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Decision Support System as an Intermediate Variable to Enhance the Influence of Tacit knowledge on The Quality of Strategic Decisions.

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Abstract

Introduction: quality decision making is knowledge based whereas the majority of knowledge that can be the nucleus of strategic decision that is rooted by the tacit knowledge. **Methodology:** the research was based on two major procedures, first the secondary research review on all scientific attributes of related subjects of DSS, Strategy and decision making process in addition to the findings of other related scientific publications. The second method was based on professional survey of related individual whom are meeting the objectives of the paper. Electronic survey was circulated to 384 sample size from all regions of Saudi Arabia. **Results:** the study have received 228 interactions from the target sample by percentage of 59.4%, and the most

important findings have shown; 1. the sample believe by 97.4 % on the direct relationship between the organization's efficacy and the strategic planning 2. Organized data and information are critical (94%) to make quality strategic decisions 3. DSS are used to explore the tacit knowledge of decision makers. **Conclusions and recommendations:** the study have shown that the individuals knowledge and experience are still the most effective practice in strategic decision for organizations in Saudi Arabia, thus developing the knowledge of those individuals are valuable.

Key words; DSS, Decision Making, Tacit Knowledge, Strategic Decision, Quality Strategy.

1. Introduction;

Many organizations have noticed that the data they own and how they use it can make them different than others. Data and information are becoming primary assets for many organizations (Demirkan & Delen, 2013).

Organizations may care about their service accuracy and quality in addition to the cost and delivery time. There also are data related challenges for organizations, for instance, there is the challenge of managing large amounts of data (big data), which is getting increasingly larger because of cheaper storage and evolution of digital data and information collection devices, such as cell phones, laptops, and sensors. For example, Facebook, a social networking website, is a home to 40 billion photos, and Wal-Mart handles more than 1 million customer transactions every hour, feeding databases estimated at more than 2.5 petabytes (Demirkan & Delen, 2013).

Most organizations today are fundamentally dependent on their data and information handling services facilitated by their information technology to collect, store, flow, manage and analyze data better (Peppard, 2003). On the other hand quality decision making is knowledge based (Howard, Lubbe, & Klopper, 2011) whereas the majority of knowledge that can be the nucleus of strategic decision that is rooted by the tacit knowledge (Širec, Rebernik, & Brada, 2009).

In this paper, as required by the course of information management is highlighting the importance of decision support systems throughout the strategic process as a variable to enhance the retrieval of knowledge from its most difficult status of in-articulable knowledge.

2. Research Problem;

Tacit knowledge represents the majority of knowledge owned by decision makers compared to the explicit knowledge (Polanyi, 2005), meanwhile decision makers are dependent on the personal experience, sense, intuition, insight, skills and own tacit knowledge for developing their decisions (Haldin-Herrgard, 2004). In the time of technology and information, the size of data and information have evolved to the use of Decision Support System to enable individuals for better decision making process (Demirkan & Delen, 2013). While diving into more understanding of decision making, there are more types that to classify strategic decision

making as one of most critical to organizations (Riguelle, Hébert, & Jourez, 2015). This research is trying to explain the input and the role of DSS with strategic making process that is dependent on the variable of tacit knowledge.

3. Hypothesis;

Unlike what is known that knowledge has only two types; mainly the explicit and tacit type, we can describe knowledge as articulated (explicit) and unarticulated knowledge (tacit) that can be retrieved or recorded through advanced systems such as DSS by the process of codification, or in-articulable knowledge that is nearly impossible to convert it to explicit knowledge (Kimble, 2013), figure (1) shows this relationship.
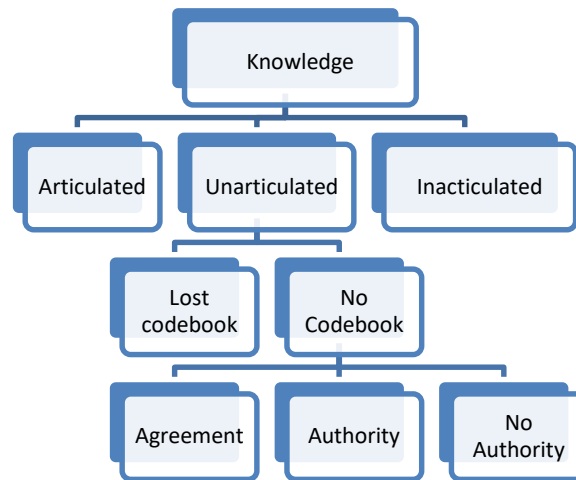

Figure 1: Topography of Knowledge transaction activities (source: Cowan et al, 2000)

Our proposition would try to figure out the relationship of Decision Support System as a variable and its influence on the conversion or by another words, on our major focus could reach to the relationship of DSS application in an organization and the possible positive, negative, or neutral influence on the conversion of tacit knowledge that would augment quality strategic decisions in an organization.

