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# The Effect of Culture and Environmental Context on Strategic Use of Decision Support Systems in Local Authorities: A Comparative Study of Egypt and the UK

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## ABSTRACT

*This article draws on a survey among CEO and IT mangers in local authorities in the UK and Egypt to explain the similarities and differences in the cultural and environmental dimensions that affect using Decision Support Systems (DSS) in making strategic decisions. The astronomical global growth of Information Technology (IT) has inspired IT practitioners, researchers, developers, and innovators to seek new, more sophisticated, and more effective methods to use DSS strategically. This interest in the subject has been manifested in the abundant research and studied carried out to identify the factors that lead to successful adoption and use of IT in general and DSS in particular (Agarwal & Prasad, 1998a; Davis, 1989; Davis, Bagozzi, & Warshaw, 1989; Rose & Straub, 1998; Thompson & Rose, 1994). Unfortunately, little research is currently available about the state of IT management in developing countries in comparison to developed countries. Furthermore, with the increased globalisation of the world economy, many organisations interested in entering the promising marketplace of developing countries may need to get a sense of the particulars of the cultural dimension that affect DSS usage in these countries in comparison to the developed countries where these technologies is developed and designed. Mangers should be aware of these findings and should take it into consideration in the planning, design, introduction, and usage of DSS in making strategic decisions in local authorities.*

## INTRODUCTION

As investments in IT, in general and DSS in particular, by organisations all over the world continue to grow at a rapid pace, However, regardless of potential technical superiority and promised merits, an unused or under-utilised DSS cannot be effective (Markus & Keil, 1994). So determining the cultural and environmental related factors that affect the strategic use of DSS will be a critical issue to increase the utilisation of DSS.

This paper presents, as far as I know, one of the few in-depth analyses of the cultural and environmental factors that affect use of DSS in Strategic Decision Making (SDM) comparing one of the developing countries (Egypt) with another developed country (UK) and one of the few non-sole Euro-American field study.

### Literature Review of the Cultural and Environmental Factors that Affect DSS Usage

The adoption and usage of IT in general, and DSS in particular, is a social process, determined largely by the attitudes of people and the culture and environmental factors. There is a growing theme of research regarding culture and adoption of IT other than concentrating on the technical issues (Kanungo, 1998) (Lin, 1994) (Pliskin, Romm, Lee, & Weber, 1993; Straub, Loch, Hill, & El-Sheshai, 1998; Straub, Loch, Evaristo, Karahanna, & Srite, 2002). Organisational culture has been mentioned as a critical success factor in IS implementation (Bradley, 1993; Pliskin et al., 1993).

With the aim of helping local authorities to improve their operations by promoting IT enhancement, both central and local governments provide consulting and advice at the request of a particular authority or helping some sort of arising problem. In addition to that government in both developed and developing countries to increase the utilisation of IT, they invest a lot of money to achieve this goal. So the researcher need to understand the variables relating to these dimension to increase the utilisation of DSS in making SD.

### Components and their Operationalisation

To measure what the CEO in local authorities think about the possibility of effect of DSS on SDM, the respondents requested to indicate, on a five-point scale, their degree of agreement or disagreement with each item of the previous framework (5 being strongly agree and 1 strongly disagree)

## RESEARCH METHODS AND DATA COLLECTION

The unit of Analysis for this research is the chief executive officer or his delegate in the local governments in both the UK and Egypt. To ensure that the respondents understood the meaning of DSS and strategic decision-making and did not mistake MIS or operational decisions with DSS or strategic decisions, DSS and strategic decisions were carefully defined at the beginning of the questionnaire. To help ensure the validity, Huber and Power (1985) suggest, if a single key informant is to be used, it should be a person most knowledgeable about the issue of interest. For the present study, key informants were those who made or participated actively in making strategic decisions but directly or indirectly use DSS.

A pre-test was conducted among number of the academics who are interested in the area of DSS in number of universities in America, Australia, UK, Israel and Egypt. Then a pilot study conducted on a number of senior executives and IT mangers in local government in both the UK and Egypt. Some alterations made on the questionnaire according to the feed back that returned from the academics and practitioners. Revised questionnaires were then sent out around mid of January 2000 and data collection was completed within the next six months.

The sampling frame includes Municipal yearbook for 1999 and directory of local government on the web by Tagish for the UK sample and the directory of DSS units in the local governments in Egypt issued by Information and Decision Support Centre (IDSC).

A package that was mailed to senior executive officers in both Egypt and the UK contains two items: a covering letter explaining the importance of the study, the questionnaire with stamped return address on the back. The covering letter requested the respondent to return the completed questionnaire within two weeks. The respondents were assured of the confidentiality of their responses. Follow-up phone calls were made to the local authorities that had not responded two weeks after sending out the questionnaire.

