidence intervals. When the upper and lower limits of the confidence intervals do not include zero, an alternative hypothesis of the mediation effect is accepted, indicating that the indirect effect is not 0 at the 99% trust grade. The alternative hypothesis is rejected if the two borders contain zero (Hayes, 2013).

It can be inferred from the results of the direct effects that ISL is positively and significantly correlated with BPM ($\beta = 0.337$, $p < .000$). Thus, H1 is confirmed. Besides, ISL is positively and significantly correlated with organization performance ($\beta = 0.324$, $p < .000$). Hence, H2 is confirmed. Also, BPM has a positive and significant direct effect on the organization performance (OP) ($\beta = 0.313$, $p < .000$). Therefore, H5 is confirmed. The standardized effect on BPM in analytical approach shows that $p < .000$ to 0.213, confirming H3. Moreover, since the standardized effect of analytical approach on the organization performance is 0.211 $p < .000$, H4 is confirmed, as well. Finally, the determination coefficient (R^2) for BPM and organizational performance was

found to be 0.46 and 0.17, seriatim. This shows that the model has kind of considered the variation of the proposed model. An outline of the hypotheses is shown in Table 5.

Table5. Hypotheses Testing

Hypothesis	Path	Standardized effect	Result
H1	ISL→BPM	0.337*	Supported
H2	ISL→OP	0.324*	Supported
H3	AA→BPM	0.213**	Supported
H4	AA→OP	0.211**	Supported
H5	BPM→OP	0.313*	Supported

Note. Information Systems Literacy = ISL; Analytical Approach = AA; Business Process Management = BPM; Organization Performance = OP; $*p < .001$; $**p < .01$.

Discussion and Conclusion

From the findings obtained in the present study, we can conclude that the presence of ISL has an effect on the use of BPM and organization performance in a highly positive model. It was also determined that it has a positive effect on BPM and organization performance in analytical approach. The significance of the impact of BPM on organization performance eventually indicates the strength of the model in achieving better organizational performance. The findings also exhibit various implications for further research and application in that ISL has been found to be an important capability for employees from a new perspective. Also, it has been concluded that to boost business compliance and organizational performance; it must be ensured that all employees and managers can use BPM.

Theoretical Implications

Previous studies have demonstrated that separate administrative data sets can be connected and processed in specific ways through the use of IT and IS. Also, managers can benefit from them to decide about organizational operations. Used only as an administrative tool, a computer can record and process cost information for various accounting functions. Therefore, it will not be of much help to managers when making decisions. Today, with the recent improvement in technology, however, managers are able to reach process and convey data quickly and in detail. This, in turn, provides them with the ability to better handle the decision-making process. It has now been easier to connect previously separate information or production systems, which may be in the same building or a wide range of locations, to networks thanks to the convergence of computing and telecommunications systems. This has, for example, enabled the information in a computer in a far-away office to be transferred to the central office to help the managers get a *picture* of the current status of the organization. Likewise, managers can make radical decisions with the help of charts produced in a computer-assisted drawing system in another plant and sent to the head office.

Furthermore, all employees can adapt to and use software technologies to boost their performance. Project teams can ensure support for the realization of organizational functions through regular mechanisms of planning and identifying business processes (Boddy et al., 2018; Norman & Skinner, 2006). For this reason, we can suggest that organization performance is positively affected by the ISL and BPM, which has also been reported by several other studies.

Theoretical and Practical Implications

In the present study, it was found that analytical approach, one of the positive predictors of BPM and organization performance, is an essential cognitive ability for both employees and managers. For example, studies in the field predicted higher activity utilitarian judgments in brain regions related to reasoning, cognitive control, and analytical approach, whereas activity in brain areas united with intuition and sense foreboded more deontological moral polls (Greene et al., 2004). Thus, analytical approaches may increase the utilitarian tendency (Li et al., 2018). Besides, we have demonstrated the IS and computer software capabilities in our previous study (Sebetci & Aksu, 2014).

Also, if we look at the literature, the relationship between BPM and organizational performance has been shown to support the happening of unexpected situations. Emergency factors such as competitiveness and uncertainty should bring about the privatization of sustainability practices (Maletič et al., 2018). For instance, previous organizational experiences can be used differently by making different estimates of the effect of previous experiences on the ensuing organizational change, depending on whether the performance is sufficient or insufficient (Jiang & Holburn, 2018). In line with this, previous studies have reported that the information management process and decision-making strategies are crucial for organizations. The relationship between the factors enabling information management such as personal skills, learning, and IT and IS and the mediating effect of organizational performance and information-building processes has been supported by a framework. Also, it is clear that the relationship between information -building process and organizational performance will be regulated by whether the decision-making process is analytical or rational or both (Abubakar et al., 2019).