4. Literature Review:

4.1 Knowledge

Knowledge is usually described as either (a) in-articulable, that is impossible to describe in propositional terms, or (b) tacit knowledge, that is articulable but only with some difficulty (Canale, 2011).

Tacit knowledge can be categorized as formalized in which it is dependent on time and cost to be explicit knowledge, and another non-formalized tacit knowledge that is embodied and its form do not allow of such type of formalization (Jarke, Applications, Area, & Series, 1985).

Knowledge It is usually seen as being acquired through direct personal experience of something, because it is hidden from the outside observer, and impossible even from the holder of the knowledge, it is also seen as being difficult to identify and measure. On the other hand, "tacit knowledge" has a personality, which makes it hard to formalize and communicate (Wells, 2001).

The intellectual basis for this view is usually attributed to Nonaka's reading of Polanyi (Bratianu, 2010).

The concept of knowledge conversion from one knowledge form to another and that of the SECI model (Socialization, Externalization, Combination, and Internalization as two by two in matrix)(Nonaka & Lewin, 1994).

Tacit knowledge might be obsolete, and sharing of such knowledge by decision makers may alternate the knowledge of those decision makers while using a misleading knowledge based experience for strategic outcomes (Širec et al., 2009)

4.2 Strategy

Professional knowledge based institutions have a unique organizational form and culture that makes special demands on strategic planning (Olivarius, Kousgaard, Reventlow, Quelle, & Tulinius, 2010).

Strategy was tentatively defined as "the specific development projects that have to be put into effect to realize the desired future state (the vision), while vision was seen as "a common image of where we would like to be in five years" (Olivarius et al., 2010).

Institutions present strategic situation underwent a SWOT analysis; Strength and Weaknesses from an internal analysis and Opportunities and Threats from an external analysis (Lynch, 2006).

4.3 Decision Making and Decision Support Systems;

Decision-making is the process of choosing a course of action over another, looking for appropriate solutions for the new problems that arise in a changing world (De, Peixoto, Golgher, Álvaro, & Cyrino, 2017).

The DSS defined as a computer system that includes most, but not necessarily all, of the following: a single database, in which internal financial data and operational and external data can be found; a friendly interface with the end user, with the ability to generate trends; analytical reports highlighting the critical information to executives and the capacity to obtain data from multiple sources (De et al., 2017) .

Decision making has the argue od two factor dependence, the rational planning practice and the exchange of information (George & Desmidt, 2016), while DSS is the tool of decision making. Decisions can range from structured, semi-structured and unstructured decisions. The clarity of situation whereas decisions are required, they usual descript different situation or levels of operational, tactic and strategic decisions (Tripathi, 2011).

DSS inherently are complex in terms of both their data management and technology architecture (Pimentel, Angelopoulos, Souza, Mylopoulos, & Castro, 2013).

Some of this confusion stems from genuine disagreement over definitions and an inability to clearly delineate related concepts, such as data marts and date warehouses, where data warehouse is a central repository for all, or significant portion, of the data an enterprise collects (Howard et al., 2011).

Data warehousing serves the function of querying reporting large sets of data, and the main purpose is to provide access to historical and transactional data in their basic format (Alyoubi, 2015).

Data mart is very similar to a data warehouse in that it is a repository for data; however data marts are limited in scope to subset of an organization's information delineated by subject, function, utility or user group(Ogle & Yeagley, 2006).

DSS can be defines as a cohesive, integrated hardware, and software designed specifically to manipulate data and enable users to distill and compile useful information from disparate sources of raw data to support problem solving and decision making (Sprague, 1980) . Figure (2) shows the components of DSS.
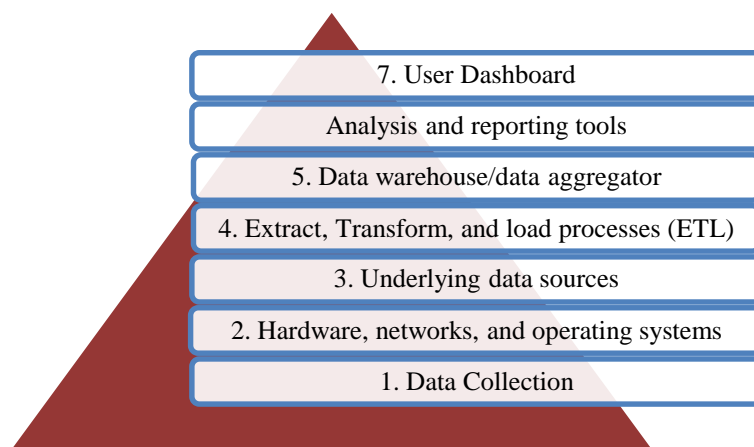

