E-Government Portal Effectiveness: Managerial Considerations for Design and Development

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ABSTRACT

In this paper we present a framework of managerial considerations for the design and development of e-government portals. The paper builds upon the available literature to devise a comprehensive framework which takes into account both back-end and front-end considerations. Eight key factors are identified in the framework. The framework includes technical as well as socio-political considerations. It provides an excellent platform for future research on e-government portals, which can also be extended to managers as a useful tool for ascertaining the effectiveness of their government's portal.

Keywords: portal, e-government, effectiveness, framework

1. Introduction

Governments in both developed and developing countries continue to make massive financial and political commitments towards change initiatives that are enabled by advanced Internet and communication technologies (ICTs) (Fountain, 2001). Broadly, these initiatives which lead to the adoption and use of advanced ICTs in public administration by government organizations at all jurisdictional levels are grouped under the umbrella term "e-government" (OECD, 2003). The significant increase in the availability and use of government information and services online is a testament to the importance of e-government (Muir & Oppenheim, 2002). However, several academic papers and analyst reports' still point out that return on e-government investments is very low or negative in many jurisdictions because these projects often fail to improve service quality (Accenture, 2005; Bhatnagar, 2002). While the exponential surge in e-government initiatives promises widespread access, it also poses significant challenges for managers who are responsible for those initiatives in their respective jurisdictions. In this paper, we focus on developing a framework of managerial considerations for effective design and development of e-government portals.

Synonymous to majestic gateways of large buildings, in a literal sense, portals are anchor websites. E-government portals provide a single jurisdictional window for offering services and information for all of a government's departments to the citizen/customer, government employees, and other stakeholders (Tatnall, 2005; Deloitte Research, 2000b) and signify a move beyond information-only government websites. E-government portals let governments reach out to the citizen/customer around the globe — inexpensively and around the clock as an integrated and single entity (Stauffacher, 2002). However, despite high potential benefits there are only a few e-government portals that can be considered successful. The rate of adoption for many portal initiatives has been found to be much less than expected (Norris & Moon, 2005).

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This research is motivated by a need to develop a comprehensive framework of managerial considerations for design and development of e-government portals. Eight key considerations (segmentation, services, navigation, content management, implementation approach, governance, take-up strategy and IT architecture) in the design and development of an e-government portal were identified based upon the review of literature and our study of several e-government portals. We contribute to the literature by synthesizing the literature of managerial considerations that affect e-government portal effectiveness. The proposed framework expands on the literature by incorporating both the front-end and the back-end considerations for the design and development of e-government portals and provides a platform for further research and practice. The next section provides a brief background and a discussion on the evolution of e-government portals. Section 3 discusses the conceptual framework proposed in this research. Section 4 provides a discussion of the key front-end design considerations and some of the associated best practices and Section 5 provides a discussion of the key back-end attributes. Section 6 provides a brief conclusion and avenues for further research.

2. Evolution of E-Government and Portals

The concept of e-government started with the advent of government websites in the early 1990s. With progression in information technologies, increased legitimacy of the Internet as a transaction medium, and the development of adequate infrastructure and regulations, government website soon evolved into a highly potential channel for supporting a gamut of front-end and back end-activities of the government and providing its services online. Individual ministries, realizing the potential of the Internet, took onus on themselves to develop innovative ways to transform their website into a service delivery channel. Unfortunately, not all governments and their departments evolved their websites in the same way. For example, few considered online service delivery as a high potential opportunity and made it a strategic priority, while others were satisfied with establishing basic online presence. Most e-government initiatives evolved in departmental silos and lacked integration which led to chaotic development and widespread inconsistency in online service delivery networks of most governments.

A strong need for integrated, structured, and standardized e-government was widely observed and reported by several analysts and researchers (e.g., Accenture, 2004), which prompted broad initiatives to revamp not just individual initiatives but the entire e-government strategy. The ultimate goal was to eliminate redundancy in service delivery and provide a “single window” for accessing all government services which led to the development of e-government portals. E-government portal’s ability to access content and applications directly from different databases of individual ministries presented an opportunity to ensure a consistent and seamless experience for the user. In this regard, e-government portals can fundamentally be considered as an organizational innovation and evolutionary phenomenon for transforming government organizations into more citizen-centric and efficient organizations.

