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A survey of Web-based business models for e-government in the Netherlands

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Abstract

Governments worldwide are increasingly using Web-based business models to enhance their service delivery. Yet the concept of the business model is unexplored within the context of e-government. Drawing upon the literature on e-commerce, we develop a taxonomy for analyzing Web-based business models for e-government. Based on a systematic survey of 59 e-government Web sites in the Netherlands, our findings indicate that most of the Web sites use the content provider or direct-to-customer business models, while only a few are using novel business models. Overall, the concept of business model is appealing and useful in the public sector. Specifically it compliments research on Web site quality by analyzing and describing Web sites using atomic e-government business models and suggesting improvements by using combinations of business models.

Keywords: e-Government; Business models; e-Government business models; Value creation; Web site survey

1. Introduction

Governments worldwide are increasingly using the Internet to provide public services to their constituents (Layne & Lee, 2001). Much of the research has focused on practical and

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technical dimensions while research on how to improve e-government for users remains scarce (Bertot & Jaeger, 2006). Web-based technologies offer governments more efficient and effective means than traditional physical channels to better serve their citizens (Evans & Yen, 2006). The nonhierarchical nature of the Internet, and its ability to speed communication with 24-hr, 7-days-a-week access offers real potential to improve interaction. Yet the transition from using the Internet as a communication to an interaction channel is not only resource intensive, but requires changes in organizational practices, key value chain activities, and strategic partnerships (West, 2004). Government organizations are challenged to provide more customer-oriented products and services, and to approach customers proactively. For this purpose, governments are increasingly exploring different types of Web-based business models to serve customers through multiple channels such as Web-based services, call centers, and physical offices. In the Netherlands, some forms of e-government have been in existence for over 20 years (e.g., remote retrieval of citizens' information). Yet the forms of e-government in the Netherlands have been limited in their diffusion and adoption, and only recently do we witness an extensive outgrowth of public Web sites with designs based on some type of e-commerce Web-based business models (Winkel, 2005). As it stands, there are more than 1800 public organizations and 500 private organizations offering one or more Web sites related to governments, policy-making, and public services.

The term *business model* is a recent addition to the literature of management and largely a product of the dotcom era (Keen & Qureshi, 2006). The business model concept is about shaping the relation between an organizational strategy and Web-based systems (Hedman & Kalling, 2003). In e-business and e-commerce, a Web-based business model is the method of doing business online by which a company generates revenue (Rappa, 2002). Analogous to business models in the private sector, we introduce e-government business models. In the public sector, instead of generating revenue, e-government business models aim at using the Internet to add value to the constituents in areas ranging from service delivery to political involvement (Janssen, Kuk, & Wagenaar, 2005).

e-Government business models are similar to e-commerce and e-business in their stages of development. The similarities include the establishment of an Internet presence and the application of various types of business models aimed at creating customer value (Layne & Lee, 2001). Since 1995, the Dutch Government has been advocating the adoption of customer-oriented business models in various e-government programs and projects. It has actively promoted policy initiatives encouraging governmental organizations to make their public services available online and to provide information, communication, and transaction services (MinBZK, 1995, 1998, 2000, 2004). While there exist opportunities for governmental organizations to transform their current practices and provide new products and services, many initiatives remain at the Internet presence stage, and the types of transactional services available remain restricted to traditional products (Winkel, 2005). The present guidelines are inadequate for governmental organizations to translate the current efforts and views into actions, and the ideas developed to this point remain abstract (MinBZK, 2004). Also, Dutch e-government initiatives are fragmented through geographically dispersed agencies and many initiatives do not learn from the experiences gained in other projects (MinBZK, 2004). Thus

far the quest toward new government business models for the Dutch government remains problematic. There is a need to develop and apply e-government business models to continue e-government progress and accomplish customer-orientation. Yet the exact link between Web-based business models and e-government initiatives is unexplored.

The goal of this research is to evaluate e-government Web sites based on Web-based business models. Rather than evaluate against any performance measures, the aim of the present study is to understand the types of business models utilized by governmental agencies. These e-government Web sites were evaluated by identifying the types of business models that are supported by each single Web site. The rest of the paper is organized as follows. First, we review the business model concept and various business model taxonomies. Next, we present our research approach which combined a deductive and an inductive approach to develop our e-government business models taxonomy by first deriving the basic components of a Web-based business model based on the e-commerce literature and then further refining them by cross-referencing to a sample of e-government Web sites. The taxonomy is then used to survey and analyze e-government Web sites in the region of Rotterdam. Next, we discuss the findings, and in the last section we draw conclusions.

2. e-Government business models

2.1. The business models concept

While high-quality experiences with responsive, integrated, Web-based services in the private sector have led citizens to expect the same from the public bodies and agencies (Hazlett & Hill, 2003), how governments can harness Web-based business models to improve their Web sites remains relatively unexplored in the literature. As a logical starting point, we reviewed existing Web-based business models found in e-commerce literature.