7. User Dashboard
Analysis and reporting tools
5. Data warehouse/data aggregator
4. Extract, Transform, and load processes (ETL)
3. Underlying data sources
2. Hardware, networks, and operating systems
1. Data Collection

Figure 2: Common components of decision support systems (Ogle & Yeagley, 2006).

DSS have evolved significantly since their early development in the 1970. Decision support Systems (DSS) are computer technology solutions that can be used to support complex decision making and problem solving (Kitsios, 2017).

Classic DS tool design is comprised of components for (i) sophisticated database management capabilities with access to internal and external data, information, and knowledge, (ii) powerful modeling functions accessed by a model management system, and (iii) powerful, yet simple user interface designs that enable interactive query, reporting and graphing functions (Street, 2007) . Simple organizational decision making model can be illustrated by figure (3).
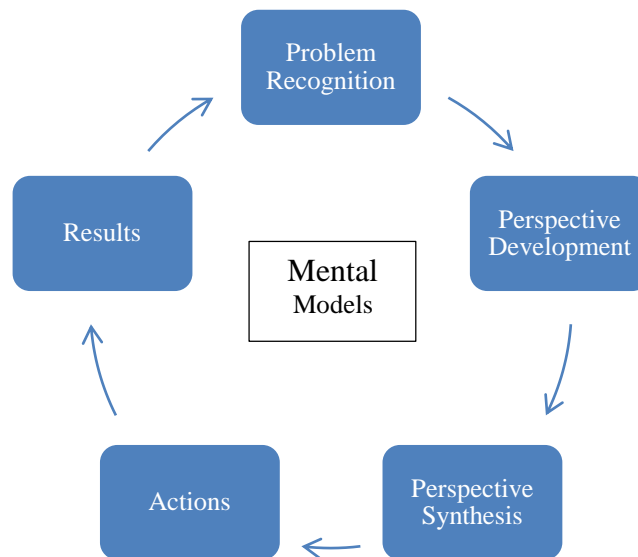
Figure (3); A new decision Paradigm for DSS. Source; (Courtney, 2001)

Quality of information is extremly important in the process of strategic decision making, it strengthen the mental models, learning, direction and planning capabilities of edisiocn makers (De et al., 2017)

5. Objectives:

5.1. To verify the importance of strategic decisions in achieving organizational goals.

5.2. Understanding if all decision makers possess an integral tacit knowledge that can be used in strategic decisions

5.3. To recognize the contribution of DSS by using the tacit knowledge in strategic decisions.

6. Methodology;

Two major approaches:

6.1. **Scientific review** of related studies and publications.

6.2. **Field Survey** by using electronic form survey in Arabic language using the concept of;

- Dependent factor; DSS in a quality strategic decisions.

- Testing the independent variables:

  i. Efficacy of tacit knowledge

  ii. Knowledge and personal experience

  iii. Consultation and external knowledge

  iv. Effectiveness of quality decision making

  v. Efficiency of DSS

Digital form questionnaire was used and distributed to target sample using link in social media.

Conducted on December 7th, 2017 for three days.

Questionnaire composed of three parts; five polar choice likert scale questions, closed prop, and open questions