3. Conceptual Framework

E-government portals have been a subject of many studies in the last few years. Several instances of e-government portal implementation have been lauded in academic papers as well as analyst reports. Kling (1978) has posited that a comprehensive information systems (IS) design framework should consist of technical as well as social and political aspects of technology adoption. However, literature on e-government portal effectiveness is fragmented, and available frameworks focus mainly on the technical aspects of portal design and development. For example, Zhang & von Dran (2001) argue that e-government portals are similar to e-commerce websites in terms of benefits to users. They posit that website attributes such as ease of navigation, clear layout of information, up-to-date information, search tool, and accuracy of information play important roles in providing benefits to users in terms of website quality. Similarly, a survey carried out by World Market Research Council (WMRC) and Accenture identifies indices for evaluating performance of government portals found out that information availability, interface, e-

commerce, application services, and accessibility are the most important indices for evaluating e-government portal performance (World Market Research Council, 2001).

In another study, Fang (2002) has proposed ten attributes of an e-government portal. He posits that an e-government portal should be comprehensive, integrated, ubiquitous, transparent/easy to use, accessible, secure, private, re-engineered, interoperable, and should have developed e-governance systems. However, e-government portal initiatives are expected to offer seamless, integrated information and service delivery (Gant & Gant, 2002), where integration across departments, transparency and accountability (Macintosh, Robson, Smith, & Whyte, 2003), and effective governance and organization (McNeal, Tolbert, Mossberger, & Dotterweich, 2003) are equally important considerations. A careful investigation and analysis of the available frameworks reveals that they only consider the social and technical aspects of IS i.e. front-end attributes of the e-government portals. However, none of them is concerned about the political aspects of IS which also contribute towards the adoption and use of the portals.

The conceptual framework proposed in this study, seeks to build upon the previous frameworks and models by incorporating the political aspects of IS also by including attributes such portal governance, leadership, and implementation approach. Our proposed framework (figure 1) consists of eight key e-government portal design and development attributes that have been categorized into front-end and back-end attributes that consist of administrative, technical, and political issues concerned with e-government portals.

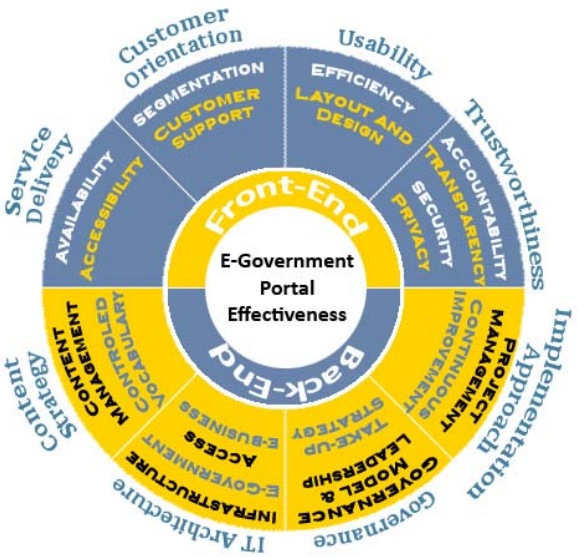

Figure 1: E-government portal Effectiveness Framework

4. Front-End Attributes

Front-end design and development attributes are those that are visible on the client-side of a system. We have identified four key front end attributes as crucial inputs towards portal effectiveness: service delivery; customer orientation, usability, and trustworthiness.

4.1 *Service Delivery*

Service delivery refers to the process of offering government services through e-government portals. Services offered through an e-government portal are one of the key motivating factors for stakeholders to adopt and subsequently use the portal. The types and number of services offered through e-government

portals depend, to a large extent, on the underlying system capabilities and integration of functional departments providing those services at the back-end. However, adoption of a portal by citizen/customers is directly related to a) the availability, and b) accessibility of various services offered on the e-government portal. This has prompted us to classify services as a front-end administrative attribute.

Availability

Availability refers to the types, levels, and number of services offered via an e-government portal. A vast number of services are already being offered via e-government portals in several jurisdictions (Bretschneider, Gant, & Ahn, 2003). A UNDPEPA/ASPA (2002) study classifies the types and number of services offered through e-government portals into five levels: emerging, enhanced, interactive, transactional, and integrated. We argue that availability of a threshold minimum number of services is important for take-up of e-government portals as stakeholders may not find the portal effective if important services are not available on the portal.

