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Matheus, Ricardo; Janssen, Marijn

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Towards an ambidextrous government: Strategies for balancing exploration and exploitation in open government

Ricardo Matheus
Delft University of Technology
Jaffalaan 5, NL-2628 BX Delft, The Netherlands
+55-11-97227-7521
r.matheus@tudelft.nl

Marijn Janssen
Delft University of Technology
Jaffalaan 5, NL-2628 BX Delft, The Netherlands
+31-15-278 1140
M.F.W.H.A.Janssen@tudelft.nl

ABSTRACT
Governments are often putting their efforts in the operation and execution of existing services without having the means to innovate. Ambidexterity is the ability to operate existing services and to innovate at the same time Ambidexterity is a concept originating from organizational studies in the private sector and is hardly used in the public sector. The goal of this paper is to identify strategies used by governments to combine exploitation and exploration. Factors influencing ambidexterity were derived from the literature and categorized in political, organizational, technological and economical categories. These factors were used to analyze two case studies. The cases revealed strategies used by government to move from exploitation to exploration. Strategies include providing incentives, like awards and prizes, to involve resources that are external to the government. The strategies can be classified as contextual ambidexterity.

Categories and Subject Descriptors
J.1 [**Computer Applications**]: Administrative Data Processing – *government*

General Terms
Management, Theory.

Keywords
e-government, public sector, transparency, open data, open government accountability, innovation, ambidexterity, exploration, exploitation.

1. INTRODUCTION
Open government is a new direction for governments to innovative [1, 2]. Open government refers to the opening of public data and the development of applications for creating transparency, accountability and engaging the public [3]. Open government efforts are lagging behind the ambitions [4]. One of the reasons is that governments have a lack of resources for creating an open government, as they are using their scarce resources for running their operational processes. Running daily processes and innovating requires ambidexterity, the ability to exploit and explore at the same time [5, 6].

In business research the field of ambidexterity is well-established [5]. The objective of exploitation is generally associated with refinement, efficiency, production and selection, whereas exploration is associated with search, discovery, experimentation, risk taking and innovation [7]. Combining both concepts have been denoted as ambidexterity [5, 6]. *Ambidextrous enterprises* are organizations that are able to combine exploitation and exploration successfully.

Open government ambidexterity is the ability to continue and modify public service-delivery and to move to an open government the same time. Open government objectives include openness, transparency, accountability and participation [1]. The Public Sector is often criticized for having a too long lag time between idea and realization [8]. Simply speaking, exploration can provide novel and even disruptive new applications, exploitation can bring small, incremental improvements. Ambidexterity combines the small improvement of existing systems and processes and the more radical, long-term innovation.

Although ambidexterity studies are well studied in the private sector, ambidexterity has been given scant attention in the public sector. The research presented in this paper has the objective to investigate strategies for public organizations to becomes ambidextrous. The scope of this paper is limited to open government. This aim is achieved by reviewing private sector literature and identifying strategies in which exploration and exploitation are combined. Based on the insights derived from the literature two cases are reviewed and public sector strategies for simultaneously achieving exploitation and exploration are derived.

This paper is structured as follows. In section 2 the research approach is presented. Section 3 provides a background of ambidexterity and the typical strategies employed by private organizations. The backgrounds of two case studies are presented in Section 4. A synthesis of strategies affecting the creation of ambidextrous enterprises is presented in section 5. Finally conclusions are drawn in Section 6.

2. RESEARCH APPROACH
Ambidexterity is a concept originating from business that has hardly gained any research attention by public sector researchers.

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Therefore we will first investigate literature about private sectors firms and enterprises to understand which strategies are used to create ambidextrous enterprises. We used "ambidexterity' and 'ambidextrous organization", and ambidextrous enterprises' as the key search terms for surveying the literature. The literature review was conducted using academic databases for literature searches including IEEE Xplore, SCOPUS (Elsevier) and ACM Digital Library. In addition, Google Scholar was used for complementing the search results. This resulted in an initial identification of 47 papers that were found to include strategies combining exploitation and exploration or strategies for supporting moving from exploitation to exploration. The identified papers were screened for their quality, relevance for the research, and insights for our research. This resulted in a final list of 13 articles. These papers show strategies for enterprises to combine exploitation and exploration or to move from exploitation to exploration.

