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AN AGENDA FOR GDSS RESEARCH IN HONG KONG

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ABSTRACT

Group Decision Support Systems is a relatively recent technological development, in that it is only now that it is attaining a measure of public awareness and shaking off the image that it is confined to academia. This paper considers the research currently being conducted in GDSS at the City Polytechnic of Hong Kong. A brief history of GDSS is presented, followed by an illustration of the state-of-the-art in GDSS today, though it should be recognised that this is a rapidly changing field, where there is no guarantee that the state-of-the-art will remain constant for any length of time. The potential results, and so achievable benefits, that can be delivered through use of GDSS are described, as is some of the more recent research that has been conducted in the US.

This is followed by an exposition of the methodology being used in the Hong Kong research, together with the hypotheses proposed. Anonymity is a major factor that is being considered in this research, and it is considered in terms of the benefits that its inclusion in the GDSS process can bring to the decision making process; notably, attention is paid to cultural factors inherent in the traditional Chinese style of business decision making that still prevails to a certain extent in Hong Kong. In this respect, the intention is to move away from a purely academic, laboratory-driven approach, and so to examine the usefulness that GDSS has the potential to offer in the wider business environment.

GDSS BACKGROUND

GDSS (Group Decision Support Systems) is a technology that emerged in the early 1980s from the longer established Decision Support Systems (DSS), yet it is only since the late 1980s that it has received attention from the non-academic sector. The focus of GDSS moves away from the single, often isolated decision maker, who may have limited access to computer-based tools, to a technology that facilitates decision making where many users or participants are involved. Initially, GDSS research tended to concentrate principally on the opportunities afforded by 'decision rooms' (Gray et al., 1981) and on the perceived impact that GDSS would potentially exert (Huber, 1982). A brief review of the history of GDSS shows that it has developed from the early 1980s, when descriptive and research survey papers were presented, to the mid 1980s when the first experiments were carried out and results emerged, to the late 1980s, when construction of advanced facilities at university sites began. The present time is transitional, since the first decade of research is behind us and the way forward is not only to continue this research, but also to introduce and implement GDSS in the commercial sector more extensively, thereby creating a new niche marketplace for decision-making tools.

As will become clear, GDSS is multi-faceted and as a consequence the current tendency is to refer to this technology as simply GSS (Group Support Systems). This diversity is exemplified by the fact that by the late 1980s, it had become apparent that the early applications had been expanded upon considerably so as to include group processes other than pure decision making, notably:

"searching for alternatives, communication, deliberation, planning, problem solving, negotiation, consensus building and vision sharing, as well as decision making..." (Vogel and Nunamaker, 1990). For the purpose of this paper, however, GDSS will be used in the very general sense, covering all of the above aspects, so as to avoid a plethora of acronyms, viz.: GCSS, GNSS, GSS,...

Typically, the participants in a GDSS meeting have differing priorities, backgrounds and degrees of computer literacy. Furthermore, they may have to resolve problems that are both complex and un- or semi-structured, encompassing both single and multiple criteria. Consequently, both the interfaces and the software used by GDSS must be appropriate for a broad spectrum of users.

Standard features of a GDSS software setup include what may be broadly termed 'resolutive' software, for example stakeholder identification, brainstorming, voting and prioritising mechanisms, as well as communication software such as electronic mail. GDSS often run on PCs over a LAN, though Macintosh set-ups running on *HyperCard* also exist, with a controlling or *chauffeur* Master Terminal and accompanying server. However, given the variety of GDSS configurations and platforms available, there is a wide range of possibilities available to the designer of the GDSS - to this extent, each GDSS is likely to be unique in some respect.

GDSS ADVANTAGES AND DISADVANTAGES

Many studies, examining such factors as minority influence, dominance, user satisfaction and the effect of anonymity, on the decision making process have been undertaken. These studies have yielded a wide range of findings, with those related to anonymity receiving particularly close attention. Although research results are not always consistent, as Rao and Jarvenpaa (1991) have conspicuously pointed out, it has been generally found, nevertheless, that the use of GDSS increases participation, process satisfaction and decision satisfaction, while reducing dominance. Anonymity has been found (Nunamaker et al., 1991) to encourage user participation especially in those situations that involve high power distances. While satisfaction is often increased, the length of time taken to reach such a decision can be considerably reduced. In particular, Pinsonneault and Kraemer (1990) reported that a clear majority of reviewed GDSS studies "resulted in significant reductions of 'man hours' spent in meetings". Furthermore, while Pinsonneault and Kraemer propose that GDSS increase participation, this is not reflected in longer decision times, since "GDSS also focus efforts on the task, thereby reducing the needed decision time overall". It is perhaps partly as a result of less 'time-constraint' pressure that the opportunities for negotiation for mutual benefit have been enhanced.

