Chapter 2
Modeling IT Evolution in E-Government: Theories and a Proposed Model

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ABSTRACT
This chapter is a critical review of the models of e-government in adopting Information Technology (IT). The authors acknowledge that the models are useful and are important for providing a conceptual delineation of IT adaptation in e-government. However, they argue that the models do not sufficiently encompass existing and emerging information technologies, fall short on considering the institutional context, and do not take into consideration the nature of e-government services. The authors provide an alternative roadmap of modeling the IT adoption that builds on the elements of existing e-government models and takes into account the three dimensions of technology, institutions, and services.

INTRODUCTION
Since Layne and Lee’s (2001) influential article, there have been several theoretical and empirical attempts at conceptualizing the evolution of e-government. While some scholars have adapted Layne and Lee’s model and sketched the extensions of the model (e.g., Andersen and Henriksen, 2006), others have critiqued these models as speculative exercises that are not accurate in describing or predicting the e-government evolution (e.g., Coursey and Norris, 2008; Yildiz, 2007). The purpose of this chapter is to critically review the e-government models, now that several years have passed since they were proposed. E-government processes have also been evolving very quickly.
Based on the review, we defend the e-government modeling efforts. Although the models are not fully verified in empirical contexts, they are useful in providing a conceptual delineation of Information Technology (IT) adaptation in e-government. Essentially, five elements of e-government could be identified in the models: content management; interaction; transactions; organizational change; and e-democracy. Empirical literature largely verifies the first three elements, but is skeptical of the last two elements.

While defending, we also concur with some of the important criticisms of the e-government models. A principal criticism from a technological perspective is that the models are mainly Web centered. Although Web technologies are significant, information technologies encompass a wide range, such as other Internet Protocol (IP) based systems, location systems (e.g., Geographic Information Systems), sensor systems (e.g., Radio Frequency Identification), and wireless systems that have not been conceptualized adequately in the models. The second criticism is from the institutional perspective, that these models do not take into account the institutional structures and constraints in which the technologies are adopted. These criticisms are particularly relevant for why the last two elements of e-democracy have not been achieved. A third criticism is the nature of e-government services and the financial considerations in providing such services. While technology could indeed be adopted for delivering several types of government services, the incentives for providing such services differ.

Drawing on the previous criticisms, we propose a re-articulation of IT evolution in e-government, based on three core dimensions: information technology, institutions, and services. The three dimensional model gives a more complex account of adoption of IT in e-government, shaped both by the institutional structures and the type of services. The proposed model does not suggest a convergence of organizational structures; rather, the organizational transformation is contingent on the contextual conditions in which the three dimensions play out.

The rest of the chapter is structured as follows. In the next section, a brief outline of the existing models is given. Then, the models are critically reviewed. Next, the basic features of the proposed model are outlined. After this, the paper concludes with the application of the proposed model.

**BACKGROUND**

**Existing E-Government Models**

The concept of e-government is less than two decades old, but is rapidly evolving. Scholars and practitioners have been grappling with the evolution of e-government in both normative and descriptive ways. Several models of e-government have been proposed in the literature. Our purpose here is not to provide a detailed review of all existing models. Such a review has been provided by Siau and Long (2005) and Gottschalk (2009). Lee (2010) gives a qualitative meta-synthesis of 12 models. Empirical critiques of the models have been provided by Coursey and Norris (2008), Moon (2002), Reddick (2004), and West (2004). Our purpose here is to advance the conceptualization of the e-government model, by building on the key evolutionary stages proposed by the extant models and by considering the principal criticisms.

At least six models of e-government, all of which had their intellectual beginnings in the late 1990s and early 2000s among practitioners and scholars could be identified (Table 1). The first model is that developed by Gartner, a commercial information technology research and advisory company (Baum and Di Maio, 2000). The Gartner model consists of four stages: Web presence (where a government agency provides basic information); interaction (where citizens can contact
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