Proposed Approach for Enhancing Adoption of E-Government Services Using AHP and PROMETHEE

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ABSTRACT

The growing attention given by governments to invest in e-government projects and the low usage of the available e-government services refers to a gap between provision and usage. This article aims to propose an approach for enhancing adoption of e-government services and maximizing the impact of investment. It is a demand-oriented approach, focuses on eliciting citizens’ requirements in e-government projects via analytical analysis of the deployed e-government services, against a predefined set of acceptance and adoption criteria. The proposed approach employs AHP and PROMETHEE methods. AHP is used to create a hierarchical representation of the decision problem and PROMETHEE is used to rank e-government services and highlight their favorable and unfavorable features. The proposed approach has been applied to measure the performance of Egyptian e-government services. The computational results are given and the research outcomes are discussed.

KEYWORDS
Acceptance Criteria, Adoption, AHP, Electronic Government, Multi-Criteria Decision-Making, PROMETHEE

INTRODUCTION

The governments around the globe are increasingly using the power of Information and Communication Technologies through the implementation of numerous e-government projects to bring central, local governments and public institutions up to the standards as pertains in private sector (Mensah & Mi, 2018). E-government services are put in place to motivate citizen’s interaction with the government in a cost effective, convenient and accessible manner (Porter, 2018). There is no universally agreed definition of e-government. Basu (2004) described e-government as a process of harnessing ICTs to reform the way governments work, share information and deliver services to their internal and external clients. Schweve (2005) defined e-government as the use of ICTs to enhance the range and quality of public services to citizens and businesses while making government itself more efficient, accountable and transparent. Yonazi (2010) defined e-government as the utilization of ICTs to transform and enhance the relationship of the public sector and its clients through an improved range and quality of service. International organizations such as United Nations and World Bank have offered definitions for e-government. E-government can be referred to as the use and application of Information Technologies in public administration to streamline and integrate workflows and processes, to effectively manage...
data and information, enhance public service delivery, as well as expand communication channels for engagement and empowerment of people (United Nations, 2014).

There are four types of e-government: Government to Citizen (G2C); Government to Business (G2B); Government to Employees (G2E); and Government to Government (G2G) (Komba, 2013). G2C refers to that the government departments can use the online medium to deal with all matters relating to citizens such as communicating, online voting, online paying, and booking appointment. G2B includes various services exchanged between government and businesses such as publishing policies, rules and regulations, registering business, updating corporate information, tax payment, get financial help, and requesting answers to specific questions. G2E provides information and services to government employees such as provision of human resource training, view of payroll and tax information, and receive email notifications when new information related to employees is available. G2G aims to improve communication and data sharing between government agencies, and departments, and between different governments. An example of a successful G2G project is the Northeast Gang Information System. It is used by states in the Northeast to share information about street gangs (Rouse, 2010).

Multi-Criteria Decision Making (MCDM) is a set of methods which allow the aggregation of several evaluation criteria in order to choose, rank, sort or describe a set of items (Zopounidis, 1999). It has grown as a part of operations research concerned with designing computational and mathematical tools for supporting the subjective evaluation of performance criteria by decision-makers (Zavadskas, Turskis, & Kildiene, 2014). Analytical Hierarchy Process (AHP) and Preference Ranking Organization METHod for Enrichment Evaluations (PROMETHEE) are two of the more widely applied MCDM methods. AHP is based on three principles: (i) construction of a hierarchy; (ii) priority setting, and (iii) synthesis of the priorities (Turcksin, Bernardini, & Macharis, 2011). PROMETHEE is one of the main outranking methods typically for European school (Macharis, Springael, Brucker, & Verbeke, 2004).

Provision-usage gap became a visible problem in e-government adoption. Limited usage by citizens is one of the main obstacles to the growth of e-government projects (United Nations, 2016). Without citizens’ usage of the available e-government services everything the governments develop such as ICTs infrastructure, web portal, training programs, and implementing e-government systems will be useless. There is a lack of performance measurement of the services delivered to citizens. Most of the previous studies regarding the adoption of e-government services have concerned with the determination of the adoption factor. Now, it is quite needed to go a further step and introduce an approach to measure the acceptance rate of the deployed e-government services with respect to specific criteria in order to enhance their adoption in the society. This simply turns the e-government adoption to be a MCDM problem which we are concerned in this paper. The proposed approach intends to enhance the acceptance and adoption rate of e-government services and reducing provision-usage gap to capture the full benefits of e-government. It employs AHP and PROMETHEE methods. AHP is used to create a hierarchical representation of the decision problem and PROMETHEE is used to rank e-government services and highlight their favorable and unfavorable features.

The following sections of this paper present the related work, procedure of PROMETHEE method, e-government in the Egyptian context, proposed approach, application of the proposed approach, significance of the study and conclusion and future research.

RELATED WORK

The adoption term has been defined as a simple decision of using or not using online services depending on some factors (Kumar, Mukerji, Butt, & Persaud, 2007). E-government adoption factors have been widely discussed in literature. Some of the common factors cited for e-government adoption are perceived ease of use, perceived usefulness, trust, awareness, service quality, web site design, availability of resources, demographic characteristics, resistance to change, compatibility, word of
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