A randomly selected list of 200 Chief Executive Officer of the five different types of local authority: County Councils, District Councils, Metropolitan Districts, Unitary Authorities and London Boroughs which make up the total number of councils in the United Kingdom which is 467. Seventy-nine usable responses were received (about 40 %) from the UK sample. But if we taken a way the 32 councils who refuse to participate in the study for different reasons (16 don't use DSS at all, 3 don't use DSS in strategic decision making but use it in operational decisions and 13 councils use it but not willing to respond for limited staff resources) from the UK sample the response rate will be 47 %.

Of the 309 questionnaires that were returned from Egypt sample, 294 (about 73.5%) were valid, 12 incomplete and 3 returned by post-office due to incorrect addresses. To ensure that the valid responses were representatives of the larger population, a non-response bias test was used to compare the early and late respondents. $\chi^2$ tests show no significant difference between the two groups of respondents in either of the UK or Egypt sample at the 5% significance level, implying that non-response bias is not a concern.

The researcher made some interviews with CEO and IT managers in some local authorities to validate the results from the questionnaire.

## RESEARCH RESULTS AND DISCUSSION

The researcher, before using the multiple regression to analyse the data, tested the different assumptions related to linearity and multicollinearity. The following results in both groups were found:

***(1) Cultural characteristics*: -**

As the results of this research showed there are culture gaps between DSS and IT people from one side and decision makers from another side in both research groups. This result is consistent with Hattens when they notice that this gap may be due to that professionals do not speak the language of business. And from another side the business people are to often separate from IS by what many perceive as priesthood IS, off limits to mortal managers (Hatten & Hatten, 1997).

To understand the differences in the effect of culture on DSS usage in SDM, the researcher will illustrate how the prevailing philosophies, values and beliefs of western and Egyptian societies have led to these different patterns. There is a dominant and resolute Western belief that human being has individual rights and a legitimate appetite for private property. This in turn has spawned specific forms of democracy, capitalism and technological development (Hall & Ames, 1993). Similarly, although the increasing business role of MIS has been enabled by technological advances, this development has hinged on the acceptance of a specific set of a assumptions. The rational for using MIS stems largely from the cultural values and attitudes that are associated with Western and particularly Anglo-American) philosophical beliefs. Theses beliefs have been crystallised in the Weberian bureaucratic idealisation (Weber, 1947), considerable effort has been made to organise economic activities into an orderly system. This system has a well define purpose and is governed by rational and impersonal set of rules. This impersonalism is critical. The organisation takes on a distinct identity, separate from that of its owners, with a structure based on an abstractly ordered set of positions. The relationships among these positions result from the need to achieve specific and objective business goals. Information, which as Drucker points out is objective, logical, formal and specific, naturally supports the achievement of these goals (Drucker, 1973). Such a cognitive model diminishes the relevance of individuals and personal relationships. A bureaucratic tradition also promotes formalism. Organisational rules are codified into systematic policies, procedures and regulations. As a result, a formal and impersonal MIS is needed to monitor and control a large number and wide range of activities. The IT application provides the manager with compressed and/or filtered symbolic data on a timely and frequent basis.

From another side, management science techniques are also used to enhance business decision-making. This assumes a rational and logical process that can be effectively modelled and quantified (Miller & Feldman, 1983). Quantitative methods are used to develop a better understanding of complex relationships between organisational and environmental variables. These methods require extensive data collection and analysis, and so their efficiency can be greatly enhanced by computers. Meanwhile, the multi-faceted and complex nature of the modelled relationships encourages integration of the resulting information systems.

The use of scientific methods further implies that nature is subject to man rather than vice versa. The environment is considered to be explainable, predictable, and controllable. As Thomas Jefferson stated, "a man's future is in his own hands" the natural world can be investigated and analysed, enabling individuals to forecast the future and make decision accordingly. This logic can also be extended to business planning. Business managers assume that they can influence environmental events and circumstances. Uncertainty may be hard to eliminate, but it can be mechanistically reduced. The assumed relationship between uncertainty and a lack of information suggests that with sufficient data there is a basis for predicting the future.

The mainstream American management literature further implies that using information processing to reduce uncertainty simply requires obtaining sufficient data to solve the focal problem (Lin, 1994). This is confirmed by the results of this research where there was a significant relationship between uncertainty avoidance (extent to which people feel uncomfortable with uncertainty) and DSS usage in SDM. DSS meets the analytic need of the decision makers to ease the risk of the unpredictable future. So DSS from this cultural viewpoint is inevitable.