Timmers (1998) made the first attempt to classify e-commerce business models. He defines a business model as an architecture of the information, product, and financial flows, including a description of the various business actors and their roles, a description of the potential benefits for the various business actors, and a description of the sources of revenues (Timmers, 1998). A business model reflects the core business of an organization and is useful to describe (and even prescribe), the organization from the perspective of its main mission, and the products and services that it provides to its customers. Recent definitions of business models emphasize the creation of customer value. Rappa (2002) defines a business model by spelling out how the company makes money. Afuah and Tucci (2000) define a business model as the method by which a firm builds and uses its resources to offer customers better value. Mahadevan (2000) defines a business model as a unique blend of three streams that are critical to the business. These include the value stream for the business partners and the buyers, the revenue stream, and the logistical stream.

The empirical use of the concept has been criticized for being unclear, superficial, and not theoretically grounded (Porter, 2001). However, the concept of business model is intuitively appealing, although there is no universal definition. Hawkins states that "[T]he business model seemed to fill a niche even if no one could explain exactly what it was" (Hawkins, 2004). A

business model can be viewed as a collection of organizational roles, the system functionalities, detailed description of a mechanism, and relationships among parties. For example, the auction business model performs the role of auctioneer by brokering the transaction between buyers and sellers, and at the same time offers a platform to auction products to sellers and buyers. The model can also refer to the system functionalities, such as the auction platform used by buyers and sellers to submit bids and offers, and where the financial settlement takes place. In more detail, it can refer to a mechanism describing how bids and offers are matched (e.g., the price is continuously raised until only one bidder remains). Finally, a business model can refer to the relations among the buyers, the auctioneer, and the sellers.

From some points of view, business models are an abstraction focusing on a particular aspect under study. According to Keen and Qureshi (2006), there are two common themes underpinning the conceptualization of business models: (first) the focus on value, and (second) a statement of the basic logic of the business. They argue that the logic of value-generation is the core of a business model. Keen and Qureshi assert that business models are a vehicle for addressing how to balance value between the customer and the provider. This view of business models is also suited to e-government, as it involves balancing between improving citizen-centric service delivery and adapting and re-engineering organizational practices.

2.2. Business models taxonomies

Most of the business model taxonomies are aimed at classifying different types of e-government business models. Essentially, they describe the logic of how value for constituents can be created. Though there are a large number of business models taxonomies available in literature (Afuah & Tucci, 2000; Mahadevan, 2000; Rappa, 2002; Timmers, 1998; Weill & Vitale, 2001), there is no established general classification, and little theoretical base for business model research and application in e-government. Rappa (2002) provides a detailed overview of Web-based business models aimed at describing and defining the underlying components. We find these detailed models, focused on business functions, unsuitable for analyzing the business models manifested in e-government Web sites. Often these models correspond to a Web site in a one-to-one manner.

In a slightly different approach, Weill and Vitale (2001) offer eight *atomic* business models for classifying e-commerce Web sites. Instead of trying to specify a comprehensive list, these authors define eight "atomic" models. Specific models can be constructed by combining the atomic business models, in analogy with atoms (which can be combined to form molecules). These models include

1. Content provider: Provides content (information, digital products and services).
2. Direct-to-consumer: Provides goods or services directly to the customer, often bypassing traditional channel members.
3. Full service provider: Provides a full range of services in one domain (e.g., financial, health, industrial chemicals) directly and via allies, attempting to own the primary customer relationship.

4. Value-net-integrator: Coordinates activities across the value net by gathering, synthesizing, and distributing information.
5. Shared infrastructure: Brings together multiple competitors to cooperate by sharing common IT infrastructure.
6. Intermediary: Brings together buyers and sellers by concentrating information.
7. Virtual community: Creates and facilitates an online community of people with a common interest, enabling interaction and service provision.
8. Whole-of-enterprise: Provides a firm wide single point of contact, consolidating all services provided by a large multiunit organization.

The first two models concentrate on a single organization. The full service provider and value-net-integrator models require organizations to collaborate, whereas the whole-of-enterprise model requires all organizations to collaborate with each other in an orchestrated fashion. The shared infrastructure model can be used to facilitate the other models. The intermediary and the virtual community are separate models. The former facilitates the matching of demand and supply and creation of a Web site attracting the customers to visit, whereas the latter concerns retaining customers' participation from both individuals and communities by participation on a recurrent basis. These atomic models can be combined to describe specific business models. We will adapt them for e-government in order to analyze how government agencies use their Web sites.

3. Research method

The premise of our research is that the business models concept can provide a useful approach to e-government. Against this, our aim is to analyze public sector Web sites based on the Web-based business models.

Wallace outlined a systematic approach to theory building, which broadly consists of observation, induction, and deduction (Wallace, 1971). As there was little literature reporting on e-government business models, we used the following iterative approach. First, we examined a sample of Web sites to identify the underlying business models, and then compared the results with the atomic business models in e-commerce and drew reference to business models found in the public administration literature. The cross-referencing aimed to refine our search and to further guide the classification process. The iterative process stopped once two independent coders reached the same taxonomy. The survey was performed within a 3-month period. This short time interval limited the number of actual changes that could be made to the surveyed Web sites.