While a company that is looking at the possibility of implementing GDSS will typically be concerned with concrete and tangible benefits such as cost savings and higher quality

HOW POTENTIALLY USEFUL IS GDSS FOR HONG KONG?

We now turn to more concrete ideas of what benefits may exist for companies in Hong Kong if they decide to implement GDSS and so how useful it can be. To establish the potential benefits, it is necessary to examine how decisions are made at present. Hong Kong is a cosmopolitan, competitive, business-oriented city where time is of the essence, where risks are continuously taken, where decisions are made on production and export to markets across the globe. Not only is time at a premium, but so too is accuracy of forecasting and planning as Hong Kong strives to maintain her position on the world leaderboard of trade and commerce. Realistically, GDSS can only be considered as a genuine option for Hong Kong if it can provide clear, tangible benefits that are seen as desirable, necessary and practical.

Before introducing GDSS, it will be necessary to be familiar with all the details of business decision making as is current in Hong Kong now. Thus, initially, my role will be to go out and, through conversation and demonstration with MIS Managers, Strategic Planning Managers and others who make decisions, to illustrate the potential benefits and advantages, both tangible and intangible as already examined above, that GDSS have the capacity to bring to decision making meetings in Hong Kong. At the same time, it will be necessary to learn about the 'present system' with its own advantages and disadvantages, about what resources are allocated and how satisfied decision makers are with the decision making process. Equally, there will be a clear requirement at this stage for the identification of which types of meeting are appropriate for GDSS implementation.

A major problem that I expect to face is that of culture and language. Most GDSS research to date has been conducted in the US and at relatively few sites. It tends to remain an academic discipline with few companies taking the plunge and investing substantial resources. Not surprisingly, there is a fair degree of US-bias, since the systems designed so far have been based upon the underlying western management and cultural concepts, as well as the taken-for-granted use of the English language. There has to be a change of focus here, in terms of not only commercialising for a business population that never has enough time and hence cannot be expected to show much degree of patience or tolerance, but also in terms of cross-cultural application. Whilst I expect to work with a western-designed software package initially, the intention will be to customise this package to the Hong Kong environment. Thus, while many of the empirical sections of the research will replicate the work already undertaken in the US, it will differ significantly by virtue of the fact that the cultural dimension has not been explored.

This cultural approach is coming none too soon, as the South-East and East Asian economic dragons spread their collective wings and shake off the dominion of outside control, further developing their own technologies and approaches. Whilst the appropriateness of the GDSS concept cannot be denied, it cannot be assumed that it can be transferred in its entirety without modification or comment. It is essential for further research to be conducted in the Pacific Rim area, and though there are many areas of interest, a notable one relates to languages and the corresponding interfaces. As already mentioned above, there is an implicit assumption that either the English language or another alphabetical language is used during meetings. Until recently, idiographic languages such as Chinese and Japanese, however, have not been supported. Some initial work, however, is in progress in Singapore on a Chinese language interface (Wei et al., forthcoming). Translation

techniques are improving, and it can be expected that in the future, instantaneous machine translation between languages will be available to GDSS interfaces. This will open up new avenues of research, enabling true multilingual use of GDSS to become a reality.

In conclusion, GDSS is an awakening technology that has developed fast over the last decade and now may be poised for penetration of the decision-making market, given its effectiveness, as demonstrated through research results published in the US, in reducing decision time and increasing decision quality. Whilst there remain problems to be solved, and indeed problems that have not yet even been found, the time is ripe for a critical and thorough investigation of the potential for the implementation of GDSS in Hong Kong, as well as elsewhere in South East Asia, though the implementation of this process must be handled with care, since too many projects have failed because not enough forethought was given to supporting and justifying their implementation.

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decision making, etc., it is the intangible benefits that may well prove to be most significant to participants. As participant/employee satisfaction with both decision process and decision outcome increases, so satisfaction with the employee's own position in the company may be expected to rise, thus generating a more healthy working atmosphere.

Whilst there are a number of advantages that GDSS offer, as briefly considered above, disadvantages exist too. The loss of face-to-face contact should not be underestimated, and it is for this reason that not all meetings will be appropriate fora for GDSS implementation. It has been noted, for example, that participants' comments and suggestions tend to be more critical and barbed, even involving personal attacks where less experienced users, especially undergraduate students, are concerned. This is encouraged in part by the anonymity function. It is possible to avoid the physical isolation and yet maintain some genuine anonymity through appropriate physical design - monitors can be sunk into desktops so that users can only view their own screens. Enforcing the isolation by erecting dividing partitions between desks is not recommended, since doing so obviously heightens a sense of isolation. A further stumbling block is that of cost, since state-of-the-art GDSS facilities do not come cheap. Though the software required to run GDSS is not so expensive and may even be provided free of charge with the hardware, many dedicated hardware and ergonomic set-ups have costs running into tens or hundreds of thousands of US dollars.

