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Research Article

IT Value Creation in Public Sector: How IT-enabled Capabilities Mitigate Tradeoffs In Public Organisations

Jie Mein Goh[a,b] **and Alvaro E. Arenas**[b]

[a] Beedie School of Business, Simon Fraser University, Burnaby, British Columbia, Canada;
[b] Information Systems and Technology Deparment, IE Business School, IE University, Madrid, Spain.

Abstract

Governments today are striving to improve services in the public sector through digital transformation but face tremendous pressures from multiple fronts (economy, national security, healthcare, education etc.). Recent studies report that worldwide IT spending in 2019 is expected to increase another 3.2% to $3.8 trillion and that government IT spending in Western Europe alone was $45.7 billion in 2016 and is expected to grow to $51 billion by 2021. Despite the increase in government IT spending, 80% of government transformation efforts failed to achieve expected results. A plausible reason for this lackluster performance could be the presence of tradeoffs or conflicts that is particularly salient in public organizations. To better understand the mechanisms by which IT enables or inhibits capabilities of the public organizations in attaining public value, we adopt a conflict resolution lens to study how information technology (IT) enabled capabilities mitigate these tradeoffs. Using a dataset collected from public organizations in a European country unreeling from a financial crisis, we examine the processes by which IT enables public organizations to manage the severe tradeoffs from conflicting value-based goals. We identify three mitigation strategies - *bias*, *tunneling* and *hybridization*, by which IT helps public organizations manage the tradeoffs arising from conflicting value-based goals. This paper contributes to the understanding of how IT mitigates value-based tradeoffs in public organizations to achieve public value.

Keywords: public organizations; public value; organizational capability; tradeoffs; value-based goals; conflict resolution

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INTRODUCTION

Worldwide investment in IT for public sector alone is estimated to be $424 billion in 2015 (Gartner, 2015). This spending is expected to increase especially in countries (e.g. Japan, Germany, Singapore, etc.) with IT as one of the key sources of their economic growth. The capacity of IT to transform the public sector has materialized into positive impacts of IT such as cost savings, improved data access, productivity gain, time efficiency, improved decision processes, etc. and it is doubtless that IT can make governments more efficient and effective in delivering public services to citizens through public organizations (Diaz-Diaz, Munoz, and Perez-Gonzalez, 2017)[1]. However, despite the large amounts of IT investments in every level of government, a recent report suggests that most public sector IT investments do not translate to value for citizens (Shevory, 2015). Further, despite the increase in government IT spending, 80% of government transformation efforts failed to achieve expected results (McKinsey, 2018). While IT issues are prevalent across both private and public sector organizations, the challenges presented to public organizations are exacerbated by the litany of other challenges such as conservative views and risk aversion to IT and innovation, increased citizen's expectations, lack of digital literacy and leadership in public organizations and even financial austerity which result in a low return on IT investment in public organizations.

A major reason for this poor translation may be justified by the unique property of IT investment decisions in public organizations in that many of these decisions have competing value-based goals (Andersen and Henriksen, 2007). Value-based goals are goals related to public safety, education, privacy, public welfare and tax rates, reflective of the diverse groups of stakeholders whose needs the public organizations need to fulfill. Such goals are typically

[1] IT can reduce the need for manual labor and paperwork through automation. For instance, registration of a company can be done online as opposed to submitting form manually. This improves the effectiveness and efficiency of delivering public services.

intangible and often in conflict with one another (Caudle, Gorr and Newcomer, 1991). As an example, a typical tradeoff of public organization is the expectation of higher protection from the government versus lower regulatory burden and costs (Deloitte, 2017). Citizens expect that the government steps up its regulatory role (e.g. conduct audits or checks). At the same time, the public organizations do not want to increase their regulatory burden given that this increases costs and resources required to perform these regulatory functions (e.g. more paperwork and audit manpower). Thus the pursuit of one goal leads to the expense of the other. As another example, improving national security through the use and capture of more personal data compromises individual privacy. Clearly, public organizations are often confronted with these types of tradeoffs: First, the goal of investing in IT to improve service provision comes at the expense of another area e.g. public organizations' IT expenditure goals on improving quality of public safety reduces the spending on other areas such as education. Second, the value-based goals in public organizations may directly conflict with one another.

Prior studies noted that conflicting values that are unresolved lead to performance issues in public organizations (e.g. resulting in analysis paralysis among public officials) (Thacher and Rein, 2004). Mitigating or conflict resolution strategies [2]to resolve such conflicts thus become pertinent for ensuring good governance and performance in public organizations. Strategies to mitigate such value conflicts have been identified in prior public management literature[3]. For instance, it has been demonstrated that public organizations employ firewalls as a strategy that allow different organizations or departments within organizations to individually assume and realize conflicting values, without leading to paralysis. While these strategies have been documented, we do not find prior studies that

[2] We use the term *mitigating and conflict resolution* strategies interchangeably in this paper.
[3] A review of the different mitigation strategies has been summarized in Table 1 on page 12.

attempt to discuss how IT facilitates mitigation strategies which help resolve conflicting value-based goals. Scholars generally agree that IT can be utilized to create value in organizations which has led to a rich body of literature on business value of IT (Ravichandran, Han and Mithas, 2017; Saldanha, Mithas and Krishnan, 2017; Trantopoulos, von Krogh, Wallin and Woerter, 2017). However, fewer studies focus specifically on IT value in public organizations with the exception of a few studies (Pang, Lee and Delone, 2014; Teo, Tan and Wei, 1997). The lack of theoretical bases focused on the public sector makes it harder for researchers to address key questions about IT value in public organizations.

The dominant argument in the business value of IT literature suggests that IT enables firm to create business value in various ways. For instance, a recent study has demonstrated that IT enables organizational capabilities such as business flexibility and operational competence (Benitez et al., 2018). Braojos et al. (2019) suggests that IT and capabilities work together and are complementary, allowing organizations to achieve desired organizational outcomes and performance (e.g., IT infrastructure capability and social media capability complement each other and result in the online customer engagement). However, studies in IT value also suggested that tradeoffs between organizational capabilities exist (Benitez, Ray and Henseler, 2018; Xue, Ray and Sambamurthy, 2012). Similar to the literature on IT value, these tradeoffs are examined to a larger extent for for-profit organizations and less so for public organizations. In some ways, such tradeoffs experienced by for-profit organizations resonate with the conflicting value-based goals presented to public organizations identified in prior literature. While these studies allude to the presence of competing or conflicting value-based goals in public organizations[4] (Wilkin, Campbell and Moore, 2013; Fedorowicz, Gogan and Culnan, 2010), research examining how IT can be harnessed by governmental

[4] At times, we use the term public sector agency(ies) and public organization(s) interchangeably.

institutions in mitigating these tradeoffs has largely been ignored. However, this perspective is useful in providing an alternative lens to deepen our understanding on how public organizations mitigate the challenges and avoid poor outcomes, making the best use of taxpayers' dollars. It has been suggested that understanding value-based conflicts in the public sector is key to deepening our understanding of IT value in public sector organizations (Pang, Lee and Delone, 2014; Campbell, McDonald and Sethibe, 2009).

As such, this study aims to expand the extant literature by theorizing how IT can help public organizations achieve two or more competing value based goals facilitated by mitigating strategies, thereby creating public value and pushing the public value frontier[5] forward. By public value, we refer to the value of an entity or organization that serves the community and contributes to the public (Meynhardt and Bartholomes, 2011; Moore, 1995). Pang et al. (2014) theorized the different IT-enabled organizational capabilities which allow the public sector to achieve public value, but their work did not provide the mitigation strategies associated with the fundamental tradeoffs or conflicting goals that public organizations typically face. This study extends Pang et al.'s work by providing the associated solutions for resolving conflicting goals faced by public organizations through a processual lens. This requires the understanding of the dynamics in IT value creation within public organizations. Therefore, we take a qualitative approach to uncover the underlying dynamics of IT value creation in public organizations. We attempt to address this through the research questions: (i) How does IT create public value in public organizations? (ii) How does IT resources help the public organizations manage the tension between conflicting value-based goals to achieve public value?

[5] The value frontier defines the maximum value feasible for a given cost. Similarly, the public-value frontier refers to the maximum public value allowed for a specified cost (Pang et al. 2014). While prior studies address in part questions related to creating public value, fewer studies focus on extending the public-value frontier and out study covers both areas.