Regarding the sampling framework, due to the presence of a large number of governmental organizations in the Netherlands, we limited our search for public sector Web sites to those within the Rotterdam region. The choice of Rotterdam was based on the consideration that there were many private and public initiatives within this region, that as the second largest city in the Netherlands it was often considered as a forerunner in comparison with other cities, that it had the largest port in Europe, and that it consisted of several small city councils and was involved in a number of innovative projects (Overheid, 2006). The past has proven that

developments in the Rotterdam region influenced developments in the other areas in the Netherlands.

For several Web sites, additional information was required to understand the type of business models used. In addition to the iterative classification, we therefore also conducted interviews with the persons in charge of the management and/or development of the Web sites. In total, 11 interviews were held with representatives of eight different Web sites. The interviews lasted between 60 and 90 min and were aimed at clarifying the type of business models used in the Web sites and improving our understanding of the elements of the business models. The interview results were used to describe a detailed example of each business model and the main characteristics.

Two researchers independently surveyed the overview of hyperlinks to public organizations on the Web sites http://010.pagina.nl/ and http://www.rotterdam.nl/. The first Web site claimed to have an overview of all relevant Web sites for the Port of Rotterdam, and the second Web site contains links to relevant government agencies for citizens and businesses in Rotterdam. A Web site in the English language is available at http://www.portofrotterdam.com/; however, this Web site has relatively few links to other Web sites. It is primarily an informative Web site targeting international organizations interested in trading with companies located at the Port of Rotterdam. Private sector Web sites that had no connection with the government were removed. This resulted in a final sample of 59 Web sites.

4. Taxonomy of e-government business models

4.1. Atomic e-government models

Atomic e-commerce business models are clearly described in the literature and enable the classification of a single Web site using multiple atomic business models. As there is hardly any literature on e-government business models, we used an iterative approach, as described in the preceding section to adapt these models to e-government. Below we discuss each model in turn.

Both the *content provider* and the *direct-to-consumer* model are often found in literature (Layne & Lee, 2001; Moon, 2002; Reddick, 2004). Layne and Lee view the content provider as the first step and the direct-to-consumer model as a next step in the development toward maturity. In a narrow sense, the content provider can be compared to the cataloguing stage. The direct-to-consumer model can be compared to the transaction, vertical, or horizontal integration stages of Layne and Lee. The integration variable and the technical and organizational complexity variable are used by Layne and Lee to distinguish among the transaction, the vertical, and the horizontal integration stages. The business model concept does not take into account the level of integration and the technical and organizational complexity within organizations and therefore does not differentiate among the stages derived using these criteria.

A useful contribution of the business model concept to stage-wise models is that it does not require passing through all the key stages before it can attain a direct-to-consumer model. The organization may remain at the content providing stage if it achieves its purposes in this way

and, for example, lets other organizations perform the roles of the full service provider and/or the value-net-integrator to process and aggregate their services.

The *full service provider* and the *value-net-integrator* models harness collaboration among organizations to provide a one-stop shop. New types of service offerings are made possible due to the cross-agency collaboration in the form of a public service network. Nevertheless, policies, programs, and laws have always required (at the very least) many agencies to take into account business requirements and to encourage cross-agency collaboration with each other (MinBZK, 2004). In e-government, the creation of a one-stop shop is similar to e-commerce, although the drivers are different, and it is often considered to be more difficult. In e-commerce, the goal is often to target a larger customer segment or to add more value, whereas, in e-government, it is aimed at reducing red tape and improving the range of services. In e-government, it is argued that a one-stop shop requires integrating public services that are offered by distinct authorities to one single access point (customer-driven integration); interconnecting all public authorities with the one-stop system to allow a smooth coordination of service performance by different authorities (task-driven and expertise-driven integration); and integrating functionality, data, and resources used by different authorities to perform the service request (resource-driven or data-driven integration) (Wimmer, 2002). This requires setting up the appropriate legal grounding; adjusting the access rights and mode of access to highly sensitive data (which is not just a matter of security, but also comprises the formalization of public–private and public–public partnerships, the adoption of an architecture to deal with the heterogeneity issues related to Web-based systems and data formats, and so on); and resolving red tape problems.

The *infrastructure service provider* model concerns the provision of generic infrastructure facilities used by many other agencies and supports the creation of an online presence. In the Netherlands, basic services (like authentication and payment) are often included in the basic infrastructure (Janssen & Joha, 2006). This has the advantage of avoiding duplication, especially for organizations sharing a similar set of basic services. This model allows infrastructure services to be developed once and then to be used and reused by many other governmental bodies.