Accessibility

Accessibility refers to the ease of attaining information and services offered through an e-government portal (Criado & Ramilo, 2003). These services need to be accessible to all citizens/customers equally to ensure wider reach and subsequent adoption of the portal. Disability and foreign language access are some of the attributes that ensure wider reach and hence must be taken into consideration for e-government portal development project (West, 2002).

- Accessibility on Multiple Channels: Accessibility of government services through multiple channels enables wider reach and increased take-up of an e-government portal (Accenture, 2005). Lately, other devices such as digital TVs, personal digital assistants (PDAs), and mobile phones are also being used to access Internet. Thus, several governments are enhancing their portal technology to make their portals compatible for access through multiple devices.
- Disability Access: If an e-government portal is ill-equipped to provide information and services to people with some kind of handicap, it fails in its attempt to reach out to as many people as possible (CDT & infoDev, 2007). Disability access features offered through an e-government portal not only ensures increased take-up of the portal, but also makes the portal a more universal media. For example, a feature such as Bobby (Accenture, 2005), could help making portal services accessible to the visually or hearing impaired (West, 2002).
- Foreign Language Access: Accessibility of services offered through an e-government portal in foreign languages extends wider reach and more take-up of the portal. Foreign language features on the portal allows access to non-native language speaking individuals. Foreign language access could be generally enabled through accessibility features such as text translation of the information into a language of choice (Criado & Ramilo, 2003).

4.2 *Customer Orientation*

Customer orientation is a key imperative for attracting more citizens/customers to an e-government portal and improving service quality. We believe that a) better segmentation, and b) improved customer support enables portal managers to improve the portal take-up by making it more citizen/customer-centric.

Segmentation

Segmentation enables managers to target information and services towards specific customers (Egan, 2004). It is an important attribute for ensuring increased take-up of an e-government portal (Mohammad, Fisher, & Jaworski *et. al.*, 2004). The following three ways of segmenting e-government portals were used by some of the leading e-government jurisdictions we studied in this research:

- By Beneficiary: This way of segmentation enables e-government portals to target its audience by offering services for a particular group such as citizen/customer (G2C), businesses (G2B),

employees (G2E), and other governments (G2G), who can find and use the services that they need (The City of Cape Town, 2003).

- By Department/Agency: This way of segmentation enables e-government portals to target citizens/customers by services offered by departments. This eliminates any confusion regarding the jurisdiction of departments over e-government service as the services are listed in under the department that offers them.
- By Life Events: This way of segmentation enables e-government portals to target customers/citizens by the stage of their life-cycle. Singapore's eCitizen Central Portal (http://www.ecitizen.gov.sg) is a successful example which displays government services according to stages in customers' lives (called "Life Journey" on the portal), beginning with registering a birth, through seeking employment, opening up a business, and retirement (Deloitte Research, 2000a).

Customer Support

E-governments portals that are equipped with customer support features are able to respond to citizen/customer better with respect to help and support requests. Customer support features put citizens/customers firmly at the center and help portal architects by organizing all the necessary information and services around use patterns and habits (Accenture, 2005).

- Automated: Automated help and support features are installed in an e-government portal by default and are available to the citizens/customers automatically all the time. They act as guide for accessing information and services on the portal.
- Human Intervened: Sometimes the automated customer support features are not able to guide or help the customers/citizens and human intervened customer support is required. Human intervened customer support can be provided online through integrated chat or email programs or over the phone through call centers.

4.3 *Usability*

Usability refers to the degree of ease and feasibility with which citizens/customers are able to use an e-government portal (Davis, 1989). Portal acceptance suffers if the citizens/customers do not perceive a system as easy to use and useful. We propose a) efficiency and, b) layout and design of the portal as key considerations that enhance the usability of an e-government portal.

Efficiency

Efficiency of an e-government portal refers to the accuracy and completeness with which its users can achieve specific goals (Nielsen & Levy, 1994). An e-government portal is termed efficient if customers/citizens/government employees feel that their output and job performance increases by using the portal.

- Search and Help Features: Easy to use search feature on the e-government portal, that has the ability to provide relevant and accurate search results (information) to users with a lower response time amounts to higher efficiency (Kulviwat, Guo, & Engchanil, 2004).
- Other Efficiency Mechanisms: Other efficiency enhancing mechanisms include online interaction, faster download time, error prevention, faster recovery time, and session back-ups (Collier & Bienstock, 2006).