To answer the above research questions, we conducted a qualitative study by collecting data from the public organizations of a European country. This government has undergone a volatile period since 2009 due to the global financial crisis resulting in massive budget constraints in the years ensuing. This context presents a unique opportunity for us to examine our research questions focusing on IT value creation when dealing with extreme conflicting value-based goals. The crisis led to limited resources and hence presents severe tradeoffs to the public sector organizations as they constantly need to tradeoff between the lack of resources (e.g. cost and labor) and other public value oriented goals (e.g. efficiency and responsiveness to citizens). This study also allows us to examine the best practices adopted by the government when confronted with conflicting goals and how it was able to attain significant improvements by the use and application of IT in public administration after the financial crisis as evidenced by the rankings produced by the United Nations[6]. Using data collected from ten public organizations which underwent this significant crisis, we delineate the processes by which IT helps the government manage tensions between conflicting value-based goals, through the development of organizational capabilities and mitigating strategies, resulting in public value. The case was analyzed using the capabilities framework which proposed that the relationship between "IT resources and organizational performance in governments is mediated by organizational capabilities" – public service delivery, resource acquisition, innovation, co-production and public engagement capabilities (Pang et al., 2014). We make use of this capabilities approach to focus on the underlying dynamics to examine the mechanisms through which IT resources result in public value.

This study contributes to existing literature in the following ways: First, we construct an integrated analytical framework that can be applied to provide insights on how IT

[6] This ranking is based on a survey conducted by United Nations where the ability in implementing digital services by governments around the world are ranked. This survey is highly regarded and it is used to measure the performance of the performance of the public sector e-services in this study. More details of this ranking are provided later in this paper.

resources will help public organizations better manage the tradeoffs arising from competing value-based goals. Second, in applying an existing analytical framework to the case, we derive a series of developmental prescriptions for government to synchronize IT for managing these tensions in order to generate public value. In contrast to Pang et al. (2014), this study focuses on the mitigation of these tensions whereas Pang et al. (2014) uncovers the IT enabled capabilities in the public sector leading to public value.

We first provide a review of the literature on public value, conflicting goals and mitigation strategies in public organizations, IT-enabled capabilities and IT impact in public organizations. The second section provides the description of our proposed analytical framework to answer our research questions. Next, we discuss our research method. Finally, we describe our findings and conclude with implications of this study.

LITERATURE REVIEW

Unique Characteristics of the Public Sector

As noted in prior literature (Eskildsen, Kritensen and Juhl, 2004; Wright, 2001), there are several clear differences between public sector from the private sector. A typical characteristic associated with public organizations is its bureaucratic culture whereas private sector organizations are typically less bureaucratic and flexible (Parker and Bradley, 2000). Partly due to this culture, the decision making structure in public sector arguably tend to be more hierarchical and slower paced compared to the private sector. While there may be heterogeneity due to regional differences between public versus private organizations, we focus our attention on the difference in the goals and values of these two types of organizations. The main goal of private sector companies is usually tied to increasing shareholder value whereas the key goal of any public organization is to increase public value. The latter tends to be more pluralistic compared to a more unidimensional focus of the private sector. In line with these goals, the values upheld by public organizations generally

focused on legitimacy, lawfulness, accountability and justice, whereas private sector generally focused on profitability, competitiveness, customer relationship and revenue generation.

Public Value

Value is a complex and broad concept relevant to every organization. According to Nobel laureate Herbert Simon, an organization has to make decisions based on several types of value premises (Simon, 1950): (i) the objectives of the organization - which depends on what value the activity is to be focused on, the groups of people served and the level and quality of service; (ii) the efficient use of resources; (iii) regulations that abide by the standards of fair play and are aligned with human rights and (iv) personal values of the individual e.g. salary increments, promotions etc. These value premises apply not only to private sector organizations but also to public sector organizations, which in the latter case is known as "public value".

The notion of public value is largely pluralistic. Bozeman (2007) defines public value as the "rights, benefits, and prerogatives to which citizens should (and should not) be entitled; the obligations of citizens to society, the state, and one another; the principles on which governments and policies should be based". A subjective and relational view of public value is defined by Meynhardt (2009) suggesting that public value is socially constructed based upon the values that reflect the relationship between individuals and society. In order to incorporate these multiple conceptualizations of public value, we utilize Bryson et al.'s (2014) definition that suggests public value is based on a multitude of perspectives. Public value, a type of value specific to public sector, broadly encompasses the notion of creating what the public values or social benefits (Bryson, Crosby and Bloomberg, 2014).

In addition to the notion of public value, we also use the concept of *public value frontier* that refers to the aim of public sector to fulfill multiple yet competing values simultaneously. For example, economic growth and social welfare, which on its own, do not work well together to produce a singular focused value such as profits (Pang et al., 2014). Typically, for public sector to extend the public value frontier requires some value to be achieved at the expense of the other (de Graaf and van der Wal, 2010). Broussine (2003) suggests that public leaders often have to be able to initiate concerted action within their organizations and at the same time establish value for a set of stakeholders with multiple and competing interests. For instance in the case of promoting tourism in a city, public leaders have to cater to the needs of a wide range of stakeholders - citizens, businesses, taxpayers etc. who have different interests. Citizens may be concerned with how the increased number of tourists will affect their lives. Businesses will be concerned with how best to attract a greater number of tourists to their establishment. These differences and wide range of stakeholders thus exacerbates the degree of conflict in creating public value. Overall, the aim of creating public value poses a difficult task to public organizations because its diverse stakeholders result in pluralistic goals which often conflict with one another (van der Wal and van Hout, 2009).

Conflicting Goals and Conflict Resolution Strategies in the Public Sector

Public organizations' goals often suffer from "value incompatibility" (de Graaf, Hubert and Smulder, 2014, p. 4), which refers to situation where the values are competing, i.e. the pursuit of one value will compromise another. Previous research focusing on the public sector suggests evidence of value incompatibility and often finds situations whereby value-based conflicts occur and situations whereby seeking a set of public values compromises other values in the pursuit of these values (Spicer, 2009). Value-based conflicts occur when one value directly goes against another value; or that one goal cannot be achieved without the

diminution of the other. To illustrate the first type of conflict, government experience conflicts between cost reduction and being responsive to citizens since the very act of being responsive requires investments in resources.

Another example of a value-based conflict is the situation whereby the government decides between sacrificing individual privacy for public safety and guarding against terrorist acts. In this situation, the government has to decide on the acceptable method of investigating terrorism within the limits of existing laws so as not to create undue fear of privacy intrusion for the general public. This characteristic is found predominantly in most public organizations' goals, as compared to private sector organizations where market and profit traditionally are the guiding forces (Caudle et al., 1991). On the other hand, public organizations often cannot have solely a consequentialist or utilitarian principle (de Graaf et al., 2014, p. 4) thereby leading to a need to resolve value-based conflicts.

Thacher and Rein (2004, p. 457) describe how having unresolved value conflicts can lead to psychological stress and results in a state of paralysis and that the response of the public sector, i.e. the set of mitigating strategies, can be seen as balancing conflicts or making a tradeoff. Scholars in the public administration literature have identified several mitigating strategies used by public administrators to resolve value-based conflicting goals such as firewalls, bias, casuistry, cycling, hybridization and incrementalism. Table 1 provides the definitions of these strategies and examples from prior literature. While the literature has documented evidence of these mitigation strategies to manage value-based tradeoffs in public governance (Tummers and Rocco, 2015; Steenhuisen and van Eeten, 2008), studies have not examined whether IT can facilitate these mitigating strategies. Further, literature does not inform us how IT resolves conflicting goals predominant in public organizations creates public value.