As the literature review found was focused on the private sector, we opted for investigating two case studies to refine and understand how these strategies were used in the public sector. Case study selection criteria include access to data, a proven record of being ambidextrous (as far as this was possible) and projects in the field of open government. The case studies which are selected are based on two initiatives on transparency innovation from the national Brazilian government. Both initiatives received awards for being innovative. The national transparency portal (NTP) was created in 2004 and was awarded in 2008 by United Nations Office on Drugs and Crime (UNODC), whereas the national open government data (NOGDP) portal was created in 2012 and received a national award in 2015. In both cases there was an initial struggle to create transparency using open data. By employing ambidextrous strategies both exploitation and exploration became possible at the same time. This provided us the opportunity to analyze the strategies that were used to move to becoming an ambidextrous organization. The case studies were analyzed by studying documents, websites and media reports.

3. LITERATURE REVIEW

3.1 Ambidexterity concepts

Ambidextrous organizations and ambidexterity refers to a concept describing the capacity of an organization be able to improve the efficiency of current processes, services and service delivery processes and the ability to innovate products and/or services to better compete on the market [6].

In the literature the difference between structural ambidexterity and contextual ambidexterity is emphasized (e.g. [5, 7]). *Structural* ambidexterity focusses on a spatial separation of exploitation and exploration [9, 10]. *Structuralists* believe that is possible to create periods to exploit or to explore, but this cannot happen at the same time [11]. *Contextualist*s believe that is possible to use theories from social and behavior sciences to explain the integration of exploitation and exploration as being different things, but happening at same time [12-14].

Exploitation is based on actions like improving efficiency [15], refinement, selection, implementation and execution [16]. Exploration is based on actions like innovation [7], experimentation, flexibility, variation and risk taking [16]. Innovation is conceptualized as the sequence of activities by which a new element is introduced into a social unit, with the intention of being beneficial to the unit or the wider society [17]. Many firms efforts are focused often on exploitation and neglecting exploration [18]. However, companies only focusing on exploitation encounter the risk of creative destruction, the process in which new innovations replace outdated ones [19].

3.2 Strategies

Our literature review shows that the majority of strategies that can move enterprises from exploitation to exploration can be classified into three categories. Each category consists of a range of different strategies.

i) organizational and political,

ii) technological, and

iii) economical factors.

Some of them are closely connected. The strategies are summarized and described in Table 1. Many of the strategies can influence each other. Embracing a single strategy might not result in the desired effects and often a combination of strategies is necessary to become an ambidextrous organization.

3.2.1 Organizational and political strategies

Shared goals, collective identity and creation of group culture can improve organizational performance [14]. Also, the strategy for decentralizing the organization structure, and the decision-making can create more flexibility and in this way enhance organizational performance [20, 21]. Finally high quality level of recruitment and training of people can help to move from exploitation to exploration [22].

The role of leadership is a frequently mentioned characteristic in contextual ambidexterity. Some decisions such as the creation of specific routines [11], feedback, behavioral reports [23], and trustiness between leaders and leaded people [11], have been identified as contributing to ambidexterity. Research shows that small companies having a low number of employees meeting these criteria were often able to combine exploitation and exploration, whereas for big companies with higher number of workers and hierarchical structures this was found to be challenging [24].

3.2.2 Technological strategies

Technological factors have also been mentioned [25, 26]. Management and standardization of data are crucial for enterprises that want to work on both exploitation and exploration [27]. Quality management and standardization of data can create flexibility on usage of data, resulting in higher accuracy and other data quality characteristics [28]. Good quality data and information can results in the creation of competitive advantage [29]. Graphical dashboards and simulations to make decisions in real-time can reduce the uncertainty of decision-making and facilitate moving to exploration [27].