The *intermediary* business model brings together buyers and sellers by creating a single point of contact and a mechanism for matching demand and supply. We substitute the term intermediary with market as other models, including the full-service, the value-net provider, and the shared-infrastructure provider business model, can also be viewed as a type of intermediary. This type of business model can be operated in a variety of domains including a market for public services, employment market, product procurement, or a market for outsourcing of public functions. Kelly argued that the market model is about satisfying customers to retain their loyalty, whereas applying the market model to the public sector may not be appropriate (Kelly, 2005). Reasons include that the public sector cannot pick and choose the most valuable customers, that customer satisfaction does not correlate with the internal improvement within the governmental departments, and that public managers and administrators use different criteria to assess their performance, and so forth. As such, this type of model cannot be used for the buying and selling of basic public services. Yet this type of model can be used in other segments, for example, to create an employee market for governmental personnel. The market model also covers the content of an e-government business model better in view of the fact that

Table 1
E-government business models

E-government business model	Description, characteristics, and typical functions
Content provider	*Description*: This model concerns the provision of static and dynamic content including product information and news. This content is coming from a single organization and can be customized to match customers' needs. Often this is organization- or internal-centric instead of customer-oriented and the first (and sometimes the last) attempt to have an online presence. *Characteristics*: Providing information of the own organization, products, and services focusing upon the core-business of the organization. *Typical functions*: Menu structure, search options, hyperlinks to related sites, news, and sometimes the use of profiles and subscription options.
Direct-to-customer	*Description*: This model concerns direct service provisions to customers and businesses including tailor-made pages and subscription options. This goes beyond the content provider model as not only information is made available, but also transaction functionality is provided. This model focuses upon the traditional functions, services, and products of the organization. Sometimes some new services enabled by the Internet are provided, such as tracking and tracing, an online agenda, and functionality for making appointments. *Characteristics*: The focus is on creating transactions and selling of services provided by the own organization. The users help themselves by focusing on self-service options. *Typical functions*: Service catalogues, self-service, shopping cart, appointment, tracking and tracing, and financial settlement.
Value-net-integrators	*Description*: This model coordinates the collection, processing, and distribution of information from several organizations. This is a networked type of business model often focusing upon a particular customer segment. In contrast to the full service provider business model, a value-net-integrator coordinates the services provision of other organizations and does not provide any services directly. *Characteristics*: Various organizations collaborate in a network to provide a one-stop shop to a certain customer segment. Each organization keeps its own identity and service requests are routed to the responsible organizations, which take care of the settlement. *Typical functions*: Subscription, alerting, life-events, business-events, integrated forms for requesting products from multiple organizations.
Full-service provider	*Description*: This model facilitates customer interaction through direct information and service provisioning. This involves the collaboration among a number of organizations to provide a one-stop shop. The customers do not directly deal with individual organizations and the identities of the organizations are often hidden and play no major role. *Characteristics*: Several organizations cooperate to create a one-stop shop by bundling information and services provided by these organizations. The separate organizations are not directly visible. Typical functions: Service catalogues, life-events, business-events, subscription and alerting options, digital safe, shopping cart, tracking, and tracing.
Infrastructure service provider	*Description*: This model provides infrastructure services to support the creation of Web sites. Often the infrastructure provider is founded when many organizations discover that they are developing a similar set of functionalities and decide to concentrate the development and service provisioning in one organization. In this way, functionalities can be developed once and provided to many users harnessing the benefits of the economies of scale. *Characteristics*: Concentrating and sharing of services in an (semiautonomous) organization and providing these services to many public organizations who act as users.

(continued on next page)

Table 1 (*continued*)

E-government business model	Description, characteristics, and typical functions
Infrastructure service provider	*Typical functions*: Range from basic functions like authentication, identification, payment, secure communications to the sourcing of a complete range of transaction support.
Market	*Description*: This model brings together supply and demand using market mechanisms. From the providers and requester point of view, a market is created by an intermediary. The intermediary is often a governmental organization who benefits from matching demand and supply. *Characteristics*: Intermediating between many providing and requesting organizations. *Typical functions*: Searching for supply and demand, showing the best matches, recommending supply or demand, keeping information of suppliers and demanders private.
Collaboration	*Description*: This model facilitates constituents participating in activities including policy-making projects and decision-making. Results and alternative policies can be discussed and evaluated. Tools, like simulation, could be used to lower the threshold of participation for nonexperts. *Characteristics*: Enabling electronic participation and discussion among citizens, business, and public administration. *Typical functions*: Chat and discussion platforms, whiteboard, e-voting, sharing documents, wiki's, and simulations to compare and evaluate alternatives.
Virtual communities	*Description*: This model concerns the creation of a community or a group of recurring customers. It aims to provide content that attracts citizens to return periodically to the Web site. *Characteristics*: A community of interested centered around a certain topic and able to retain users. *Typical functions*: Discussion forum, blogs, information searching, actual content, and information feeds.

markets bring supply and demand together whereas an intermediary can provide a broader range of services including full-services provider and value-net-integrator.