Table 1: Public Governance Mitigating Strategies For Resolving Value-Based Tradeoffs

IT-enabled Capabilities and IT Impact in Public Organizations

Conflict Resolution Strategy (de Graaf et al. 2014, p. 8-9)	**Definitions**	**Examples**
Firewalls	A mitigating strategy which separates and walls off values such that all values receive attention from respective organizations, departments or persons. In this type of strategy, policy actors may compartmentalize each institution from the responsibilities of others such that multiple institutions commit to different values.	Thacher and Rein (2004) suggests that instead of charging the FBI with the prevention of terrorism, an alternative would be to apply the notion of firewalls by assigning this role to a different agency.
Bias	A mitigating strategy where some values are deemphasized and acknowledged as not important, so as to remove the value conflict between these and other values.	De Graaf et al. (2014) gives an example of municipality client managers who handle conflicts by focusing on lawfulness and emphasizing on the rules instead of efficiency, effectiveness or even fairness.
Casuistry	A mitigating strategy where public officials decide on a value conflict according to their past experiences with similar conflicts.	Police departments, use a case-by-case approaches on how to respond to situations based on historical cases (Thacher and Rein, 2004).
Cycling	A mitigating strategy where values are focused in a sequential fashion. Values that are considered to be important are implemented for a certain limited period of time until they are taken over by another set of values.	According to Thacher and Rein (2004), the Australia pension program was confronted with conflicting values whereby a group of people thought that pensions should be distributed according to need, while others thought they ought to be distributed according to the recipients' contribution to the tax system. As such, Australian pension policy alternated between two principles of distribution.
Hybridization	A mitigating strategy which combines multiple conflicting values.	British local government overlaid the market oriented values with public service values. Public servants have to be professional, efficient, neutral and responsive at the same time (Stewart, 2006)
Incrementalism	A mitigating strategy, slowly and step by step, shifting the focus to a different value.	Dutch railway (DR) implemented incrementalism – DR wanted to remove slack from the rail schedule to increase rail capacity, but at the same time this reduces system resilience. As such, DR increased the rail capacity in step-wise fashion such as slowly incorporating extra stops or extending trains (Steenhuisen and van Eeten, 2008).

Under severe constraints, the goal of public organizations in moving towards the public value frontier becomes more challenging and IT may be able to alleviate some of these difficulties by creating capabilities for public organizations to achieve stakeholder value without having to trade off on either of the conflicting values. We argue that IT provides public organizations with capabilities, i.e. IT-enabled capabilities, necessary to resolve these conflicting values so as to achieve public value.

The concept of IT-enabled organizational capabilities (Sambamurthy and Zmud, 2000) refers to an organizational wide capability of leveraging technology in order to differentiate from competitors. This notion of IT-enabled capability traces its root to the extensive literature in organizational capability (Winter, 2000), which refers to the coordination of resources, processes, routines and activities within the organization to generate productive activities of the firm. Previous studies suggest that organizational capability occurs in high performing firms as a result of high level organizational practices (Winter, 2003). In line with these findings, scholars in the Information Systems (IS) area have found evidence of IT-enabled capability, which refers to the ability to "acquire, deploy, combine and reconfigure IT resources" that lead to better organizational performance (Bharadwaj, 2000) and a driver of IT business value (Benitez, Ray and Henseler, 2018; Ayabakan, Bardhan and Zheng, 2017; Chen, Wang, Nevo, Benitez and Kou, 2017; Rai, Arikan, Pye and Tiwana, 2015; Piccoli and Lui, 2014; Mithas, Ramasubbu and Sambamurthy, 2011). Several IT-enabled capabilities identified in previous literature include: knowledge management, communication, environmental strategy, improvisation, productivity, innovation and transformation (Pan, Pan and Lim, 2015; Gu and Jung, 2013; Benitez-Amado and Walczuch, 2012; Grover and Kohli, 2012; Mithas et al., 2011).
While IT-enabled capabilities have been well explored in the private sector, research on IT enabled capabilities in the public sector or public organizations has been relatively muted,

with an exception of Pang et al. (2014). The bulk of the literature pertaining to IT in public organizations centers on e-government. The findings from this set of literature, though valuable, have not been able to address research questions such as ours. The majority of studies in this area focuses on e-government and a review of these studies can be found in Andersen, Henriksen, Medaglia, Danziger, Sannarnes and Enemaerke (2010). As a result, calls to move from technology adoption studies to value based studies have been emphasized (Belanger and Carter, 2012).

Although there are studies employing resource-based theory to explore the effects of capability on organizational outcomes in the public sector (e.g. Pablo, Reay, Dewald and Casebeer, 2007), current studies do not focus on this aspect of IT-enabled capabilities. This gap in the capability literature is also apparent within other fields in public administration. Studies on the organizational capabilities in public organizations (Andrews, Beynon and Mcdermott, 2015)[7] is limited and the link between IT capabilities and their strategies in resolving conflicts in public organizations has not been studied in depth. To the best of our knowledge, this is the first study to examine how IT helps public organizations achieve capabilities to manage tradeoffs and achieve value-based conflicting goals through conflict resolution strategies. Thus, it is imperative to study how IT can be successfully assimilated in public organizations by resolving or managing the tradeoffs and achieve conflicting value-based goals in order to move the public value frontier forward which is the objective of this paper.

PROPOSED ANALYTICAL FRAMEWORK

To construct a theoretical lens that help make sense of how IT can be used to resolve value-based tradeoffs in public organizations, we synthesize the IT-enabled capabilities and IT impacts literature so as to examine IT value in public organizations using a capabilities lens.

[7] This study analyzes the organizational capability in the public sector by bringing together resource based theory and contingency theory.

In terms of IT impacts, this study specifically focuses on the mitigating strategies that organizations can deploy which will lead to public value. Pang et al. (2014) propose a theoretical based framework suggesting that IT resource enables public sector organizations to develop their IT capabilities which leads public organizations to move the public value frontier forward. IT capability is a firm's ability to mobilize and deploy IT-based resources in combination or co-present with other resources and capabilities.

Using Pang's framework, five types of IT-enabled capabilities are proposed: (i) public service delivery (ii) resource acquisition (iii) innovation (iv) co-production and (v) public engagement. See Table 2 for definitions of each capability. Pang argues that IT resources can develop these different sets of capabilities in public sector organizations. The impact of IT resources on public organizations' capabilities can be explicated by the different roles IT resources have been theorized to play in organizations. In particular, IT "automate, informate and transform" organizations (Anderson et al., 2006; Dehning et al., 2003; Chatterjee et al., 2001; Zuboff, 1985). The theoretical arguments for each of these links are explicated in Table 3.

While this theoretical framework is valuable in that it provides a processual view of IT value creation in public organization, this framework does not inform us about how IT-enabled capabilities resolve conflicting value-based goals to achieve public value. To counter this issue, we employ the rich characterization of mitigating strategies for resolving conflicts proposed by de Graaf et al. (2014) as shown in Table 1. In line with recent work suggesting that capabilities are the basis on which organizations execute strategies (Helfat and Winter, 2011; Leinwand and Mainardi, 2011), we propose that IT-enabled capabilities will allow organizations to execute strategies that help resolve conflicting value-based goals. By identifying IT-enabled organizational capabilities (Pang et al., 2014), we will be able to tease out the mechanisms through which IT resources resolve conflicts in value-based goals in

Table 2: Definitions of IT-enabled Capabilities in Public Organizations (Pang et al., 2014)

IT-enabled Capability	Definition
Public service delivery	The ability of the public organization to deliver and maximize public services' outcomes with minimal public resources.
Resource acquisition	The ability of the public organization to achieve and develop adequate resources necessary for starting and maintaining public value initiatives. Examples of resources include tax revenues, legitimacy, consent and political support.
Innovation	The ability of the public organization to recognize the importance of innovation and the ability to lead, initiate and implement valuable and innovative projects.
Co-production	The ability of the public organization to promote co-production between more than one organization (public sector agency, private firms and other stakeholders) through acquiring the necessary resources from partners, match competing interests, and coordinate their efforts and activities.
Public engagement	The ability of the public organization to generate the participation of a multitude of stakeholders during the process of formulating and implementing policies.

Table 3: Theoretical Arguments on How IT Resources Drive Organizational Capability

How IT drives organizational capabilities	Theoretical Arguments
IT → Public service delivery	IT helps to automate manual business processes, inform business units and improve both internal administrative tasks and external service delivery (Anderson et al., 2006; Dehning and Richardson, 2003; Chatterjee et al., 2001; Zuboff, 1985).
IT → Resource acquisition	IT provide information that allows good judgement of public organizations take to identify their partners and suppliers (Stoker, 2006).
IT → Innovation	IT resources allow the public organizations to use multiple sources of information and convert these data into insights that can translate into value to the organization (e.g. new business process or model) (Pang et al., 2014).
IT → Co-production	Moon (2018) suggests that IT resources promote collaboration and cooperation between the public sector and private organizations. Moon introduces several types of co-production; for instance, IT is used to cluster information such as complaints, reported directly by citizens to the government via online or mobile channels. After which, the government then use the data for policy implementation and service delivery.
IT → Public engagement	IT provides the ability of integration and cooperation between different stakeholders (Barua et al., 2004).

public organizations (de Graaf et al., 2014). We combine the two approaches to allow for a finer grained analysis of IT-enabled capabilities in public organizations. In this way, we are able to generate new and deeper insights into how IT-enabled capabilities create public value by better managing the tensions created by conflicting value-based goals.