Layout & Design

Symmetrical organization of the content, links and navigational features, along with use of better aesthetics improve the layout and design of an e-government portal. An e-government portal must have a consistent design to be able to appeal to the citizen/customer. We think that to achieve consistency, the portal should have certain features which are as follows:

- Aesthetics: The aesthetics of the website comprise of graphics and layout, colors, multimedia and other features that are critical to the success of an e-government portal. Consistency of the logo, web page design, colors, and icons, however, have been found to be the most important factors that can improve site design and layout (van der Merwe & Bekker, 2003).
- Navigation: Navigation is defined as "the process whereby people determine where they are, where everything else is, and how to get to particular objects or places" (Jul & Furnas, 1997). A well articulated navigation system for an e-government portal, that is designed according to user needs and has proper menu systems, site maps, and moderated/non-moderated spaces for the presentation of content, greatly enhances the usability of the portal (Jul & Furnas, 1997).

4.4 *Trustworthiness*

Trustworthiness is the perception of confidence in an e-government portal's reliability and integrity (Belanger, Hiller, & Smith, 2002). While citizens' reluctance to use e-government portals is a major challenge in their adoption, citizen trust is an important catalyst of e-government adoption. We have identified a) accountability, b) transparency, c) security, and d) privacy, as ways to increase trustworthiness in e-government portals.

Accountability

Accountability is the relationship between an e-government portal and citizens/customers in which the portal is held to account for its performance by the citizens/customers). Accountability with respect to e-government portals is divided into internal and external accountability (Meijer, 2003). Internal accountability exists within the bureaucracy of the organization whereby the portal is accountable to the higher echelons of the organization for the information and services it offers. External accountability exceeds the boundaries of the organization where the portal is accountable to citizens/customers for the information and services it offers (Wisniewski & Stewart, 2004).

Transparency

Transparency refers to the organization of information on the e-government portal that reveals the depth of access it allows, the depths of knowledge about processes it is willing to reveal, and the level of attention to citizen response it provides (Demchak, Friis, & La Porte, 2000).. Transparency in functioning can lead to increased trustworthiness in e-government portals (Gant & Gant, 2002).

Security

Security has been defined as the protection against threats such as a situation, condition, or incident with the potential to cause economic hardship to data or network resources in the form of destruction, non-protection, modification, denial of services, fraud, mismanagement and abuse (Kalakota & Whinston, 1996). Several studies have found that security is a potential indicator for consumers to take online purchasing decisions (Zhang & von Dran, 2001). With regards to e-government portals security can be conceived as transactional security, authentication, and protection against functional risks. Better security in e-government portals leads to increased trustworthiness i.e. if citizens/customers are assured that the personal or financial information that they entering in an e-government portal is secure and cannot be tampered or misused, their trust in the portal's reliability and integrity is increased.

Privacy

Privacy breaches can shatter public trust in e-government as e-government portals hold vast amount of personal information (CDT & *info*Dev, 2007). Citizens/customers are always concerned about privacy issues such as disclosure and misuse of personal information (Ranganathan & Ganapathy, 2002). These issues influence citizens' attitude towards the portal and can impede the adoption of the portal. If the citizens/customers are sure that their personal and financial information is kept private and cannot be used

without their authorization, their confidence in the portal's reliability and integrity increases and trust is generated.

5. Back-End Attributes

The back-end design and development attributes of an e-government portal are those that are not generally visible on the client-side of the system. These attributes include implementation approach, governance, IT architecture, and content strategy.

5.1 *Implementation Approach*

Implementation approach refers to the process through which an e-government portal is built and implemented. With a high number of services being offered and critical information provided, the task of implementing e-government becomes very challenging and often an ongoing process. Several issues such as security of on-line transactions, consistency of applications, and integration of all the functional departments must be taken care of before the implementation project is rolled on (Beynon-Davies & Williams, 2003). An e-government implementation project requires a) project management and b) continuous improvement for enhancing portal effectiveness.

Project Management

Project management is a key factor in ensuring that an e-government portal implementation project is carried out successfully since the implementation project requires careful planning, management, and development.

- Project Planning: It includes the critical activities of planning, including information audit and standardization, process mapping and design, authority strategy and modernization, informatics strategy, risk assessment and cost–benefit analysis (Beynon-Davies & Williams, 2003; PeopleSoft, 2001). However, planning should also include considerations over key enablers of the internal value chain and supply chain of the e-government portal: for example, selection of partners for service delivery, selection of various channels for service delivery, and planning for the type of services the portal is going to offer.
- Execution and change management: This factor is concerned with the governance part of the e-government portal implementation project (Beynon-Davies & Williams, 2003; PeopleSoft, 2001). Management of e-government portal implementation process is often vast, not managed within the internally available resources, hence adoption of established protocols and standards are needed to minimize customization (Bhatnagar, 2002). Availability of strong project management skills in the organization is important to tackle the issues arising due to project execution and change management.