Partnerships with external parties and outsourcing information systems and information technology can help to improve exploration [27]. Yet exploitation might suffer, as the implementation and decision-making of improvement can take longer than without outsourcing. Outsourcing might also impact knowledge management as a high dependency with third parties is created which might lower the exploitation performance [30].

Table 1. Strategies to move from exploitation to exploration on enterprises

Category	Strategy	Description	Source
Organizational and political	Shared goals	Creating shared goals affects both exploitation and exploration to reach organizational performance. No shared goals contribute negatively to ambidexterity and results in lower performance, while clear shared goals contribute to better performance.	[14]
	Collective identity	Creating a collective identity affects positively ambidexterity, due the feeling of being part of the same group. Even different departments such IT, marketing and finance or different hierarchical levels such as white and blue collars can have a collective identity.	[14]
	Group culture	The creation of group culture disrupts the old paradigm of departmental silos and avoids inside battles and can help to direct all the power against external adversaries. If a group culture exists, this affects ambidexterity positively and if a group culture does not exists, this affects ambidexterity negatively.	[14]
	Decentralized structure	The decentralization of structure can affect positively the organizational performance due its increase in speed of decision-making and solving small problems, quickly avoiding snowballing, saving time and resources.	[14]
	Decentralized decision-making	Based on the decentralized structure a decentralized decision-making can affect positively the organizational performance creating faster and cheaper solutions for future big issues on production. In this way decision become not overwhelming and at the same time managers are empowered at the decentralized levels.	[20, 21]
	Recruitment	Good decisions and high quality products or service can attract potential staff. High quality level of recruitment affects positively the organizational performance and is a bases for both exploitation and exploration.	[20, 21]
	Training	Training is the continuous process of improving and training people and affects positively the organizational performance. A lack of training can affect negatively both exploitation and exploration	[22]
	Leadership decisions	Top and operational manager leadership is a factor that affects positively or negatively the organizational performance.	[22]
	Routines	Specific routines and micro-goals for each individual based on the shared goals of the enterprise can improve ambidexterity.	[11]
	Feedback	People are expensive and valuable assets of the enterprise. Retaining and improving the quality of people are factors that affect positively the organizational performance. Providing feedback can help staff to decide who and what can be done to at same time improve efficiency and avoid expend funds on firing and search for new people.	[23]
	Trust	Consensual decisions and transparency can affect positively the relationship between leaders and leaded people. Trust is a factor positively affecting organizational performance.	[23]
Technical	Data management	Data can be an asset for improvement and innovation. The first step to have good data quality is to manage well all the data. Collection and storage of data can affect positively ambidexterity.	[24]
	Standardization of data	Standardized data affects positively exploitation and exploration. Standardization of data influences data quality and decisions-made.	[27]
	Data quality	Data quality is a multi-dimensional construct. Accurate, updated and other characteristics of data can help better decision-making to improve exploitation and exploration.	[28] [29]
	Graphical dashboards	Graphical dashboards with good data quality result in better decision-making and can affect exploitation and exploration. Positively.	[27]
	External partnerships	External partnership can affect positively or negatively ambidexterity. Positively if the partnership is sustainable on the short and long-term avoiding dependency on the third partner and creating knowledge inside the organization. Partnership can also reduce costs and bring synergy from the third partner to the operation and service delivery. A bad partnership can have the opposite effects.	[30] [31]
	Outsourcing Information systems	Outsourcing information systems are another level of external partnerships and can create the same benefits and risks that external partnership brings. Outsourcing can either affect exploitation and exploration positively or negatively.	[30]
Economical	Resources for new technology	Lack of resources can affect negatively bot exploitation and exploration. A lack of resources can lead to not updated technological equipment and software, reducing potential probability of competitive advantage brought by the same updated equipment and software.	[32]
	Resources for Retaining staff	Lack of resources to hire and retain talented people can affect exploitation and exploration negatively	[33]
	Reward system	Reward system to employees can affects exploitation and exploration negatively.	[34]
	Partnerships	Partnership can affect exploitation and exploration positively, but if it does not work out the effect will be reversed.	[31]
	Financial leverage/external financing	Financial leverage and external financing can affect exploitation and exploration negatively or positively, depending on the conditions of the economic (crisis) or sector (market boom).	[35]

3.2.3 Economical strategies

Combining both exploitation and exploration can result in better and new products resulting in higher sales figures [5]. However a lack of resources, and consequently the access and sustainment of updated technology and know-how from talented people can reduce the ability to explore [33]. Knowledge management and viewing knowledge as an assets can stimulate innovation [36, 37].