Collaboration with and involvement of participants in policymaking is typically a government-related and not a business-related phenomenon, as customers will hardly be involved in companies' strategic decision-making. In e-government, the argument has moved from assessing the success or stage of e-government based on technological sophistication (the first wave) to the success of using technology in engaging and encouraging participation (the second wave) (Scott, 2006; Tolbert & Mossberger, 2006; West, 2004). It is often argued that there is still limited deployment of technologies which engage citizens in discussion, debate, or decision making (Welch, Hinnant, & Moon, 2004). Especially with the rise of Web 2.0 technology, many authors argued that the Internet would increase the opportunities for citizens to communicate with and interact with government on the Web (Milward & Snyder, 1996; Thomas & Streib, 2003). Furthermore, many citizens, administrators, and politicians are interested in increasing public participation in public decisions. This implies more than simply finding the right tools and techniques for increasing public involvement in public decision-making (King, Feltey, & Susel, 1998). This requires a new e-government-specific business model focused on enhancing the collaboration between citizens and public sector agencies. This *collaboration* model enables electronic participation and discussion among citizens, business, and public administration.

The *virtual community* creates and facilitates an online community of people with a common interest, thereby enabling interaction and service provision. The essence of this business model is the ability to attract a group of recurring customers. Most of the technologies of the virtual community business models do not require sophisticated technologies (e.g., online discussion forums/communities relying upon simple, and cheap technologies) (Scott, 2006; West, 2004).

The *whole-of-enterprise model* provides a firm with a single point-of-access to a consolidation of services provided by a large multinational organization. In the e-commerce literature, this form of organization is associated with government (i.e., one contact point for the whole government) (Weill & Vitale, 2001). We removed the whole-of-enterprise business model, as this model might be appropriate within countries having a centralized governmental control, but not for countries having a decentralized structure (such as the Netherlands).

In summary, based on a deductive-inductive approach, we derived eight e-government business models to assist our analysis. They include (a) Content provider, (b) Direct-to-customer, (c) Value-net-integrators, (d) Full-service provider, (e) Infrastructure service provider, (f) Market, (g) Collaboration, and (h) Virtual communities. Table 1 provides a summary of the definitions, main characteristics, and typical functions of the eight e-government business models.

4.2. Survey results

Rotterdam has one of the largest ports in the world. It is the second largest city in the industrial heartland of the Netherlands and the economic, social, and cultural center of the Rijnmond (Rhine Estuary) region. Rotterdam has a decentralized form of public administration with 11 districts. Each independently makes decisions relating to issues at both a district and a neighborhood level. In total, 13 Web sites were found: one Web site per district for nine districts; and two Web sites for each of the other two districts. Apart from the council Web sites, there are a large number of government agencies in this region having their own specific Web sites.

In Table 1, the atomic e-government business models are still described in an abstract way. Table 2 contains examples of each of the business models as found in this area. The examples are primarily used for illustration purposes. We did not find the infrastructure service provider model; therefore, we complemented the table by using an example of the national level.

Fig. 1 displays all the e-government business models[1] covered by the public Web sites surveyed in the Rotterdam region. The content provider model is found in 85% of the Web sites surveyed. These results can be attributed to a disproportionate focus on information and service provision in national e-government policy documents. Initially the focus was on information provisioning and later this shifted to transaction support. The aim of the Dutch government was to bring 25% of their services online before 2005, and to bring 65% of their existing products online before 2006 (MinBZK, 2004). Consequently, governments began by bringing their existing products online to accomplish these targets. Often they started with

[1] Please note that one Web site can incorporate more than one business model and thus is classified using multiple atomic business models. As a result, the total number of atomic business models is higher than the number of Web site surveyed.

Table 2
Example of e-government business models

E-government business model	Example
Content provider	*Bestuursdienst* of Rotterdam offers information concerning past and present laws, regulations, policies, and policy-making processes. Constituents can subscribe to information based on subject or regional area.
Direct-to-customer	*Charlois* is a municipality offering a number of online services. It also offers a digital safe to reuse information and subscribe to alerts.
Full-service provider	*Rotterdam* is a one-stop shop offering information and services from various local governmental organizations. There is no direct link to the governmental organizations. Service and product requests are routed to the right organization, which processes the request, and the results are communicated back by the Rotterdam Web site.
Value-net-integrators	*Virtual business counter* provides a one stop for entrepreneurs. The services provided by the Chambers of Commerce, Inland Revenue Service (IRS) and Municipalities are bundled. Each organization is still visible for the entrepreneurs. If an entrepreneur starts a company, it can fill in a single form. The information on this form is submitted to the IRS, the appropriate Chamber of Commerce, and municipality responsible for the geographical area. Then, each organization directly interacts with the entrepreneur.
Infrastructure service provider	*DigiD* is a national authentication service for citizens and businesses that can be used by all public organizations and nongovernmental organizations to authorize access to their systems.
Market	*Vrijwilligerscentrale* matches supply and demand for volunteer vacancies. Organizations can advertise their jobs and people interested in doing volunteer work can browse and search jobs. In this way market friction is reduced, there are fewer vacancies without volunteers, and less volunteers who are not able to find volunteering activities.
Collaboration	*City townhall* offers information, news, and a participation platform for policy-making in Rotterdam. It provides participation instruments such as an online discussion platform to provide opinions, a content management system to share documents, and various voting tools. Zoning plans are visualized and incidentally alternative zone plan is visualized to support the discussion of the strengths and weaknesses of each plan.
Virtual communities	*Drugs information Rotterdam* is a virtual community dealing with drug-related issues. It provides documentation and information about drugs and the risks of drugs. Drug users can chat with each other to share thoughts and persons can ask all kind of questions to virtual persons.