Continuous Improvement

There is an ongoing debate in the literature on whether to term an e-government portal initiative a project or an ongoing program. However, in practice we found that many e-government portal projects are never ending as they become a way of doing business. Several governments are trying to enhance their IT capabilities for providing long term value to their clients and stakeholders through e-government portals. Even when treated as projects, successfully implemented portals depend heavily on the continuous improvement process for greater effectiveness. Most of the desired potential business benefits are achieved through this ongoing process, where along with some fine tuning of the technology, the organization modifies its work practices, skill-sets, business processes, and norms to develop a better fit, utility, and value (Bhatnagar, 2002).

5.2 *Governance*

Governance is key factor which is required to provide a framework for decision rights and accountabilities

to encourage desirable behaviour in the use of an e-government portal (Weill, 2004). It includes the use of institutional structures of authority and collaboration for allocating resources and controlling activities of an e-government portal project. Governance can be categorized into a) governance model and leadership that is concerned with the authority or decision rights of e-government portals, and b) take-up strategy that is concerned with devising strategies in order to increase take-up of e-government portals.

Governance Model & Leadership

The objective of portal governance is to identify roles and relationships needed for policy setting, control, and monitoring the use of the e-government portal (Rau, 2004). Successful portals depend heavily on a sound governance model. Weill (2004) proposes five IT governance models (Table 2). Most of the leading jurisdictions studied for this research used IT Duopoly governance models in line with recommendations made in the literature (Weill, 2004; Davenport, 1997).

Table 1: IT Decision/Input Rights

Governance Model	IT Decision/Input Rights
Business Monarchy	A group of, or individual, business executives (i.e., CXOs). Includes committees comprised of senior business executives (may include CIO). Excludes IT executives acting independently.
IT Monarchy	Individuals or groups of IT executives
Feudal	Business unit leaders, key process owners, or their delegates
Federal	C level executives and at least one other business group (e.g., CXO and business leaders) – IT executives may be an additional participant. Equivalent to a country and its states working together.
IT Duopoly	IT executives and one other group (e.g., CXO and business leaders)
Anarchy	Each individual user

Source: (Weill, 2004)

The governance models require strong executive leadership that can guide the whole decision making process with respect to the e-government portal project. Several papers suggest use of an IT governance council that assumes responsibility across all business functions for policy setting, control (budget approval, project authorization, performance appraisal), and performance management and reporting may be important for providing leadership for projects of such magnitudes (Rau, 2004; PeopleSoft, 2001).

Take-up Strategy

The potential benefits of e-government portal such as: improved service, greater efficiency, and potential cost savings will not be realized if their take-up is low (Malta e-Government White-Paper, 2001). Critical take-up thresholds must be reached to make an e-government portal implementation worth the investment. Hence, different take-up strategies such as branding and promotion need to be taken into consideration.

- Branding: Branding enables to create a corporate identity for the e-government portal that is distinct from that of the functional departments providing the individual back-office services. The aim is to provide the image of Government e-services as one homogeneous product (Mohammad, Fisher, & Jaworski *et. al.*, 2004). Branding increases the brand equity of the portal and ensures that citizens/consumers get emotionally and psychologically attached to the portal and hence is important in order to ensure high take-up.
- Promotion: Promotion is the "voice" of the brand, and it is fundamental to brand equity (Keller, 1998 in Mohammad, Fisher, & Jaworski, *et. al.*, 2004). It is a very important tool for ensuring brand recognition thus increasing portal take-up. It includes all forms of communication such as TV ads, banners, interstitials, emails, coupons, and sponsorship deals that are designed to inform, remind, or persuade target customers.

5.3 *IT Architecture*

IT architecture refers to the underlying technological architecture of an e-government portal. Its stability and scalability are critical for successfully implementing an e-government portal. An e-government portal must be capable of providing access to all government back-end services from all delivery channels, structured to accommodate different back-office requirements, scalable to accommodate growing and changing requirements of technology, equipped to handle digital authorization, and capable of handling unpredictable volumes of traffic (Accenture, 2004; Deloitte Research, 2000b).

