

and model for knowledge transformation processes, knowledge sharing processes and knowledge sharing decision making for performance

4 - Factors affecting knowledge-based decision support systems in multinational corporations

Mahmoud Abdelrahman, K. Nadia Papamichail

The main aim of this study is to examine the impact of using Knowledge Management Systems (KMSs) on Knowledge Sharing (KS) to support decision-making processes (DMP) in Multinational Corporations (MNCs). This aim was achieved through conducting and analysing a literature review, followed by exploratory research with thematic analysis of 42 semi-structured interviews with participants from Europe & Middle-East who are working in MNCs to identify the factors affecting KS. A set of strong overarching themes were identified in a conceptual framework comprising four core dimensions. In the first dimension Knowledge Management Systems, three themes were identified: Technology Acceptance, Communication Tools, and KMSs Usage. In the second dimension Knowledge Sharing Practices, three themes were identified: Content, Willingness to Share, and External Factors (i.e: politics, corruption). In the third dimension Culture, the three themes were: National Culture, Organisational Culture, and Information Technology Culture. In the fourth dimension Decision-making Processes: Extent of Analysis and Speed of Decision-making were identified. The conceptual framework will make important contribution to the literature in Information Systems, Operational Research and Decision Support Systems which will help MNCs to identify new ways of leveraging and sharing knowledge to support the DMP. The findings give fruitful insights to managers inside MNCs to improve KS by using KMSs to support the DMP.

■ TA-17

Tuesday, 8:30-10:00 - 309A

DEA and performance measurement 2

Stream: DEA applications

Invited session

Chair: Yu Yu

1 - Performance assessment of Portuguese wastewater treatment plants using data envelopment analysis

Ana Camanho, Alda Henriques, Milton Fontes, Pedro Amorim, Jaime Gabriel Silva

This study develops a framework to assess the performance of wastewater treatment plants (WWTPs). The Data Envelopment Analysis benchmarking technique is used to identify potential improvements in utilities' operation. The procedure proposed can have a key role in the enhancement of operational methods and asset management systems supporting utilities activity. This research contributes to a better understanding of WWTP performance, helping utility managers to fast detect and monitor efficiency degradation. Potential performance improvements are sought in terms of resources' utilization (energy and labour), considering the amounts of pollutants removed and the volume of wastewater treated. It is given particular attention to resources usage, as operational costs are one of the most important indicators that professionals need to consider for the prioritization of assets replacement or refurbishing investments. The approach proposed also includes the analysis of the influence of contextual factors on the performance of the WWTPs (e.g., plant size, percentage of utilization of the installed capacity, sewage biodegradability, type of secondary treatment technology, plant age, the existence of tertiary treatment and nutrient removal). The framework developed in this research is illustrated with a real-world case study, using the WWTPs of a Portuguese water company. The managerial implications of the results are also discussed.

2 - A performance framework for European museums

Stella Sofianopoulou

The aim of this study is to investigate the performance measurement and evaluation of European museums. Without ways to measure museums' performance, museums will remain unaccountable in the current world, that demands accountable results (Jacobsen, 2016). The performance measurement of museums under investigation consists of financial and personnel performance, although other performance indices can be taken into account. The model consists of implementation of Data Envelopment Analysis (DEA) approach, that is used to measure relative efficiency in these institutions. Several studies, some of them quite recent, have employed various models to investigate the performance of museums. DEA in particular has been used to evaluate a group of institutions that employ different inputs to produce outputs (Del Barrio and Herrero (2009, 2013), Fernández-Blanco, 2013). In this work, we employ DEA, a methodological approach, to analyse the efficiency of a homogeneous group of museums that use a series of inputs (labour, expenditures) to achieve a set of outputs (visitors). This method can help museums to compare their institution with their peer, discover the gap in their resources or outputs and can be utilized as a tool that shows that a museum is not performing as it should. In our sample investigated, there are museums with sufficient inputs and which are efficient in the outputs, whereas the less efficient ones could be considered oversized in terms of resources utilized.

3 - Evaluation of ecological systems and the recycling of undesirable outputs: An efficiency study of regions in China

Wanghong Li, Wade Cook

A balance between environmental regulation and economic prosperity has become a major issue of concern to attain a sustainable society in China. This study proposes the application of Data Envelopment Analysis (DEA) for measuring the efficiencies of the ecological systems in various regions of that country. The proposed approach differs from most of the previous ecological systems models in that we view it in a two stage setting; the first stage models the ecological system itself, and from an economic perspective, while the second stage (decontamination system) models water recycling as a feedback process, and the treatment of other undesirable outputs coming from the first stage. There, we separate polluting gases and water into two parts; one part is treated, while the other is discharged. The model considers two major desirable outputs from the first stage, namely Population and Gross Region Product by expenditure (GRP), as well as undesirable variables in the form of consumed water, and certain pollutants, namely nitrogen oxide, sulfur dioxide and soot. At the same time, these undesirable outputs from the first stage are inputs to the second decontamination stage. As well, recycled water is fed back into stage 1. Thus, intermediate variables such as consumed water and waste gas emission simultaneously play dual roles of both outputs and inputs in the ecological system.

4 - Measuring the R&D efficiency in China: A two-stage data envelopment analysis with time lags effects

Yu Yu

Although R&D efficiency has been widely studied using standard DEA (Data Envelopment Analysis) models and its variations. These standard DEA models were developed under the basic assumption that inputs of a specific period are consumed to produce outputs in the same period. This underlying assumption may not be valid in some situations such as performance evaluation on R&D activity. In R&D activity, the outputs of a specific period can be thought to be produced by consumption of not only inputs in the same period but also the inputs in multiple previous periods. In other words, inputs of a specific period can be considered to contribute to the outputs of several subsequent periods as well as the same period. There are some time lag between input period and output period. Furthermore, a regional R&D process contains two sub-processes, one is technology development and the other is economic application. Under this circumstance, a two-stage DEA model with time lags effect was established to solve the drawbacks of traditional DEA model. The newly developed models are applied to measure the regional R&D efficiency of China. Results indicate that R&D efficiency in China are heterogeneous. Beijing and