products that could be easily translated to an online environment. The goal set by the central government has led to a largely product-driven rather than customer-oriented approach. In terms of functionalities, only a limited number of content-providing Web sites offer a search engine or interactive forms for submitting queries. No Web sites offered customization or subscription options.

The direct-to-customer model is the second most common category. Many Web sites offered only a limited number of services, and most did not support online transactions. The other e-government business models were found less frequently and provided only limited functionalities. None of the full-service-provider models tried to harness the increased network externalities by involving private organizations. The only model that involved public–private

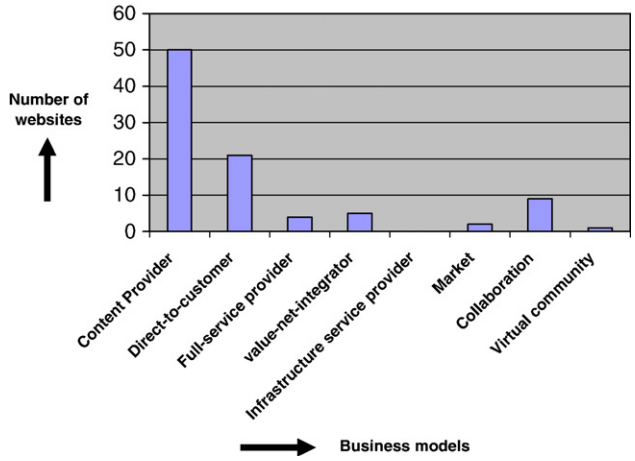

Fig. 1. Type of business models found.

partnerships is the market-model, which brought supply and demand together (e.g., in the *vrijwilligerscentrale*, as described in Table 2, both public and private parties publish their vacancies for voluntary work). Chat functionalities were found in the collaboration model, but not the other more advanced features described in Table 1.

The value-net-integrator model was found more often. Some agencies collected information from other agencies and aggregated it on their Web sites. The results of the interviews supported this observation as some of the interviewees indicated that some public managers understood the need to provide a one-stop shop in a given domain and therefore adopted the value-net-integrator model. No infrastructure provider model was found in this region; however, the interviewees indicated that such business model can be found at the national level. Only one virtual community initiated by a public agency was found. This community received less traffic than the two well-established, Web-based communities centered on sport (soccer) and trade. This could be due to the limited attractiveness of a public community. The private-initiated communities had a wider appeal with a broader focus and included information related to both the public and the private sector.

The survey results concur with the findings in the literature that current e-government business models are largely focused on creating Internet presence, where government agencies put their product and service online as electronic catalogues (Winkel, 2005). The survey results show that governments are still focused on making their existing content and services accessible online, whereas the other possible e-government business models are less common. It should be noted that in our survey many Web sites provided no transaction functions, and differentiation of products between similar government agencies was limited. This can be explained by the fact that the districts offer similar products based on the centrally founded and standardized *Vind* catalogue and were less concerned with innovation or pioneering new types of services.

5. Discussion

This paper examines the extent to which the Dutch governmental agencies have been using e-government business models. Using an iterative deductive-inductive approach, we devised a taxonomy to guide our analysis of the types of Web-based business models manifested in 59 Web sites. Below, we discuss the findings in relation to practical implications for public managers and the need for gaining a better understanding of business models that goes beyond the atomic approach.

5.1. The use of business models

Current efforts in the Netherlands have focused on comparing the quality of Web sites and Web site functionality for information and service provisioning using a designated monitoring agency (Overheid, 2006; Winkel, 2005). This has stimulated the further creation of an Internet presence by public agencies. The monitor shows that agencies copy each other's Web site features and the top 10 Internet sites have similar features. Therefore, we initially expected that the types of Web-based business models manifested in governmental agencies' Web sites were likely to be limited. Our survey supports this expectation as most of the Web sites were predominantly driven by the content-provider and the direct-to-customer models. The interviews also shed light on this. One of the interviewees commented that "Like all agencies we want to be listed in the top ten of governmental website monitors. This means primarily enhancing the features of our website." There were hardly any Web sites that enabled Web-based personalization such as receiving an e-mail alert before the expiration of one's driving license, or using online surveys to elicit constituents' feedback for the continuous evaluation and improvement of the online content and services. Also, there was a lack of online guidance to direct customers to the right service or to draw customers' attention to interesting services or information sources.