Sampling; the target research community; all individuals whom are involved with strategic decision in public and private sector organizations in KSA. Non-random expert sampling procedure was applied, with confidence level of 95% and margin error of 5% taken by researcher as the target research community was unknown in Saudi Arabia, thus the target of a population size of one million, these parametrs would target 384 samples (Dahiru, Aliyu, & Kene, 2006).
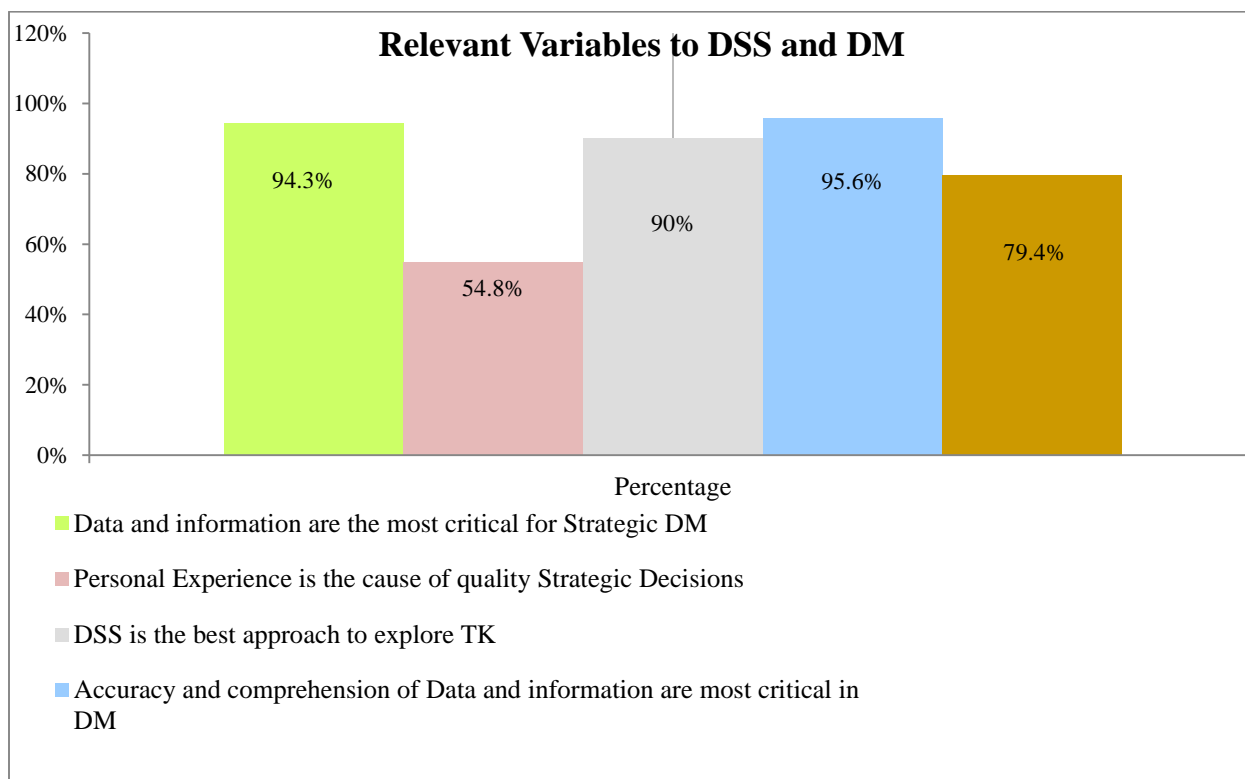
7. Findings:

Most important to researchers is the criteria of individuals tested in the research that would achieve the objectis of the research, and the criteria of the research sample had the formula;
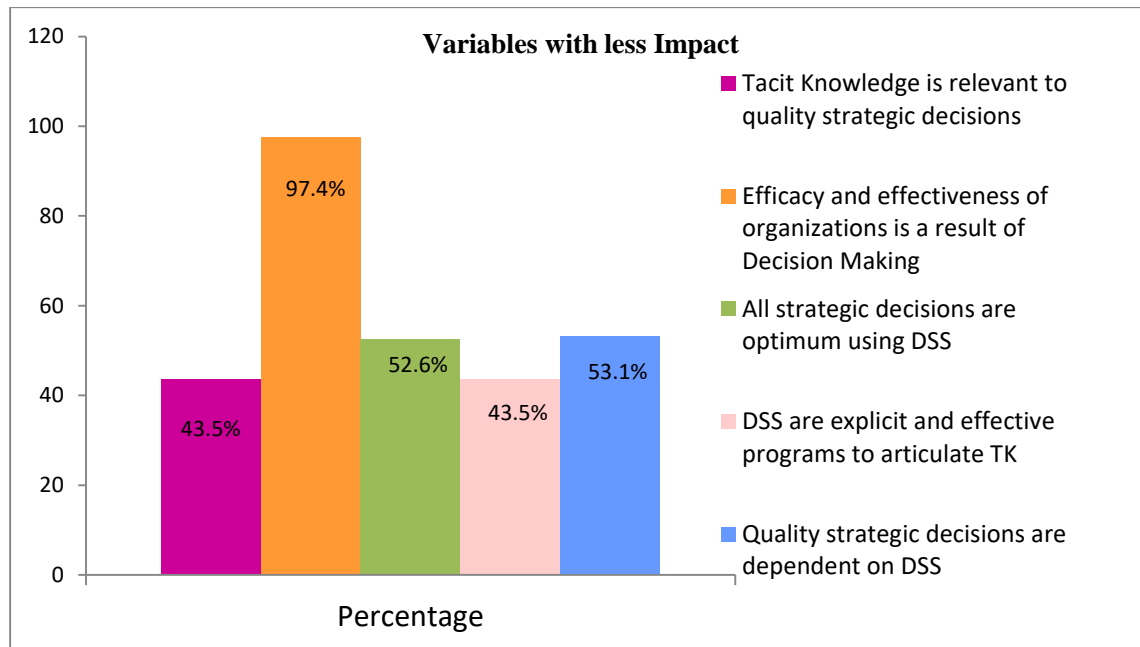
- Total sample size 228, with 64% from government sector and 36% from private sector organization in Saudi Arabia, the returned acceptable sample rate is 59.4% of target sample size.