Reward systems are related to the human factors found in the organizational and political category. Reward system are used to motivate staff to innovate [34]. External partnership can reduce costs and improve quality of products and service at low costs [31]. Finally, financial leverage and external financing are factors that can enable or impede both exploitation and exploration of enterprises. If there is a lack of resources internally, money can be obtained by getting a loan or sell stocks on the market [35].

Job rotation was mentioned as a strategy to train people, create a shared culture and understanding of the mission of the enterprise. Hiring external staff might look easy at beginning, but expensive on the long run and resulting in less exploration [37, 38]. Attracting and retaining talents is a crucial strategy to improve exploitation and exploration on the short and long-term [39].

4. Case studies background

The strategies found in private sector literature are summarized in table 1 and were used as an input to investigate two case studies in open government. This article is a further refinement of our previous study [8].

4.1 Transparency portal

Portals can be used by government to create transparency and accountability by making government data online available [40, 41]. Transparency is aimed at overcoming the information asymmetry between the government and the public which should help the public to understand the various aspects of government and its inner working [42].

The transparency portal of Brazilian national government was created in 2004. The agency in charge of this portal is the Comptroller General of Brazil (*Controladoria Geral da União* - CGU), which was founded in 2001. Overtime CGU become better organized and more powerful.[43]. CGUs initial objective was to avoiding fraud, corruption and promote the defense of public assets. In 2002 a decree [44] was introduced giving more responsibilities and new functions to CGU. The internal control functions from Chief of Staff (*Casa Civil da Presidência da República*) and general ombudsman from Ministry of Justice were moved to CGU. In 2003 a national law was introduced making the CGU even more powerful [45]. This law gave the CGU the status of Minister of State for Control and Transparency purposes. In 2006 another legislation became int effect which gave to CGU yet more powerful of decision-making (efficacy) and allocated a higher number of high skilled civil servants (efficiency) [46]. CGU was re-structured in 2013 by a decree [47]. This prompted to CGU the central place of national government focused on control, and prevention and a place for receiving complaints, such as an ombudsman on the public sector.

The Brazilian national TP was created in 2004. This portal had the objective to make all expenditures of the Brazilian national government available to the public. The portal lists all expenses and money transfers of the federal government, including the list of all people receiving funding from the social aid program *Bolsa Família* benefits (Family Allowance). Since its creation, the portal has received several prizes in Brazil and worldwide. The most important award that TP received was in 2008 by UNODC [8].

After Brazilian national government created the national TP, several regional and local level governments started to create their own portal showing all their expenditures and incomes. This movement resulted into a national legislation in 2009 called supplementary law 131 [48] and changed the supplementary law 101 [49] of fiscal responsibility of the government. This law obligates all the level of governments (local, regional and national) to create TP for transparency and accountability of expenses and incomes [50].

Several strategies to move from exploitation to exploration were found in this case study. There were several innovations. First, before the Internet and the transparency portal all the transparency and accountability of data was shared via paper or electronically. All these efforts were digitized requiring a change in the processes. Second, an innovation to monitor and fight corruption via decree and late by law between the years of 2001 to 2003 was introduced. Third, the fighting of corruption was given high priority on the agenda of the government. This was improved by data collection and storing in the TP. The innovation was initially lagging behind when there was no legislation on information disclosure. Later legislation was created and approved disclosing all the data. This was found to be an important enabler.