RESEARCH METHOD

Political Background of Research Site

Since the end of 2009, several European countries struggled through a multiyear financial crisis where many were unable to refinance their government debt or bailout their national banks. This situation was a result of a confluence of reasons: shrinking economies, high unemployment rate, bursting of domestic housing bubble with over-indebted bank mortgage defaults. This significant political impact resulted in the crafting of massive bailout programs for many countries in the Eurozone. This crisis had significant adverse economic and labor market effects, with unemployment rates reaching as high as 30%. During these turbulent years, the incumbent governments were faced with the balancing act of implementing austerity measures to contain spending, and to revive the bleeding economies to appease the unhappy populace. This pursuit of public value creation by improving government services and keeping costs low further accentuate the importance of our study on how IT can mitigate value-based tradeoffs.

While our case site result in conflicting value-based goals that involve two conflicting goals (e.g. cost and another conflicting goal)[8], this political situation confers a rare and unique opportunity for us to collect data which represents the most extreme case of such conflicts. The degree of conflict is likely to influence the resolution process far more than the type of conflict.

Data Collection

We exploit this rare crisis experienced by one European country to collect data to answer our research questions. Qualitative data were collected from interviews conducted at major public

[8] Examples of conflicting goals experienced by the public organizations include better services versus lower cost, better services versus increased transparency, better innovation versus lower cost etc. Details of these tradeoffs were explicated in Table 6.

Table 4a: Description of Public Organizations in Study

Public Organization	Areas under purview	Civil Servants *	Non-Civil Servants Work Force*	Total Employees*	% civil servants over the total of employees	Average IT Budget from 2012-2015 (in thousands)	Average IT Investments from 2012-2015
Ministry of Agriculture	Manage issues on agriculture, food and environment	4828	3738	8566	56.4%	75479	45452
Ministry of Economy	Manage the economic affairs and promote competitiveness of economy	6296	5493	11789	53.4%	7702	27329
Ministry of Education, Culture and Sports	Manage issues on education, promote culture and sports	5989	7712	13701	43.7%	26509	10699
Ministry of Finance and Public Administration	Manage matters relating to treasury and public administration	41619	5050	46669	89.2%	251803	51217
Ministry of Foreign Affairs	Manage external policies, international relations, protect citizens	2405	3425	5830	41.3%	31905	7980
Ministry of Industry, Energy and Tourism – State Secretariat for Tourism	Manage policies and services relating to tourism	2263	658	2921	77.5%	4011	19015
Provincial Government 1	Manage provincial services	46484	0	46484	100%	N.A.	N.A.
Provincial Government 2	Manage provincial services	23924	0	23924	100%	N.A.	N.A.
Provincial Government 3	Manage provincial services	33285	0	33285	100%	N.A.	N.A.
Regional Health System	Provide citizens with health services	-	-	69242 **	-	N.A.	N.A.

*2013 statistics based on official data released about public administration
**2013 statistics did not discriminate between civil and non-civil servants

organizations in this European country. This target country suffered a major financial crisis since 2009 and faced severe constraints in the years ensuing. As mentioned earlier, public value goals may be inherently conflicting, and the recent financial crisis poses severe challenges and constraints to public organizations which further increased the degree of conflict. As such, the context of this country presents a unique period where value-based tradeoffs were dominant and severe.

We collected data on 10 public organizations in the country from 2012 to 2015. We were able to gain access to 6 ministries out of all 13 ministries in the country. To provide a comprehensive analysis of the public organizations at different levels, we also interviewed informants from 3 provincial governments and a regional health organization. Details of each

of the public organizations we examined are provided in Table 4a. For each formal interview, we strived to interview at least one top executive in each organization (e.g. the Chief Information Officer) (see Table 4b). The size of the ministries we had access to had sufficient heterogeneity ranging from 2921 – 46669 employees. Given that different technological levels could affect public organizations capabilities, we use the technological budgets and IT investments for each ministry to proxy for this factor and found that they were sufficiently different.

Table 4b: Details of Data Collection

Data Source	Interviewee	Number of formal interviews	Number of informal interviews	Number of websites related to agency	Additional sources (e.g. presentations, reports)
Public Organizations					
Ministry of Agriculture	Deputy Director of IT Director of Production Health	2	-	1	Yes
Ministry of Economy	Director of IT Deputy Director General Studies	2	1	1	Yes
Ministry of Education, Culture and Sports	Deputy Director of IT	1	-	3	Yes
Ministry of Finance and Public Administration	Senior official of Ministry of Finance Deputy Director of Technology	2	2	3	Yes
Ministry of Foreign Affairs	Deputy Manager of IT	1	-	3	Yes
Ministry of Industry, Energy and Tourism	Deputy Director for Business Development	1	-	2	Yes
Provincial Government 1	Deputy Director of Information Systems Director of E-Administration	2	-	4	Yes
Provincial Government 2	Director of Business Development	-	1	-	Yes
Provincial Government 3	Director	-	1	-	Yes
Regional Health System	Director of Health Information Systems	-	1	1	Yes
Total		11	6	18	

We began our interviews in late 2012, when the crisis was still ongoing. All formal interviews conducted are recorded on site. The interviews were semi-structured, guided by a list of questions provided in Appendix 1. The questions were validated by seeking input from 2 faculty holding PhD in Information Systems. In order to increase the validity of our

analysis, we added questions in our interview protocol about other factors which may affect the improvements in the ratings to ensure that we can rule out other exogenous factors which may affect public sector organizations. Each interview lasted about an hour on average which were later transcribed. In the event where interviewees declined the recording for privacy reasons, extensive notes were taken manually. In total, we collected data based on 11 formal interviews and 6 informal interviews. Formal interviews are lengthy interviews whereas informal interviews are shorter follow up conversations which we used for clarification or validation. Data and reports from the public organizations' websites were also used to triangulate our findings. In particular, we triangulated our findings using data sources such as the internal documents (e.g. presentations, interviews), external documents (e.g. consulting reports, news articles) and websites of the focal organizations to validate various aspects of the public organization (e.g. mission, IT initiatives, performance). The internal documents were reviewed to provide us with a deeper understanding of the various projects that were mentioned. External documents were collected and reviewed to understand the external stakeholders' perceptions about the state of the overall public sector as well as focal organizations. We collected additional data from 18 websites which included the websites of each agency and the webpages for associated projects related to these agencies. Information from the various websites of focal organizations were useful in examining their online services and for obtaining statistics about a particular organization.

Additional data on performance of the government were obtained from the United Nations (UN, 2014) E-Government survey data to make objective assessments and evaluations of public sector performance in terms of their ability to implement e-government. This survey has been conducted for over a decade by the United Nations to evaluate global e-government development of its member states and identify patterns in e-government development and performance across countries. This data is an authoritative benchmark that

provides a ranking of e-government development status across all governments around the world based on their abilities to use IT in supporting public policies and service delivery. The ranking is derived from the E-Government Development Index (EGDI) which is derived based on three components: provision of online services[9], telecommunications and infrastructure connectivity index, and human capital index. Results from this ranking across countries indicated that the country where we conducted our study improved its performance significantly, moving up more than ten ranks in 2014 from 2012 to be within the top 15 countries in the world and the top 5 countries in Europe. Additionally, this country ranked amongst the top 5 countries worldwide in terms of online service delivery (one of the three components in EGDI), and one of the top 20 countries in terms of e-participation[10]. To increase reliability, we also reviewed data used for industry performance benchmarking on six of these public organizations obtained from a consulting firm and found it to be consistent with the evaluations in the UN survey.

Data Analysis

We employ a case study approach (Yin, 2003) as it is deemed most appropriate for our research questions focusing on the processes underlying public value creation. While the case study approach has limitations such as generalizability, many IS research has applied this method (Kaiser and Buxmann, 2012) especially for questions that are exploratory such as ours. Since our objective is not to establish or test causal relationships, we develop our theory by first utilizing existing frameworks on IT capabilities and conflict resolution mechanism. This allows us to develop a "theory for explaining" (Gregor, 2006, p. 624) and then inductively analyze the process oriented narratives (Jaccard and Jacoby, 2010; Van de Ven

[9] The online service delivery measures the use of ICT by governments to deliver public services at a national level.