- Work experience of sample individuals is 61% of more than 10 years.

- Qualifications of sample individuals 5.8% PhD., 27.4% BSc.

- Gender distribution of 82.6% male and 17.4% female.

- Geographic sample distribution in Saudi Arabia; 60% western region, 20% central region, 10.7% eastern region, and 2.3% from southern region.

Majority of the sample (62%) have experienced DSS forms and/or applications, and 64.6% are involved with strategic decisions in their organizations. Meetings and consultation of experts are more supportive to reach quality DM than using DSS (67.5%).

Relevant Variables to DSS and DM

- Data and information are the most critical for Strategic DM
- Personal Experience is the cause of quality Strategic Decisions
- DSS is the best approach to explore TK
- Accuracy and comprehension of Data and information are most critical in DM

8. Discussion:

Demographic differences did not put an impact on the findings, these of gender, age, qualifications and years of experience (Al Shobaki & Abu Naser, 2017).

Decision makers still are *less* dependent on DSS for their strategic decision as 36% prefer to use their personal knowledge and 24% are not confident on the situation. Multiperson DSS (Jarke et al., 1985)or what become Group Decision Support System(DeSanctis & Gallupe, 1987) can be another tool for knowledge sharing among decision makers.

High percentage of responders (90%) believe that DSS can facilitate the transfer of tacit knowledge to explicit knowledge, however some (35.5%) believe DSS are complicated programs and procedures.

Higher proportion of the sample decision makers (53.5%) prefer to use DSS for achieving quality strategic decisions while less portion (35%) have an opposite opinion. Decision makers have in mind the high risk of system failures, as DSS has been relted Executive Information Sytsems (EIS) and Online Analytical Processing (OLAP), these systems have shown failure may reach up to 70% of practice (DeSanctis & Gallupe, 1987).

The research shows that organized data and information are the most critical for making quality strategic decisions (94.3%), in parallel manners the accuracy and comprehension of information are similarly essential (95.6%). The quality of information is the main driver for value added strategic decisions (Howard et al., 2011).

DSS appears to be important (79.4%) tool by providing the information through dashboard models for quick or operational decision making. DSS is not the only tool available for decision makers, Expert Systems (ES) are known to be differentiated by the ability of reasoning and explanations that is granitng better option for decision makers (Borissova & Mustakerov, 2012).

Decision makers can use the concept of Community of Practice (COP) (Holgersson, 2013) that is not neccisseraly using the computerized or electronic applications such as GDSS (Group Decision Support System), that is one way of decision makers are reliance on meetings for developing their own knowledge and further to enrich their capabilities for decision making.

9. Recommendations:

Strategic decision makers believe that sharing knowledge through consultants and experts are prominent over the applications of DSS, thus the intellectual capital of individual has the added value.

The sample community gave a positive direction on the Saudi society being information based community, that is an important factor toward preparing this culture into knowledge based economy.

The full understanding of tacit knowledge still uncertainly digested by many professionals and decision making experts, that dictates the need for more studies in the field of knowledge.

DSS importance appears to be well established in the field of operational decisions that involve complicated processing of data and information. Fields such as navigation, aviation, financial spot markets are clear examples, indeed many of such operations are requiring vital but ongoing decision making entity. DSS purpose is to handle decisions involved with large amount of data (E.Kersten, Gregory, Zbigniew Mikolajuk, 2000).

Distinction between strategic decision making and long-term decision making is theoretically valid, whereas geological big data to study earthquakes and volcanos for example can be suitable area for using DSS. It is know that tacit knowledge helps organizations to achieve long-term goals (Chen & Mohamed, 2010)

The use of DSS has several advantages to organizations among of which is the automation of management process and promoting innovation and creative competitive adavantages (Pimentel et al., 2013).

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