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Business Intelligence - A Gift for Decision Maker for the Effective Decision Making

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ABSTRACT: Business Intelligence is a socio-technical concept emerged to help managers especially in their decision making tasks. A manager with different decision making styles has been started to make use of business intelligence in their own ways. Are the all managers taking benefits of Business intelligence in the same way? Does Business intelligence give each category what they want in the decision making process? If the answer to these questions is – No, then what is the expectation of managers from BI having different decision making style? Will BI could satisfy their needs? If yes, then how? By using well-formed theory in different styles of decision making and taking BI capabilities into consideration this paper highlights the framework which defines appropriate BI capabilities with each decision making style. Study shows in order to serve each style of decision in which BI capabilities changes with respect to style. It is believed that by making BI customized based on decision making styles; BI would be the much more successful in serving all the categories of managers.

Keywords: Business Intelligence, decision making, Decision making styles, decision making factors, business intelligence capabilities, Synthesis quality methodology,Meta-ethnography methodology.

I. INTRODUCTION

In today's era of competition every organization looking forward for successful growth and this could happenonly with good and effective decision making. This leads the availability of quality of information which is very crucial to them for making quick and rational business decisions. By implementing analytical tools, business intelligencehas emerged to present complex internal and competitive information for planners and decision makers by combining large number of data gathering, storage of data and knowledge management. One of the main objectives of BI is to provide the managers the vital and actionable information in right time, right place and in right and appropriate form as one of the vital input of decision making process. What are those different situations which affects in making a decision? Reardon et al. answered this question as "decision makers always acts, perceive and analyse information differently while framing their problems, perceive and analyse information and determine the extent and quality of data to be analysed. Moreover they are different in tolerance for ambiguity, interacting with subordinates and paying attention to details."[1] The motive behind this paper is to understand the framework which has a bidirectional relationship between capabilities of BI and different styles of decision making. The models of Hostman et al. [2] for BI capabilities and Rowe& Mason [1] for decision making styles are used in framework conceptualization.

II. DECISION MAKING CONCEPT

Decision making is the process of making a choice between more than possible alternatives oriented towards a particular goals achievement. Decision making is a creative process realized in a rational way under following three premises:

1. There is a clear understanding of alternative directions by which goals set could be accomplished against existing opportunities and limitations;
2. There are information and capability of decision maker for analysis and evaluation of alternative within a framework of goals set;
3. There is a wish of decision makers for identifying the best alternative solution which has to be efficient for realization of goals set.[3]

Differences among managers on different levels of hierarchies as to a problem deciding on, kind of decisions as well as percentage of particular problems and on the basis of those problems kinds of decision having being made.

Decision making involves following 7 phases: identification of a problem, defining of a task, survey and analysisof an existing condition, seeking of versions for problem solving, evaluation of all versions of problem solving, decision making, implementation of decision and control of implementation of decisions. Following figure 1 shows each phase in graphical format:

Fig.1: Decision making phases

III. BUSINESS INTELLIGENCE CONCEPT AND CAPABILITIES

Business Intelligence in terms of decision making is stated *as "By procession and use of information the decision maker removes a certain amount of uncertainty and places the user in more favourable situation. The amount of information available to decision makers rose dramatically during the last years and their processing creates a product called* ***BUSINESS INTELLIGENCE****."*[3]

According to Brackett[4] BI is a set of concepts, methods and processes with ability of monitoring business trends, evolving and adapting quickly as situations changes, making intelligent business decisions on uncertain judgments and exploration and analysis of unrelated information to provide relevant insights, identify trends and discover opportunities, which leads to effective decision making. Following figure 2 reveals clear understanding of BI In figure 2 it clearly depicts BI Components:

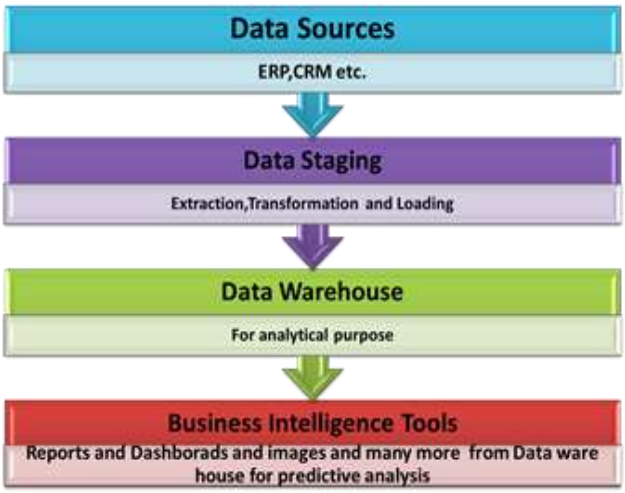

Fig.2: Basic understanding of BI

The figure 2 shows that the data is collected from various sources. Than it traverse through the process of ETL. This data can be of any type such as collected from structured ones such as ERP or CRM, to unstructured ones such as images, spreadsheets and other kind of business processes.
Hostman et al [2] has delivered following list of eight BI capabilities which makes BI more relevant.

1) **Data Source:** Data source is from where the data is collected for the purpose of analysis.
2) **Data Type:** Data could be either the dimensional or non-dimensional and numerical or non-numerical. Dimensional data is structured and subject oriented and non-dimensional data is unstructured.
   Hostman et al [2] refers dimensional and numerical data as quantitative and non-dimensional and non-numerical data as qualitative data.
3) **Data Reliability:** Data reliability is purely dependent on data source where actually it is qualified and controlled.
4) **Flexibility:** Flexibility shows the amount of interaction a BI system have with variety of data source and analytical tools.
5) Intuition involved in Analysis: Analysing the intuition is based on feelings rather than facts.
6) Interaction with other Systems: Shows the level of communicability BI holds with other parts of the systems.
7) **Risk Level:** Risk taking organizations have high tolerance for the uncertainty and they expect that BI will support for exploring new opportunities whereas on other hand non risk taking organizations have low tolerance for the ambiguity and then they faces the specific problems.
8) **User Access:** BI systems can be web-centric systems and specific desktop based applications. This two differs in terms of amount of control and restrictions on the access of the system for the user. [5]

IV. DECISION MAKING STYLES

According to Driver [6] decision styles are habitual patterns that individuals use for decision making process. In their career all the individuals always start with the default decision style while this style could strengthen through frequent success or replaces the new style with continuous failures [7]. Various authors popularly named as McKeeney and Keen [8] has proposed different models for better understanding of decision styles Driver et al [9] and Scott and Bruce [10] and many more. McKeeney and Keen [8] mainly focuses during their research with respect to variation in the decision makers. Their proposed framework purely combines factors of perceptive or receptive an intuitive or systematic.

This leads to framework with four decision making styles:

1) Systematic-perceptive 2) Systematic-receptive 3) Intuitive-perceptive 4) Intuitive -receptive. Figure 3 illustrates four decision styles proposed by McKeeney& Keen.
2)