[10] E-Participation is a supplementary index derived from several items in the same survey emphasizing on three areas: use of online services by government to disseminate information to citizens, interaction with stakeholders and ability of citizens to engage in decisions.

and Poole, 2005) to explain how IT creates value in public organizations by resolving conflicting value-based goals. Additionally, this approach provides evidence for supporting our proposed conceptual framework and new insights to emerge. To analyze the data, we first conducted thematic analysis (Boyatzis, 1998) where we coded the data using conflict resolution strategies (Table 1) and IT capabilities (Table 2). We first coded our data based on the five proposed capabilities for each agency noting simultaneously the conflicts experienced by the public sector organizations. During this step, we coded the entire dataset of interviews identifying all the relevant data extracts that correspond to the main themes: five capabilities and conflict resolution strategies. A summary of our coding procedure can be found in Figure 1.

Figure 1: Coding Protocol Development and Coding Procedure

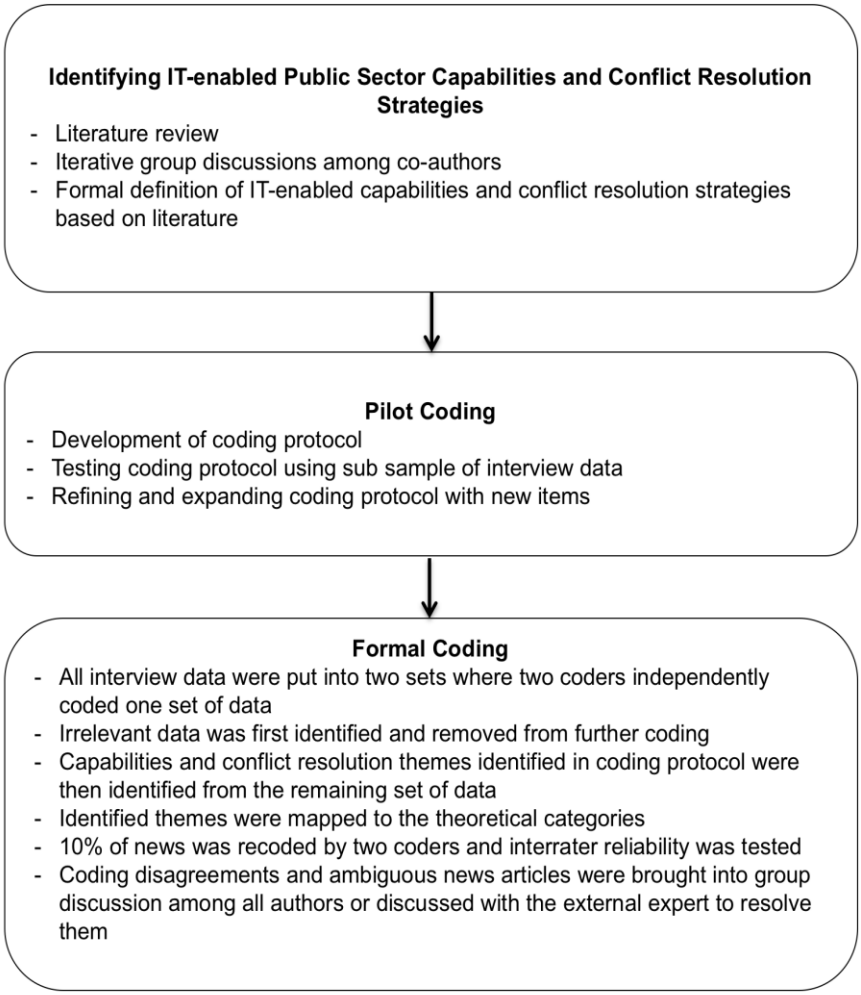


Table 5a: Organizational Capabilities and Number of Occurrences in Data

Organizational Capabilities	Number of occurrences	Percentage of occurrences
Public Service Delivery Capability	32	30.8
Public Engagement Capability	21	20.2
Co-production Capability	14	13.5
Innovation Capability	22	21.2
Resource Acquisition Capability	15	14.4
Total	104	100.0

Table 5b: Themes and Subthemes Identified as Strategies for Mitigating Conflicting Goals and Number of Occurrences in Data

Themes and Subthemes	Number of occurrences	Percentage of occurrences
Themes Related to Bias		
Consolidation of activity	25	17.5
Prioritization of values	13	9.1
Focusing on one task	12	8.4
Themes Related to Tunneling		
Linking different functions	16	11.2
Coordination and integration of functions	19	13.3
Aggregation of demands	18	12.6
Themes Related to Hybridization		
New Operating Model	21	14.7
New Functionalities and Services	19	13.3
Total	143	100.0

FINDINGS

In this section, we identify and describe the conflict resolution mechanisms through which IT resources generate capabilities for public organizations to produce public value. Two of these mechanisms were found in prior literature and one was derived from our findings. In each mechanism, we describe the nuances of value-based tradeoffs and how IT capabilities help the organization in executing various mitigating strategies that resolve or manage the tension between value-based tradeoffs. Table 6 summarizes the findings in this section.

Strategies for Managing Tensions Between Conflicting Value-based Goals

In times of crisis characterized by high uncertainty and constraints, IT resources were able to assist agencies in managing conflicting value based goals through three different conflict resolution strategies: bias, tunneling and hybridization. Through IT-enabled capabilities, conflicting public values were resolved via *bias*, *tunneling* or *hybridization*, and this in turn helped public organization achieve positive outcomes. A single public value was attained through bias while public value frontier, i.e. attaining multiple conflicting values at the same time, was enabled through tunneling and hybridization. *Bias* removed the cost concerns of various public organizations through economies of scale and demand aggregation. *Tunneling* allowed transparency and shared identity to develop, which increased collaboration, flexibility and transparency.

As a result, even though the public organizations started with having conflicting values and goals, they underwent all three conflict resolution strategies and were eventually able to move away from siloed data management systems towards a single data center which facilitates the attainment of the goal of providing citizen centric services and cost reduction through better resource acquisition capability.

We detail the process by which IT enables the conflict resolution strategies in public organizations which has not been documented in previous literature. A summary of the three strategies is presented in Table 5. Of these strategies, bias and hybridization have been commonly identified in previous studies on mitigating strategies employed by public sector (de Graaf et al., 2014). For instance, Stewart (2006) find that bias develops as "a result of performance measurements (which reward behavior in line with certain values)". On the other hand, tunneling has not been identified in previous studies but was found to be present in our case.

Table 6: Summary of Findings

Example of conflicting value-based goals	Organizational capabilities → Conflict resolution	How IT helps to resolve value-based tradeoffs through IT-enabled capabilities	Representative quote	Examples of Public Values created
Bias (de Graaf et al., 2014): Shifting priorities such that one value is no longer emphasized				
Public Service Delivery Capability → Bias	• Centralization of information systems across the public organizations facilitated demand aggregation • Led to economies of scale	Better service versus Lower cost	"We have all the **information systems** put in place perfectly, as they repeat every year or every two years… our role has changed… it is dedicated to other functions and more fun things concerning strategy rather than tactics.. now we are **dedicating time to value added activities**" (Ministry of Education, Culture and Sports)	Remove cost savings constraint to provide citizen centric services
Resource acquisition capability → Bias	• Reuse of information systems across agencies created routines which reduced cost and improved speed, accuracy and quality of public services			

Organizational capabilities → Conflict resolution	**How IT helps to resolve value-based tradeoffs through IT-enabled capabilities**	**Example of conflicting value-based goals**	**Representative quote**	**Examples of Public Values created**
Tunneling: Finding commonalities and possibilities of collaboration across agencies				
Resource acquisition capability → Tunneling	• Better awareness of common needs of other agencies and stakeholders	Better services versus increased transparency	"We are working on the… **virtual invoice** in order to have an analytical accountancy and so **everyone know how much it costs** the Ministry, the expenses associated to its work, and then, there is a second level, which is a cost structure by managing centers. We are moving those two variables. Then, in that cost allocation, there is obviously **co financing**" (Ministry of Education, Culture and Sports)	Allow for transparency and shared goals
Co-production capability → Tunneling	• Virtual invoice allows for co-financing • Integrated systems allow better prioritization of projects			
Public engagement capability → Tunneling	• Led to stronger identification with public sector organization and alignment of roles	Greater security versus greater convenience	"the **Visa Information System**, where all countries in the Schengen area, as you know, for the Schengen Member States work with their own systems, but cooperating with a European system **in real time**. This means that an applicant for a short stay visa at a consular post, the entire transaction is being accessed from our Consular Office, to a centralized database that is in Strasbourg. In this transaction, in addition to knowing whether the applicant has applied for another visa before or at the same time to **avoid visa shopping and someone trying to gatecrash** somewhere, the photograph and the ten fingerprints of the applicants must be uploaded in **compliance** with the ICAO Standards" (Ministry of Foreign Affairs)	