From another side the Egyptian culture are less inclined to use systematic and formal planning procedures than their Western counterparts. Instead they will rely more on extrapolations from experience and intuition. This was clear from one of the interviews with one of the head of city council, he stated:

> *DSS and IT in general is like a sledge hammer waiting to fall on our heads. We have mangers that thy think they know how to use it and don't. We deal with people interest in their daily and future life and this system could be very dangerous if we depend on it in making our SD. They trained the IT staff to use this system but the city managers. And if any one is going to train me around its use, it is better to be an experienced head of city council who has used the system. I don't understand why we needed it, what it can do for us, so I have no intention to use it.*

As the results of this research showed there was a significant relationship between DSS usage and individualism. Strategic decisions, in most of the cities, made by powerful individuals (rather than group) who frequently rely on personal knowledge and intuition rather than objective criteria or formal and quantitative method. As one of the DSS staff expressed his negative feelings about the way that decision makers made their decisions, he stated

> *Most of managers seek the information that they need by their own personal way. Much of this information remains in a soft form, in the mind of the manger, and is verbally communicated mainly in private meetings rather than written memos or reports. In the formal meeting, employees will compete for privileged confidence of the boss and manoeuvre to get close to him by showing the agreement with what he is saying and the decision will be at the end what the boos think is right and suitable according to his viewpoint.*

So in most of the cases head of city councils in Egypt are widely perceived to have natural right to determine the strategic direction to their cities according to their individual interpretation of the general policy of the state.

This results agree with two of Hofstede dimensions which is power distance where "less powerful should be dependent on the more powerful", Subordinates expect to be told what to do" and individualism where individual interests come first (Hofstede, 1997).

***(2) Environmental characteristics: -***

Different environments experience different types of DSS applications and development problems. In relation to the UK group, mangers are characterised with uncertainty avoidance and this make them use DSS tools to

alleviate this uncertainty that prevailing in SDM. It is notable that there is a significant relationship between DSS usage and availability of favourable government policies in both groups. Favourable government policies was noted as a facilitator for the strategic use of IT in either developed or developing countries (King & Teo, 1996). In Egypt the government dominate the shape of IT development in the country, so control over the computing infrastructure has frequently been associated with the political control of information, particularly to reinforce the power of the government (Nidumolu, Goodman, Vogel, & Danowitz, 1996). Although the results showed the importance of government policies in the two groups, there is a difference in the applications and the outcomes. The government in Egypt is highly centralised and the public administration system is dominant. So the head of cities ought to closely follow the central government plans and priorities and therefor most of the important decisions made centrally. This views were formed based on the interview results that researcher made with the head of cities that don't use DSS in their SDM. The most important reasons for this were as follow:

1. There are very few important decisions to be made. Most of the decisions have always made by the centralised government.
2. Most of the decisions are quits simple and we used to it for long time, so that required evaluation can be done mentally.
3. Important factors affecting SDM are qualitative in nature; therefore, they can not be incorporated into computer mode as the results of this research showed earlier in the task characteristics.

While in the UK local authorities is much decentralised and this give the CEOs more room to evaluate the benefits of DSS and use it according to the requirements of the situation.

In relation to Egypt group the research results showed a relationship between DSS usage and competition among local government. This result is in consistent with Nidumolu et al., where they found that although the governors perceived that putting a long term investments in computerising the governorate's information and decision making processes as a low priority, and there was a lack of clarity of benefits, it is nevertheless noteworthy that only because adopting DSS in the governorates will give the governors a considerable political and symbolic value as a rational decision maker on the governorates and on the national levels, they chose to go for the adoption of this systems (Nidumolu et al., 1996).

## CONCLUSIONS

1. As expected, there was a direct relationship between DSS usage and complexity of analysis and evaluation of alternatives in the UK group, while in Egypt group managers perceived SDM as too person centred and too complex to be computerised. This result reflected on the utilisation of DSS usage where it was higher in the UK than Egypt. This result could be of importance to the local authorities in the UK and Egypt. For the UK, the DSS should be design considering specific characteristics to extend its use to the intelligence phase of strategic decision process and not limited its use to only analysis and evaluating the alternatives as it now the case. For Egypt it is recommended to involve decision makers from the early stage of developing DSS, this will make them relies the possibilities of using this system in SDM and it is capable of supporting the 'intelligence' and design phases of the problem solving process rather than later 'choice phase' (Chung, Lang, & Shaw, 1989).
2. As highlighted by the results of this research that organisational culture plays an important role in the effective implementation and usage of DSS in SDM. So high culture differences between IT people and decision makers which may cause culture clash between the two groups and reflect on the effective usage of the system. Therefore it is highly recommended that local authorities in both countries should pay as much attention to issues of cultural fit during the implementation of DSS.
3. This study clearly demonstrate that favourable government polices play an important role in using DSS in SDM in both research groups. But this government policy should be different in both countries according to the current situation of each. For example, in Egypt the way DSS is managed centrally by the CIDSS which affect the effectiveness of managing and using the systems for the local authorities located far away from Cairo because of longer response time and excessive control by CIDSS. So the government policy need to change to be more decentralised which will allow the local decision makers more room for making strategic decision and use the systems more effectively.

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