Services offered through an e-government portal are developed in a very complex technological scenario as often multiple departments and technological platforms are involved. A common and integrated IT architecture improves communication between different government agencies so that citizens/customers need not ask the same information or service separately from different government agencies (Tyndale, 2002), thereby removing confusion, ambiguity, and complexity. Authors Ebrahim & Irani (2005) and Sharma & Gupta (2002) suggest a multi-layered framework for developing the IT architecture for e-government portals. Multi-layered architecture facilitates the exchange of data and services between and within public sector organizations, as well as supports the consistency of government data and transactions. The four distinct layers which are logically connected include: a) access layer, b) e-government layer, c) e-business layer, and d) infrastructure layer (Ebrahim & Irani, 2005).

Access Layer

The access layer is the first level of a portal's architecture which provides the interface to portal users (Ebrahim & Irani, 2005). It extends access to a gamut of online and offline channels through which users can access government services. It is essential for better portal adoption that public sector organizations maintain channel coordination by creating a common look and feel across different channels. In order to provide a common way of finding all government information and services, portal managers must develop guidelines and also comply with them (The Cabinet Office of UK, 2000).

E-Government Layer

The E-government layer defines the approaches to improve channel coordination and integration of different services offered by public sector organizations into a one-stop e-government portal. This layer also defines the e-government portal segments such as which services are targeted toward which constituencies. This is the layer where G2C or C2G and other interactions take place (Ebrahim & Irani, 2005). However, this integration cannot be achieved without a solid and interoperable foundation of compatible and integrated information systems and applications.

E-Business Layer

This layer focuses on integration, coordination, and interaction within and between individual systems among various government agencies (Smith, 2004). This layer defines the ICT application and tools that should be used for information processing and knowledge sharing (Ebrahim & Irani, 2005), for example, a selection of common applications and information systems, such as web services, EAI, ERP, CRM, and data warehouses that play a significant role in e-business layer architecture and thereby support the e-government operations. The function of this layer is to integrate front-end e-government layer applications with back-end activities to support the relationship and interaction of various segments like G2E and G2G (Ebrahim & Irani, 2005). Thus, this is the layer that provides a seamless, automatic, and real-time communication between their systems at both a data and process levels.

Infrastructure Layer

Infrastructural layer is the foundation layer of a e-government portal's IT architecture. This layer provides a reliable foundation for the rest of layers, such as access layer, e-government layer, and e-business layer

(Ebrahim & Irani, 2005). This layer defines the various standards and protocols such as the internet, intranets, extranets, and computer hardware (Ebrahim & Irani, 2005; Smith, 2004). Coordination at the infrastructure layer is equally important for interoperability and smooth functioning of the portal and can be achieved through necessary standards and protocols (Ebrahim & Irani, 2005; Smith, 2004).

5.4 *Content Strategy*

Content strategy is a key back-end attribute that dictates what content is published and how it is published on an e-government portal. It is considered one of the most important design attributes of an e-government portal (Gant & Gant, 2002). Use of a) a controlled vocabulary and b) a content management system enhances the government's administrative efficiency of publishing reliable and up-to-date information on the portal and hence improves the portal's effectiveness.

Controlled Vocabulary

Finding specific information or a service on an e-government portal can sometimes become a nuisance. Hundreds of thousands of documents reside on a portal, and locating one among them might prove to be difficult. Hence, development of a vocabulary system is compulsory. However, governments have their own rules and regulations and abide by their own unique vocabulary. Hence, development of a controlled vocabulary system for the portal that conforms with the existing vocabulary of the government becomes imperative.

Content Management

The content on e-government portals should be managed carefully. The information provided on a government portal should be authentic and reliable (Lin & Lu, 2000). The information should be up-to-date so that the users can take full advantage of the information and services provided on e-government portals. A content management strategy is required so that the currency, usefulness, and reliability of the content can be maintained. The digital content life cycle consists of six primary phases: create, update, publish, translate, archive, and retire.

6. Concluding Remarks

This paper synthesizes the relevant literature to provide a comprehensive framework of managerial considerations for the design and development of e-government portals. We highlight eight key design considerations and some of the prominent best practices associated with those considerations. However, the research is still at an exploratory level - an empirical study is required to test the proposed framework. The framework developed contributes to the existing literature by providing a platform for further research. Additionally, e-government portal managers can make use of this framework as a tool to manage the design and development process of their portals.

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