Organizational capabilities → Conflict resolution	How IT helps to resolve value-based tradeoffs through IT-enabled capabilities	Example of conflicting value-based goals	Representative quote	Examples of Public Values created
Hybridization (de Graaf et al., 2014): Combining multiple conflicting values simultaneously				
Public service delivery capability → Hybridization	• Data standardization across public organizations IT allows others to participate (e.g. private organization can make use of public sector data)	Better innovation versus lower costs	"In the short to medium term, we will acquire new powers of information systems … with which we will face new integrations which in turn allow us to offer new features to the citizen." (Provincial Government)	Achieve cost savings and innovation
Innovation capability → Hybridization	• New technologies allow public organizations to keep tabs on multiple citizens' expectations	Higher protection versus lower regulatory burden	"We have reduced the number of staff in the ministry, but we have not reduced responsibilities, on the contrary, responsibility has increased. Society wants the administration to increasingly have more control.. For example, you give a cow number and know where exactly it is located in Spain and everywhere it has been." (Ministry of Agriculture)	Higher protection and lower regulatory burden
Public engagement capability → Hybridization	• Integrated systems allow citizen-centric services to be developed because IT enables notifications to citizens, better feedback loops from citizens back to public organizations • Led to citizen centric services			

How IT-enabled Capabilities Mitigate Value-Based Tradeoffs to Achieve Public Value

IT-enabled Capabilities Help Resolve Conflicting Values Through Bias

Public organizations often have to grapple with competing demands. In disentangling the conflict resolution mechanisms of IT, we often find evidence of IT resources leading to some form of capabilities that allows the public organization to directly remove the constraint imposed by one of the two public values, very often in the form of cost savings. In other words, IT capabilities result in a mitigating strategy, bias, that allows the organization to change focus from two goals to one goal, and emphasize on a single public value (e.g. providing citizen-centric services). This type of mitigating strategy known as bias has been identified in prior studies (de Graaf et al., 2014). From our analysis, we find that bias is mainly facilitated as a result of improved public service delivery and resource acquisition capabilities because public service delivery and resource acquisition capabilities of the public organizations were enhanced, and this in turn, facilitated and circumvented the tradeoff such that one of the tradeoffs is completely removed. For instance, IT-enabled capabilities such as public service capability can help public organizations provide better services at lower costs. One of the tradeoffs is typically cost reduction and this was removed when these capabilities directly resulted in centralization of information systems across various units and led to demand aggregation which resulted in lowered costs. Similarly, the resource acquisition capabilities as a result of reuse of various IT systems and routines also removed the concerns of cost. In other words, these capabilities facilitated the removal of one conflicting goal through the use of the "bias" strategy, where one of the tradeoffs has been eliminated. In most of the public organizations in our dataset, bias was not only facilitated with the unification of the information systems across all the public organizations and the consolidation of data across agencies, but also with an increasing emphasis on the reuse of existing systems and the use of service based models.

"The cost is of course important. One thing is when you have no choice but to do it, our choice is clear in developing a system or reusing other systems that have already been developed… So, we always conduct studies and business plans thinking" (Ministry of Foreign Affairs)

After the consolidation of data management systems, there was a call to reuse systems across all public sector organizations. Instead of reinventing the wheel, information systems developed in one agency were reused in other public organizations leading to lower cost and higher effectiveness.

"The combination of these three models [centralization, consolidation and outsourcing] help to obtain significant savings in these times is a necessity in any organization." (Provincial Government)

This reuse of information systems was guided with a strong alignment to the priorities of the crisis period i.e. cost control. This culture of reuse provided public organizations with substantial cost savings and alignment of conflicting values among the public organizations.

"[Our IT] is strongly aligned with these guidelines of reusing of all systems, both inside and outside, for example; personnel systems, payroll etc. for financial control." (Ministry of Foreign Affairs)

Because routine jobs are now taken care by the information systems, public organizations could easily shift and recalibrate their focus and priorities to those which are most salient. This shifting of priorities is helpful in volatile environments because the public organizations were then able to prioritize on the highest value added services relaxing the value-based conflicting goal between cost and providing high quality of citizen service. This point is illustrated in the comment below, as the ministry of education changed its focus on resolving technical issues to more "value added activities".

"We have all the information systems put in place perfectly, as they repeat every year or every two years… our role has changed… it is dedicated to other functions and more fun things concerning strategy rather than tactics.. now we are dedicating time to value added activities" (Ministry of Education, Culture and Sports)

To illustrate the essence of how IT resolves the conflict through bias, the CIO of Ministry of Finance indicates that economies of scale creates cost savings which can be redirected into other projects:

"We consolidate all DC [data centers] … looking precisely for economy of scale and to have a lifeline in budget… [this in turn] revert life into projects that have significant return that are not purely for maintenance and rationalization" (Ministry of Finance)

IT-enabled Capabilities Facilitate Tunneling - Resolving Value-Based Tradeoffs Through Tunneling

The public sector is a large and complex system where several layers of organizational structures interplay with one another across ministerial, provincial and regional levels. Tensions resulting from competing resource allocation decisions and priorities of various projects are especially salient. In many ways, IT resources enabled the public organizations to develop better resource acquisition, co-production and public engagement capabilities. These capabilities then propelled the organizations to deploy a new strategy that resolves conflict – tunneling, a strategy which has not been identified in prior work. Firewall (de Graaf et al., 2014), a common mitigating strategy in public administration, refers to the situation whereby policy actors establish institutional boundaries to ensure that different values are managed by separate institutions. This strategy removes the value-based conflicts by assigning each institution to be responsible for a single value. The conventional approach where firewall is

being utilized to compartmentalize values with institutional structures such that the responsibility of each functional unit is focused on one key value

In our case, we find evidence that better IT enabled capabilities break down firewalls , a process which we conceptualize and label in this paper as *tunneling*. Tunneling refers to the mitigation technique where the different business units in the same entity find ways to establish a common goal or objective. This is a strategy which has not been identified in prior literature. As opposed to the firewall strategy which entails walling off values in different functional units and forming boundaries to circumscribe each value, we find that IT resolves value-based tradeoffs by finding commonalities, creating a tunnel through existing firewalls compartmentalizing conflicting values. For instance, the regional health services created interoperability across all the IT systems at different layers: clinics, hospitals and regional health services. IT resources help provide a point of entry to another agency with conflicting value-based goals (e.g. ensuring all time services availability and increasing costs to maintain and support infrastructure) using IT-enabled capabilities. This strategy manages the tension of value-based conflicts in public organizations by forcing the higher level conflicting goals present across different units to decentralize into a set of finer-grained goals. In some cases, this tunnel helps manage tension arising from conflicting goals by forcing units to find commonalities among each other.

To illustrate this, the agencies manage the tension arising from offering more citizen-centric services versus cost reduction with the aid of IT by a tunnel through the firewall and connect the functional units, through the use of a centralized database and the virtual invoice system. For instance, the virtual invoice system allowed the public organizations to process a total of 2 million invoices per year. As suggested by the Ministry of Education, Culture and Sports, the ministry benefitted from an improved transparency of budgets within the agency

which led to better resource acquisition and co-production capabilities as a result of the implementation of a virtual invoice system:

> *"We are working on the virtual invoice in order to have an analytical accountancy and so everyone know how much it costs the Ministry, the expenses associated to its work, and then, there is a second level, which is a cost structure by managing centers. We are moving those two variables. Then, in that cost allocation, there is obviously co financing" (Ministry of Education, Culture and Sports)*

"Tunnels" were created such that each agency is armed with a holistic view of all functional units which helps the ministries exchange data and better understand needs across the entire public sector. Key information such as demands and budgets of all units are centralized and presented through the system to management. The tradeoff resulting from the competing goals of multiple projects proposed by different units are ameliorated by demand aggregation and decentralization of the goals. Instead of dealing directly with conflicting goals across units, key metrics pertinent to every unit are presented via the system, enhancing the resource acquisition capability and creating co-production opportunities for joint projects funded by multiple units. Individual units focus on the amount of resources they can contribute instead of amount of resources they need. In this way, budgets across units are pooled for common needs across units alleviating the tension between cost savings and initiating new services. Information from IT resources significantly improved the public organization's ability to prioritize services and allocate budgets to the most important need.