4.2 Open Government Data portal

Open government data portals are electronic portals that publish governmental data based on open data formats [51, 52].In Brazil, the first open data portal was opened in 2010 by the national government. Later this was followed by regional states and municipalities, such as Sao Paulo, Recife and Rio de Janeiro. These portals started with a limited number of datasets, and functionalities [53, 54]. Over time these became more advanced. National legislations that helped to advance the initiatives are the Brazilian freedom of access law [55], the Federal Constitution [56] on the article 5, XXXIII, 37, §3, II e 216, §2, the supplementary law 101 (Law of Fiscal Irresponsibility) [49], the supplementary law 131 that ask to publish on Internet and electronic format the expenditure and income of government [48], the Brazilian FOIA [55] and the Brazilian Civil Rights Framework for the Internet [57]. The city of Rio de Janeiro is the only local government that has created its own legislation about open data since 2014 [58]. The Federal Legislative (Camara dos Deputados) wanted to stimulate this further and initiated a new law for open government and data, but this law is still on the phase of public hearing [59].

The technical infrastructure for the opening of data is centered at a group called National Infrastructure of Open Data (INDA) [60]. Organizing hackathons, the introduction of prizes and media coverage were used as stimuli to enable use and the creation of novel ideas for using the data. These kinds of incentives are focused on mobilizing external capabilities and resources for exploration.

Management and standardization of data are crucial for the opening and use of data [61]. Indeed this standardization and creation of interfaces that helped programmers and coders, but can also create a cycle of public value for the data disclosed [61]. Hence this is an important strategy to move to exploration.

Apart from political support and legislation international, pressure and investments can be crucial for the change of agenda setting and political sponsorship.

5. Findings and Discussion

The two cases revealed a number of strategies to move from exploitation to exploration and to create ambidextrous public organizations. Thirteen strategies were identified ranging from political to technical, which are summarized in table 2. This suggests that a broad range of issues need to be addressed to become an ambidextrous government.

Some of the strategies shown in table 2 are similar to the strategies of private sector organizations, whereas other strategies are different. In particular strategies categorized in the organizational and political categories are different, whereas the technical and economical strategies are more similar.

Not surprisingly the role of legislation was a key strategy that is in contrast to the private sector. Legislation forces organizations to innovate and to reallocate the use of their resources. The standardization and availability of data to create transparency were enabled by introducing national legislation[48, 49]. The national transparency legislation is focused on creating the enabling conditions for transparency by requiring to disclose the expenditures and incomes of national government using the CGU. The data disclosed by CGU has helped journalists to create news and developers to create software and applications that revealed transparency of government expenses to people [61].

The role of external pressure is another difference. In both cases pressure was a key determinant for stimulating ambidexterity. Due to a number of reasons, many scandals of corruption were discovered in Brazil over the last 15 years. These discoveries created a wave of crisis of representativeness [62], a need for a change of agenda setting [63] and fiscal-budgetary commitment [64]. Whereas people experienced bad quality service delivery and public policies were not are aligned with what society needs, politicians and civil servants had high salaries and benefits. Many fraud and corruption investigations did not result in prosecutions due to nepotism.

International pressure and investments resulted in higher data quality, the making of necessary investments. This kind of pressures were found to be crucial for the change in agenda setting and political sponsorship. After the United States created the Open Government memorandum, the OGDP Brazil followed this wave and was invited to lead the Open Government Partnership in 2012.

Some strategies identified in the literature were not found in our cases. This includes shared goals, collective identity and group culture. One explanation for this is that the goals are driven by legislation and civil servants might have a certain collective identity and group culture. Often this group culture is criticized for being risk adverse that hinders exploration.

Although both public and private parties employ external resources, the public sector seems to be more focused on their efforts to mobilize the public by providing incentives and prizes. In general the private sector focus on using their own internal sources is this can be better used for creating competitive advantage, whereas for government are focused on openness, transparency, accountability and participation. When private sector organizations try to mobilize external resources they look for formal constructions like outsourcing and partnerships, which were not found in our public sector cases. Nevertheless outsourcing and (public-private) partnerships are commonly found in government and the selection of other cases might result in a different conclusion. Hence we recommend to survey a broader range of cases in further research and also research outside the open government field.