At this juncture, it is worth noting that to date the vast majority of GDSS research has been undertaken in academic environments, with very little penetration of the commercial marketplace. Notable exceptions are: ICL, IBM, Gould Inc. and Xerox Palo Alto Research Center, yet it is clear that these companies are involved in the process of computer research, so it is hardly appropriate to consider them as representative samples. Moreover, it should also be realised that research in this area has often had limited application to more general situations since it is frequently undertaken with volunteer student subjects, for example: Jessup et al., (1990); Easton et al., (1992). This is a particular concern of the current research project. However, it is also true that the University of Arizona's GDSS software *GroupSystems* has been used by a large number of groups and at a range of sites both inside and outside the US.

RESEARCH METHODOLOGY

It is recognised that it is essential to provide the current research with as realistic and non-laboratory specific a basis as possible, in order for findings and results to possess more than a passing relevance and value. Hence, the research emphasis is to consider the participation of 'real' businessmen, managers and decision makers from the non-academic community. However, it is expected that, especially in initial stages of the research, undergraduate and postgraduate students and faculty members of my own institution, the City Polytechnic of Hong Kong, and possibly other tertiary institutions in Hong Kong, will take part in laboratory sessions to pilot-test the GDSS software selected as being most suitable.

The principal empirical goals of this research are two-fold, yet they lie within a broader framework, that is the specific geographical context of Hong Kong. The first objective is to examine the effect of one controllable variable (anonymity)¹ on the decision making process in GDSS in terms of particular expected outcomes, viz.: user satisfaction; minority influence; user participation; dominance. Therefore, it is specifically hypothesized that the application of anonymity in the GDSS will have the effect of:

- [I] Reducing both dominance and minority influence in the decision making process;
- [II] Increasing the number of participants who become actively involved in the decision making process;
- [III] Increasing user satisfaction with the decision reached, and its quality;
- [IV] Increasing user satisfaction with the decision making process.

The above hypotheses will be assessed in the light of analysis performed on data collected by the Master Terminal during the GDSS session, and by questionnaires completed by participants after the session. Furthermore, the questionnaire will examine the relationships that exist between individual participants in terms of culture, both corporate and societal, particularly with reference to three of Hofstede's cultural factors, viz.: power distance, uncertainty avoidance and individualism (Hofstede, 1980).

Hong Kong's own characteristic environment, with elements of both Chinese and Western culture, is ripe for an examination of the potential for GDSS implementation since there are a number of indigenous issues in Hong Kong, such as large power distances, and management's unwillingness to delegate authority, which GDSS has already shown it has the potential to address. Furthermore, the author is not aware of any Hong Kong company utilising GDSS technologies to date. The Cultural Studies Program at Hong Kong University led by Redding has shown that traditionally, Hong Kong business culture has been very traditionally Chinese oriented with patriarchal and familistic management techniques, often incorporating nepotism with formal obedience and deference to senior managers. This is now changing as a more Westernized, formally educated and ambitious younger generation is making its presence felt, challenging the leaders of yesterday, offering its own solutions to problems, seeking the possibilities of self-ownership, increased autonomy and a greater degree of influence and control in the way companies are run. The differences may be particularly marked in firms that have traditional management practices, with entrenched ideologies and Confucian principles, and yet which are also recruiting a younger generation of better educated personnel so as to maintain competitiveness, (Pun, 1991). It is worth observing that although GDSS may be perceived as opening up opportunities for this younger generation, there is no guarantee that entrenched ideologies will suddenly disappear. The process of change is continuous, and today's younger generation will also become old in the future.

A second objective is to explore the issue of 'usefulness', i.e. what benefits can GDSS offer companies in Hong Kong. The potential usefulness can be measured in a number of ways: the empirical data obtained from the Master Terminal for the first objective, above, will be analysed and supplemented by 'cultural' information gathered from the questionnaire. It is expected that the design of the questionnaire will be crucial to the success of this stage of the research, since it is essential that detailed information be acquired, documenting the positive and negative aspects of the GDSS, suggesting improvements, criticising the design and illustrating deficiencies, anomalies and irrelevancies. Ultimately, therefore, it is intended that improvements and developments will be suggested for not only the theoretical model and methodology of GDSS implementation along something akin to sociotechnical, user centred system design lines, but also to indicate directions for future research.

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