The present findings also indicate that most of the applied models were not aimed at innovation in terms of creating additional customer value. This is not surprising as the existing work practices and ethos within the Western European public sector have failed to offer incentives for governmental agencies to collaborate and to improve their service performance, and notably to innovate and think creatively (Strejcek & Theil, 2002). The Dutch government, in its existing capacity, merely serves as a legislator to coordinate e-government developments. Governments may consider publishing performance information to stimulate competition, improve services, and increase adoption of technological innovations (Naushad & Wield, 2002). Against a backdrop where there is little market for services and competition among governmental organizations, competition among different types of business models can be used to stimulate customer-orientation and drive innovations.

An infrastructure service provider typically offers shared services to a network of organizations. Services including secure connections, user authentication, payment services, and integration of information systems aimed at sharing and reusing data among network partners. In our survey, we did not find any e-government business models aimed at providing such shared services or facilities to government organizations. However, at a national level, we

found that the Ministry of Interior and Kingdom Relations founded intergovernmental agencies to provide shared services. The use of such an infrastructure service provider model could help to manage the complexity and technical details so that government agencies can focus on the creation of customer value.

The survey showed that there are a number of value-net-integrator models available. The success of the value-net-integrator business model requires cooperation among governmental organizations. The Web sites using the value-net-integrator model focused on specific areas like drugs abuse prevention and treatment, social security, and so on. One interviewee stated that "…there is a pressing need to avoid the sector-oriented approach … [to overcome the fragmentation, there] should be something that provides a real one-stop for all, a kind of account manager that manages all relationships with governments…." There is still a need for a business model targeting multiple areas to create a one-stop shop for the entire government.

The community business model builds upon community loyalty rather than traffic measured by the number of Web page hits. Community models heavily investing in developing relationships with members of their community are likely to attract recurring visitors. This can be considered the least understood business model. Only one public organization in the region of Rotterdam was able to create and operate the community business model. It is not likely that many community-type business models are necessary, as customers will not likely become part of multiple communities. Participation in communities consumes time, which is limited. Thus it is not surprisingly that most of the surveyed Web sites did not include the community business model and did not establish a close relationship with their customers. Consequently customers only visit the Web site when they are in need of a particular service and do not return for other purposes. Mahadevan (2000) argues that maximum value for all parties, including buyers, sellers, market makers, and content providers, are found in virtual communities. The added value from the community business models seems to come from the organization of networks of government agencies, businesses, and citizens. The policy of many government organizations should consequently be aimed at collaborating to attract recurring visitors. It is often argued that to create a community, large investments in marketing are necessary and interesting content should be continually added and updated (Mahadevan, 2000). Moreover, customers might not be interested in a new community as they already participate in private-initiated communities. One of the managers of a community business model stated that "[T]raditionally governments are not able to stay close to the customer unless there is some negative incentive like an accident, child abuse … even our community has a negative incentive, drugs." Moreover, government might not want to establish a community, as they would compete with the private sector and the policy of the Dutch government is to avoid such competition. The question is thus whether public agencies want to establish a community themselves, join a private sector community, or stay out of this type of business model.

When looking at the overview of Web sites (http://010.pagina.nl/), it can be concluded that more private-initiated than public-initiated Web-communities exist within the Rotterdam region. Some of these private initiatives have already established a community of recurring customers. Private initiatives, focused on a limited geographical area, seem to have fewer difficulties in creating a community (Winkel, 2005). When looking for explanations for this phenomenon, we found that citizens, having a broad interest in the local politics, community, and

regional affairs, launched many of those private communities. No communities based on public–private partnerships were found in our survey. There seems to be no direct need for private parties to cooperate with governmental agencies. Governments are no threat to their existence and are not viewed as competitors. The added value for cooperating with government is limited for private parties, as the inclusion of public information and services in their Web site does not help to differentiate them from their competitors. Consultancy, modification, enriching, and distribution of public information can create added value, but it is questionable whether private parties are prepared to change, aggregate, and thus add value at their own expense. From the government perspective, cooperation with private parties can have several disadvantages. The uniformity public channels need cannot be guaranteed, as private organizations publishing public services or information will likely present this material in their own layout, or might only publish fragments of information, without providing direct links to the original source. Furthermore, the equality of rights and the image of the government agency as neutral party might not be guaranteed, as this might become dependent on the quality and willingness of a private organization. Agreements about service levels, the monitoring of quality, allocation of responsibilities, and how to deal with problems have to be made in order to mitigate those risks.

In e-commerce, a business model is the method of doing business by which a company can sustain itself; that is, generate revenue (Rappa, 2002). In e-government, this might not be the case, as the public administration structure might block the quest toward customer orientation, and there is no need to differentiate from competitors, as there are no competitors. In e-commerce, there is only a limited need for certain business models. Think of the much-cited business models of Amazon and Ebay, which many companies copied, but in which only a few succeeded. The same might be applicable to e-government, as there is no need for each agency to provide all types of business models. From a single agency perspective, the need for customer orientation might be limited. Yet from an integrated government perspective, there is a need for improved customer orientation to ensure trust, reduce red tape, and to improve and simplify interactions. As a result, from the perspective of a single agency, the adaptation of more atomic business models might not result in better customer orientation; whereas for the total government, a whole range of business models should be supported.