In this process, IT resources help create public organizations' resource acquisition capability and co-production capability by incorporating conflicting goals from two or more stakeholders (e.g. citizens, departments, ministries and provinces). The actions among different stakeholders with varying and competing interests tend to initiate a concerted action when data from multiple sources are pooled and presented to multiple stakeholders. We find

that IT resource facilitates the sharing of resources in times of budget constraints and prevents inefficiencies resulting from public organizations having to guesstimate the optimal allocation of resources. As a result, the public organization was better able to prioritize on projects.

Further, employees started to identify themselves with the organization-wide goals instead of unit-wide goals. The employees were able to associate themselves with the broader goals of the organization and employees from different business units were banding together and finding ways to work together to contribute to the organization-wide goal. Interestingly, this led to higher employee satisfaction (e.g. Ministry of Finance, Education and Economy) and better knowledge sharing in other projects. Before, the employees focused on and protected their own interests. However, as a result of the conflict resolution process which led to greater clarity in terms of what is truly important to the organization and promoted the identity to the values of the organization. This is illustrated in the responses as follows:

> *"It is one of the criteria.. besides commitment, the highest added value to the organization.. that leads us to prioritize the citizen service" (Ministry of Foreign Affairs)*
>
> *"...obviously there are associated components of the systems …that people share and people will identify with the organization." (Ministry of Education, Culture and Sports)*
>
> *"There is technology transfer between regions: collaborative technological platform for each agency to share best practices, technological development and initiatives." (Ministry of Industry, Energy and Tourism)*

Our finding provides an indication of IT reducing the tradeoffs caused by conflicting value-based goals by tunneling or breaking firewalls, an important deviation from the established concept of firewall as a mitigating behavior exhibited by public sector agencies.

IT-enabled Capabilities Resolve Conflicting Values Through Hybridization

One of the dominant conflict resolution strategy enabled by multiple strands of IT-enabled capabilities was hybridization (de Graaf et. al, 2014). Hybridization refers to the strategy whereby multiple conflicting values are achieved simultaneously. This type of resolution was made possible through the combination of capabilities including: public service delivery, innovation, and public engagement. Most public organizations were able to harness the data for other purposes and more innovative projects through hybridization. As an illustration, the conflicting values between cost savings and innovation was attained via the consolidation of data management systems.

Data was standardized across public organizations by developing technical standards. This standardization can help alleviate tradeoffs between public sector and industry. One of the key concerns from industry was the lack of standardization across different public organizations at various levels (e.g. local, provincial or regional government) which diminishes the benefits of economies of scale. This resulted in the ALPHA (name disguised) project which provides a set of reusable data and information for the industry to exploit economies of scale and simultaneously promotes transparency.

Another underlying capability that drives this strategy is the increased innovative capability of public organization that stems from the rising expectations from external stakeholders. From our data, we find evidence of IT resources driving innovative capability when the public organizations were able to sense the changing and emerging needs of the public and provide more innovative solutions as a result. This innovative capability within public organizations results in the hybridization of conflicting values.

A good example that illustrates such capability is that of an online service called the "Digital Diplomacy" project, initiated by the Ministry of Foreign Affairs. This project aims to "*contribute towards increasing its efficacy and transparency and facilitate connection and*

dialogue with citizens, while at the same time harness opportunities that arise from new technologies for promoting the ministry's interests abroad". Its goal is to modernize equipment and communication, and to adapt the provided services to the demands of a modern society. To achieve this goal, the Ministry has developed an extensive network of profiles in social networks, including a webpage called "social network atlas" to facilitate interaction with the general public. This use of social networks is a perfect example of engagement capability to promote interaction with citizens.

A culture of reuse permeated across the public agencies which enabled and promoted technical standards across the entire government. Standardization of data allowed cross-agency exchanges and promoted reuse and transparency. Public engagement capability also drives hybridization strategy removing the conflict between cost savings and innovative services to cater to the public. As the public organizations engaged with the public through publishing data, different stakeholders were also allowed to partake in the ecosystem. Third party developers started to harness data published by these public sector agencies for creating innovative apps. For instance, the Ministry of Industry, Energy and Tourism was able to attract third party developers with open data initiatives. Third party developed apps improve tourists' satisfaction by complementing tourists' experience and offer interactive 3D virtual spaces simulating the tourist destinations. Users of these apps were able to examine every corner of these tourist destinations in very high resolution and access the destinations that are not open to the public. These apps were then adapted for other context such as museums. Users were able to use holographic scans and 3D techniques to generate high resolution images of the most important masterpieces in the museum.

In the above cases, tradeoffs such as cost reduction hybridization removed tradeoffs by resolving multiple conflicts simultaneously, enabling both cost reduction and innovation, as well as cost reduction and better engagement. As one respondent suggests, IT was a

catalyst which produced much changes and enabled the innovation capability across the public sector:

> *"Speaking of information systems involves talking about evolution, it's part of our daily challenge for new projects representing a growth, continued evolution and adaptation of our organization according to new requirements." (Provincial government)*
>
> *"In the short to medium term, we will acquire new powers of information systems … with which we will face new integrations which in turn allow us to offer new features to the citizen."(Provincial government)*

Overall these changes led to the ability of public organizations in achieving multiple conflicting values simultaneously. For example, the conflict between costs and the development of innovative citizen centric features increased through innovation, public service delivery and public engagement capabilities. As suggested by respondents below:

> *"The relationship of the government with the citizen has to move in this direction and this relationship will not strengthen without technology" (Ministry of Agriculture)*
>
> *"The current economic situation forces us to adapt and find new procedures that allow us to do more for less and we are working along that line, analyzing new business models that are being implemented in ICT." (Provincial government)*

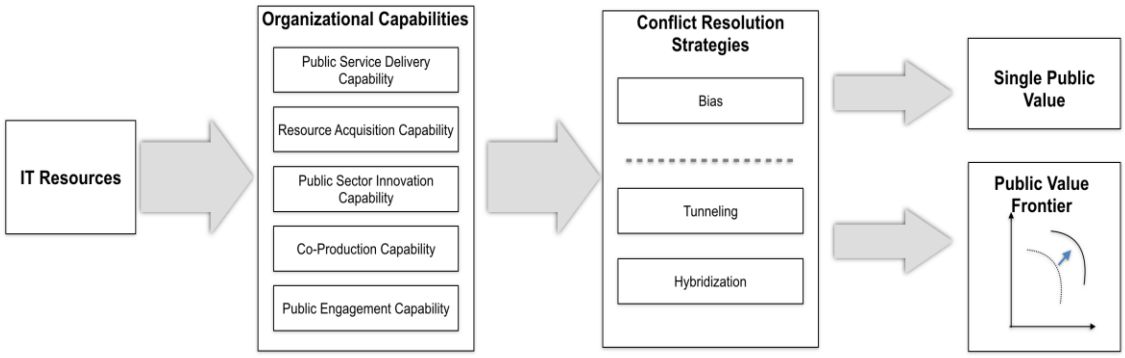
DISCUSSION

In this study, our aim is to provide an account of how IT resources can strengthen organizational capabilities in public organizations of a European country to resolve tradeoffs in order to achieve public value. To do this, we adopted a conflicting value-based lens. Additionally, we elucidate how IT enables the public organization to achieve public value by resolving or managing the tensions between value-based conflicting goals. We exploit a unique environment in the country that we study, one that suffered from a financial crisis, so

as to tease out fine-grained mechanisms of how IT enabled capabilities might mitigate tradeoffs arising from conflicting value-based goals in public organizations. As the country's economy was only starting to improve after a financial crisis, the political environment was still subject to substantial turbulence and financial constraints when this study was conducted. Most projects in every public organization were confronted with the conflicting goals between citizen-centric value and cost savings. While cost is one of many conflicting values that confront public organizations, the degree of conflict presented in this country allows us to tease out the conflict resolution mechanisms during which there is maximum level of conflict.