Although BPM produces effective outcomes in terms of organizational performance, BPM companies haven't finalized their applications, and therefore it is not widely used in public bodies and other sectors. One of the underlying reasons for this is the problems with managing a business around processes. Among future challenges, we can list management structure and responsibility, IT support, inter-company processes, standards, process strategies, and industry structure. It is, however, clear that process management is carried forward to the present even though there are no solutions to these challenges (Hammer, 2015). Also, the basic properties of process management (e.g., designing processes, developing the metric, developing artists, and developing everyone else) have already been settled.

Limitations and Future Research

The present study concludes that ISL and analytical approach are related to the implementation of BPM in public bodies and these three factors together have an impact on organization performance. The fact that most of the participants (67.8%) in the study have a bachelor's or master's degree also needs to be considered. In light of the findings, we recommend that top state executives should assess the ISL and analytical approach capabilities of all civil servants. Also, they should produce solutions to improve such talents in their employees. Moreover, we believe that BPM should be implemented in all government institutions under the structure of that institution to ensure synchronization rather than employees acting individually. Finally, the model proposed in the present study can be utilized to make comparisons between the public and private sector, which, we believe, is quite ahead of the public sector in terms of BPM, and to assess the impact of BPM

on the private sector organizations. The limitations of our study of the application are made in Turkey. Therefore, the application of this model to other countries may be interesting for researchers.

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Appendix A. Construct Sources

Construct	Source	Item
Organizational Performance	Kim et al. (2012), Moon et al. (2018), Powell & Dent-Micallef (1997), Tippins & Sohi (2003).	Our organization is better than other government agencies to bring detailed information to its processing tasks.
		Organizational performance measures the efficiency of the organization and the conduct of business processes within the organization.
		Our organization is better than BPM (e.g. communication and information sharing) that connects the parties with other government entities.
Business Process Management	Prajogo, et. al. (2018).	We have standardized and clear process instructions for our processes.
		Most processes in our plants are currently under statistical quality control.
		Process Management Inter-organization all activities are closely coordinated.
Analytical Approach	Umay, 2007; Umay & Arıol (2011).	I know I have analytical thinking.
		The analytical approach helps me to solve feasibility problems.
		I know what the concepts of analytical approach and thinking are.
Information System Literacy	Horton, (2008), Pinto et al. (2010), Sebetci, (2019), Winter et al., (1997)	I know which application to use for the job I want on the computer.
		I know the structural architecture logic of any information system (database, interface, software).
		I would not hesitate to use any information system, even if I had not used it before.
		I can solve problems when I'm having problems using information systems.

Appendix B. Results of Structural Equation Modeling
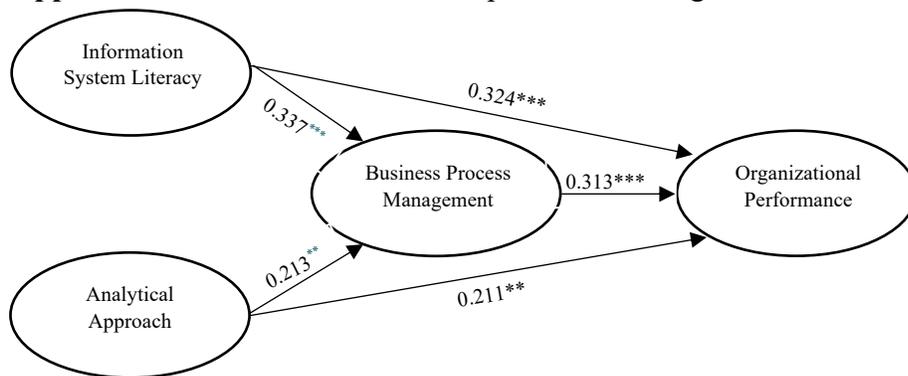
$X^2 = 502.335$; df = 268; X^2/df = 1.874; GFI = .921; CFI = .931; NFI = .902; NNFI = .924; RMR = .047; RMSEA = .041