When viewing the strategies used in the two cases and in the literature, we can conclude that the private and public sector can learn from each other. In short, the private sector can focus more on external sources and open innovation, whereas the public sector can look better how their internal sources can be used to combine exploitation and exploration and look at private sector strategies.

6. Conclusions

Ambidexterity becomes a key issue for governments from all over the world, as their constituents expect that services are provided seamlessly and at the same time innovations are accomplished. In this paper strategies for moving from exploitation to exploration in open government were identified by reviewing private sector literature and investigating two cases. The literature review of the private sectors shows a number of strategies to combine exploitation and exploration. These private sectors strategies were used as a frame of reference to identify public sector strategies using two cases. The main strategies found are stimulating data usage by society, attracting and retaining talented and specialized staff, political support, legislation, external pressure, internal pressure, management of data, standard interfaces, training, resources for technology, retaining staff, reward system, and international support and pressure. The strategies are contextual ambidexterity strategies, in which exploration and exploitation are different things happening at same time.

Some strategies for creating ambidexterity by public organization were focused on mobilizing the user community and in this way mobilizing the use of external resources. In this respect the public and private strategies are found to be different. The private sector focusses on using their own internal sources, whereas the government focuses on involving other parties. Both sectors can learn from each other. Private sector can focus more on mobilizing external sources, knowledge and open innovation, whereas the public sector can look better about how their internal sources can be used to combine exploitation and exploration.
Although we did not find any research in ambidexterity in the public sector, ambidexterity is found to be relevant for the public sector. We recommend to deepen this concept for the public sector and to investigate more and different cases to understand better which strategies will work under which circumstances. This can help governments to become ambidextrous organizations that are able to run their daily business and innovate at the same time.

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Table 2. A summary of strategies influencing exploitation and exploration strategies

Category	Strategy	Description	Case(s) in which strategy was found
Organizational and political	Stimulating data usage by society	Events like Hackathons, prizes and news and other stimulus were found to be a means to innovate.	Case 2 - Open data portal
	Talented and specialized people	Need for specialized people and to retain talent s.	Both cases.
	Decentralized structure	The use of decentralized portals and opening of data and creating transparency at a local level results in higher levels of transparency and accountability.	Both cases.
	Decentralized decision-making	In the first case a new organizations (CGU) is introduced which is a separate, decentralized, entity which facilitates quicker decision-making.	Case 1- Transparency portal
	Political support	Political support was given by prioritizing the efforts for disclosing data and improving transparency. Political support resulted in more attention, commitment by other agencies and the public. Furthermore political support can also result in the availability of more financial and human resources.	Case 1 - Transparency
	Legislation	Creating legislation showing the high level ambitions was an important instrument to facilitate exploration.	Both cases
	External pressure	Pressure from international organizations, non-governmental organizations, and the public resulted in changes of political and organizational behavior to deliver more with less, and to create transparent actions and the opening of data.	Both cases
	Internal pressure	By auditing the quality of the data pressure from within the government was created.	Case 1 - Transparency
Technical	Management of data	Data has been considered as an asset that needs to be managed and governed well. High data quality influences exploration positively.	Case 1 - Transparency
	Developing standard interfaces	The creation of standard interfaces for publishing data, such as Application Programming Interface (API), results in easier access and use.	Case 2 - Open data portal
	Training	Technological people are trained to learn new methods and software tools.	Case 1 - Transparency
Economical	Resource availability	A lack of resources can affect negatively exploitation and exploration, as new or updated equipment and software is out of reach and no human resources available for operating them.	Case 2 - Open data portal
	Retaining staff	Talented and specialized people is necessary for both exploitation and exploration. Ensuring that staff is well paid was a strategy to retain expertise.	Case 1 - Transparency
	Reward systemsn	Reward systems to give (financial) incentives for staff stay on the departments and to excel.	Case 1 - Transparency
	Job rotations	To advance insight in the different domains and increase understanding staff is rotated among different functions.	Case 1 - Transparency
	International support	International support is connected to the external pressure and availability of resources and enables budget to be allocated to the exploration.	Case 2 - Open data portal

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