We drew on a conflicting values perspective to explain how IT resources help public organizations generate value through IT-enabled capabilities. Previous work (Pang et al., 2014) delineates several mechanisms of IT-enabled capabilities in public organizations and ignores how tradeoffs between value-based conflicting goals are resolved through IT-enabled capabilities in public organizations. Our work proposed a framework and delves deeper into the detailed elements required for the mechanisms to occur using a conflicting value-based goal perspective.

Figure 2. Proposed framework of how IT creates public value through conflict resolution



This analysis allows us to build deeper insights into the different conflict resolution mechanisms to attain value-based conflicting goals. As a result, this study has resulted in new insights into how conflicting public values are resolved through IT-enabled capabilities in public organizations. Our primary findings are presented in Table 5 and Figure 2.

Figure 2 provides an overview of how IT creates public value by managing the tradeoffs resulting from conflicting value-based goals. Through IT-enabled capabilities, these resolution strategies led to the creation of public value. From our analysis, we identified the three mitigating strategies to resolve conflicting values in public organizations. Overall, we found evidence of two established strategies – (i) bias and (ii) hybridization (de Graaf et al., 2014) from the public administration literature whereby IT resources enable different capabilities - public service delivery, resource acquisition, public sector innovation, co-production and public engagement capabilities, that facilitate the public organizations to resolve or better manage the tensions between conflicting value-based goals. We found evidence of these strategies across the range of public sector organizations in our sample which varied in terms of size. While every attempt was made to ensure that we had a wide range of public sector organizations, there may be other strategies which are present in other agencies not available in our dataset. However, these strategies are dominant in our dataset because we are analyzing a cross-section of the dataset which will not allow us to capture other strategies which is time dependent (e.g. cycling). Thus, we do not rule out the possibility of other strategies. Additionally, we identified a new and distinct conflict resolution strategy – *tunneling*, which has not been identified in prior literature. Tunneling refers to the strategy where different public organizations across the public sector find ways to establish a common goal or objective. This strategy breaks down existing boundaries across public organizations, creating a tunnel across organizations by establishing a common goal across all organizations such that they will cooperate with one another. This new

strategy highlights the possibilities that IT-enabled capabilities can generate in public organizations especially in situations with trade-offs that are abound in the public sector.

IT-enabled capabilities facilitated the resolution of tradeoffs because these capabilities facilitated the deployment of various strategies. In particular, we find that public service delivery capability, resource acquisition, facilitates bias reducing the need of public organizations to focus on cost savings through the centralization of systems and demand aggregation which led to economies of scale. Resource acquisition, co-production and public engagement capability also facilitated the strategy of tunneling as public organizations were able to find common goals and collaborated with one another to resolve conflicting goals. Finally, public service delivery capability, innovation and public engagement capability could also lead to hybridization which again removes the need for conflicting value-based goals.

CONCLUSION

The public sector has evolved over the years from a traditional public administration characterized by a bureaucratic, top down structure with lack of transparency, to an approach which is market driven, and finally to one which is decentralized, transparent and citizen-centric. Despite this evolution, public organizations are still confronted with the situation of having to resolve conflicting value-based goals of the public administration. From our study, we find that IT provides public organizations with the capability to respond directly to the perennial challenge of tradeoffs from conflicting value-based goals. Using a capabilities framework, we delineate the mechanisms by which IT resolves or better manage tensions between conflicting value-based goals to achieve IT-enabled capabilities. In particular, IT resolves or reduces the tradeoffs between value-based goals through mitigating strategies to achieve public value.

Our study is the first to contribute to extant literature by examining how IT helps to mitigate these tradeoffs in public organizations. Prior studies have noted that conflicting values are especially predominant in the public sector (Pang et al., 2014) and can be attained through various IT enabled capabilities, but neglect to identify the strategies by which IT can be used to help resolve these conflicts. In contrast with prior work, our study documents how three strategies actively produce resolutions by mobilizing IT. As a whole, our study demonstrates the relevancy of IT to resolve tradeoffs arising from conflicting values in public organizations. Our results indicate the need for future research to systematically consider IT to resolve tradeoffs in order to attain public value. Future studies could leverage on these concepts to maximize the deployment of IT resources in public organizations.

Our paper contributes to multiple strands of the IS and public administration literature. First, our paper is one of the first to embark on a study that juxtaposes IT value creation with conflict resolution i.e. how IT resolves or at least reduce the tensions between conflicting value-based goals to generate value. Previous scholars in IS business value have identified the need for more theory building (Schryen, 2013) and our findings suggest that conflict resolution lens may be useful in extending studies in IS business value. We contribute to a nascent literature on examining conflicts in public service delivery and the implications of using IT for public organizations. The theoretical literature on value conflicts in the public administration literature has long emphasized the importance of conflicting public values afflicting government and their policy implementations. However, most of these studies have focused on the mitigating strategies of public sector organizations in dealing with conflicting values. None of these studies examine the effect of IT in these scenarios. Our study clarifies the ways IT resolve value conflicts and in the process help public organizations attain the value of IT. We identified a repertoire of strategies by which public organizations can use IT to mitigate multiple and conflicting values. Specifically, we demonstrate that IT can help

public organizations achieve conflicting value-based goals by effectively reducing the tension that public organizations experience and simultaneously provide more and better services. Further, while prior studies address partly questions related to the creation of public value, few studies focus on extending the public-value frontier like our study In particular, our study focus on understanding how this is achieved through the deployment of IT.

Second, it adds to a growing number of studies which evaluates IT in public organizations. While most studies focus on the adoption and use of e-government, in contrast, we observe the impact of IT on creating public value within public organizations. Third, we contribute to the IS literature which seeks to obtain a deeper understanding on the generative processes of IT value in the context of public organizations, which are reported to have starkly different characteristics from private sector. Ours is one of the first few studies which combine the IT capabilities framework with conflicting public value lens to provide evidence on how IT helps public organizations cope with conflicting value-based goals and attain public value and performance. Specifically, rather than just focusing on the mechanisms whereby IT lead to public organizations' performance, we identify the ways by which IT helps resolve conflicts in public value by examining these mechanisms of IT value creation in a highly constrained environment, i.e. a country whose public sector organizations experienced conflicting value-based goals, following a crisis.

We acknowledge the limitation of this study in that our findings are derived from one country and thus cannot be generalized to all settings. However, we are currently analyzing data from multiple companies in the private sector using the same approach described in this study. We also do not claim to have an exhaustive list of strategies whereby IT can help manage the tensions arising from conflicting value-based goals. Rather, we provide the first steps for future research to build upon the conflicting value-based lens that we have introduced in this paper. Future research can extend this work by studying other countries and

strategies by which IT helps public organizations manage tradeoffs from conflicting value-based goals. Nevertheless, our proposed framework should generate further interest and application in future studies.

This study provides meaningful implications for elected officials and managers in the public sector. Budget shortfalls persist in many countries, and IT budgets have become an easy target for cuts. For instance, the National Association of State Chief Information Officers (NASCIO) in the USA revealed that during recent years one of the most critical issues facing its members is managing budget reduction; including defining strategies for savings and reducing or avoiding costs (NASCIO 2017, NASCIO 2018). Our research results show how public organizations can resolve conflicting goals, such as budget reduction, via IT-enabled capabilities. From a practitioner point of view, the examples of the application of IT-enabled capabilities discussed in this article could be used as blueprints by IT managers of public organizations in order to define strategies to mitigate value-based tradeoffs within their organization. Further, policy makers and IT managers in public organizations can utilize the different strategies (bias, tunneling and hybridization) found through this study and leverage IT resources to develop capabilities that enables them to circumvent value-based tradeoffs more effectively. Public organizations can implement strategies as identified in this paper depending on the trade-offs they are confronted with. They are also able to understand how these strategies can be deployed with the help of different IT resources.

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APPENDIX 1: Interview Questions

Understanding the overall role of IT in public sector organization

1. What are the issues addressed in your organization with respect to technology?
2. What is the mission of IT in your organization?
3. How is your organization using IT to differentiate, or to generate new business, or transform internal business operations?

Understanding the overall organizational structure of public sector organization

4. What is the overall organizational structure? What is the structure of the IT department? How does the overall organizational structure affect coordination with the IT department?
5. Is the IT department part of the organization or is it outsourced?
6. How are IT projects authorized?
7. What are the kinds of technology adopted or technology projects approved?

Understanding the perceived impact of IT on the performance of public sector organization and other exogenous factors which may impact performance

8. How is the impact or return on investment of IT analyzed?
9. What are some challenges you have experienced as a result of IT projects?
10. Are there any changes in the organization as a result of the current financial crisis?