In our survey, the evaluation of e-government Web sites was performed by using a relatively straightforward process. The types of business models supported by each Web site were identified. Public managers can easily use the business model to assess their Web sites and use this assessment to consider the adoption of new business models. Although it should not and cannot be used to recommend all agencies to adopt a certain complex e-government business model, the business model concept can be used by individual agencies to evaluate whether their existing e-government model provides the desired customer-orientation. One public manager indicated "… this is helpful to extend our scope and understanding of the potential of the web…," whereas another interviewee stated that "our focus on copying and enhancing features and gadgets is finally widened… I'm so happy that I have some support for this." Another interviewee was more skeptic about the use of business models, claiming that, "nice categorization, but what can we do with this? We don't need 1000 communities … we simply don't have any funding to take advantage of this." The business model taxonomy for e-government can too easily result in copying each others' features in terms of characteristics, functions, and ideas, rather than looking

at the customers' needs, and then deciding which atomic models best satisfy these needs. The essence is that if organizations only need to provide information, they should only select the content-provider model and should not try to combine with more complicated business models. On the other hand, when a public organization wants to stay close to the customer, multiple business models should be operated and the appropriate models selected given the limited amount of resources.

5.2. Elements of the e-government business model

Business models are an abstraction focused on a particular aspect under study specifying the logic for creating customer orientation by governments. Designing business models requires that a variety of requirements be accommodated and balanced (Bouwman & MacInnes, 2006). There is no established general classification system, which means that there is as yet little theoretical basis for business model research and application in the e-government field. Although there is no consensus of what constitutes an e-government business model, we found that addressing a number of elements is useful when applying the concept to e-government business models. These elements include that a business model

- is derived from the main mission of the public organization, often founded in law;
- contains the logic and elements to fulfill the mission successfully using the Internet, and to satisfy citizens and/or businesses.
- describes the products, services, and mix of channels;
- addresses the relationship between an agency's strategy and information systems;
- describes the position in the organizational network and relationships with other agencies that target the same audiences;
- describes future evolvement; and
- is ideally independent of temporary technology.

These elements show that there is much more to adopting new business models than just analyzing which atomic business models are not supported by an agency's Web site, and then copying and integrating the missing business model into the Web site. Considering these elements should help public managers to gain more insight into the need for adopting new business models to improve customer orientation. These elements show the need for starting by specifying the logic for creating additional customer-orientation based on the agency's mission. As such, the term e-government business model does add to our descriptive understanding of public organizations. It draws the attention to the creation of constituents-value by improving customer-orientation and to the elements and logic which can be used to produce this value.

6. Conclusion and recommendations

In this paper, we evaluated e-government Web sites using the business models concept and presented a survey of e-government business models drawn from existing governmental Web sites in the Netherlands. Based on a deductive-inductive approach, we derived eight

atomic e-government business models to analyze 59 public sector Web sites. We found that in the region of Rotterdam most of the public Web sites could be described by using a limited number of atomic business models. Specifically, most Web sites could be described using the content-provider and direct-to-customer models. Furthermore, the types of business models used by these Web sites were predominantly noninteractive and nondeliberative. The full-service provider, value-net-integrator, infrastructure provider, market, collaboration, and community business models were rarely found. This underlies the need to investigate whether the missing kinds of business models can be used to enhance customer-orientation.

So far, the business model concept has not been applied to examine public sector Web sites. Current efforts in the Netherlands have focused on comparing the quality of Web sites and Web site functionality, which is useful for the creation of a Web presence by public agencies. Our research shows that the concept of e-government business models provides a complementary view to research Web site quality. The e-government business models surveyed primarily focused on creating an Internet presence and digitalizing existing content and services, whereas overall e-government business models draw the attention to the creation of constituents-value by understanding the logic for specifying the creation of customer orientation. The business-model concept draws attention to potential new types of Web-based business models which better match citizens' expectations. The business-model concept demonstrates that the adoption of multiple business models, possibly in cooperation with other organizations, can contribute to an improved customer focus, although the costs of operating multiple business models may be out of reach.

Whether the eight Web-based business models are the best for e-government research remains debatable, however, we found the atomic models useful for classifying the Web sites and did not spot any Web sites that could not be classified using the updated atomic business models. A limitation for generalization is the geographical scope and the number of Web sites surveyed. As political climate and structure of e-government can account for different business models, it is likely that other business models can be found in other countries. Research on examining cross-national types of e-government business models seems to be a viable direction for further research.

In this paper, we proposed a list of elements that make up e-government business models. More research in this area is needed to further refine the business-model elements. We especially recommend conducting further in-depth case studies to capture a variety of models so as to better understand the elements that make up a business model and the contribution of these elements to the success or failure of a business model. At a later stage, quantitative research can be conducted to link the contribution of each element to performance measures including service quality and usage.

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