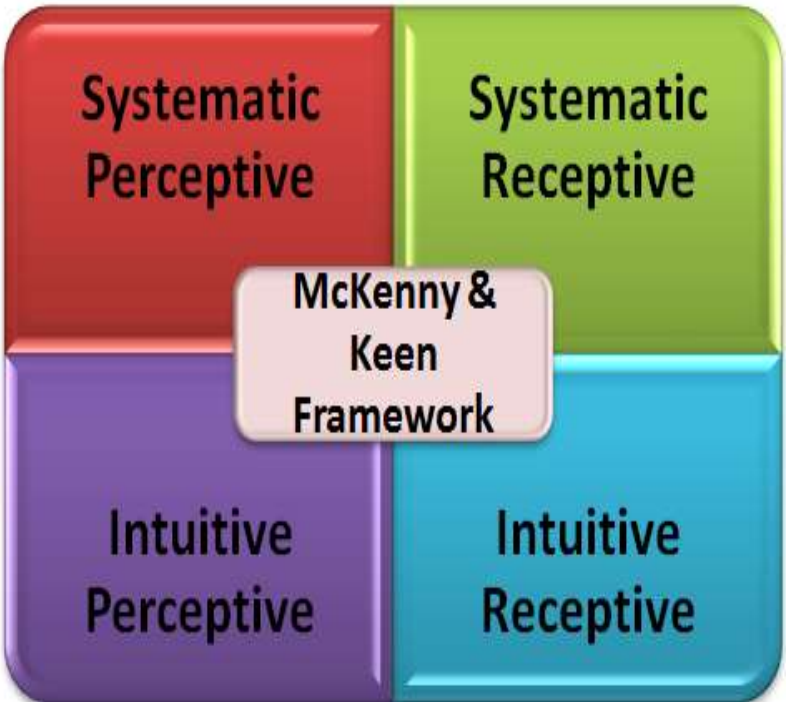

Fig.3: McKeeney and Keen Model

Driver focused on amount of information decision maker use in order to make the appropriate decisions besides the number of choices they developed to choose between them [9]. By combining these two factors they come ahead with framework with following five dimensions as shown in figure 4:

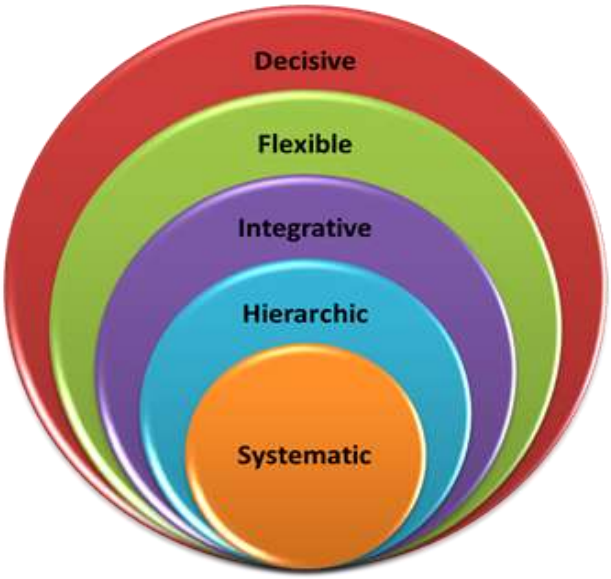

Fig.4:Dimensions of Driver's Framework

Scott and Bruce introduce the decision making as it is habit based propensity to react in a certain manner rather than the personality trait. They specified four decision making styles as:

1) rational 2) intuitive 3) dependent 4) avoidant. [10]. Rowe and Mason [1] has proposed very effective framework with four decision styles as shown in figure 5. Their framework focuses on two dimensions. First dimension is cognitive complexity. Cognitive complexity determines utilization of information by individuals in different ways at different level of hierarchies. Second dimension is technical aspect of decisions which mostly relates with accepted contribution of other peoples by leader in decision making process. This model also considers the left-brain and right-brain implementation of individuals. Biological concepts differentiate the left hemisphere of brain as mostly devoted to verbal and logical thinking whereas right hemisphere of brain focuses on artistic and emotional aspects of the life of the individuals.

Hence according to Rowe and Mason [1] individuals fall under following four categories: directive, analytical, conceptual and behavioural.

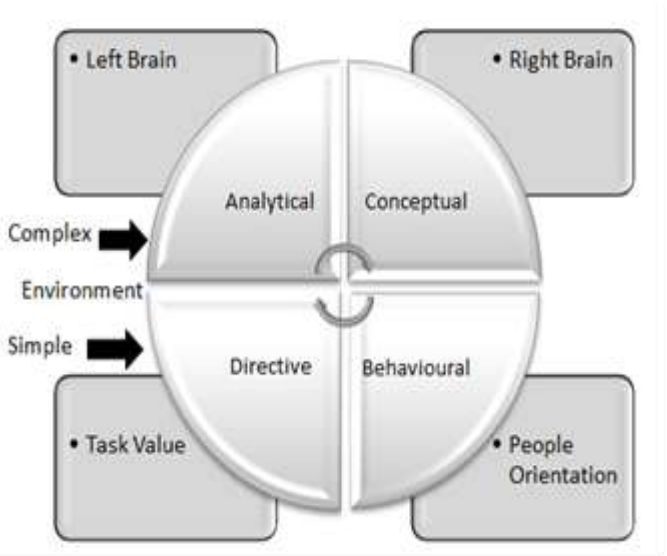

Fig.5:Rowe and Mason's Framework

V. METHODOLOGY

Synthesis Quality methods are one of the well-known techniques in social science. This concept mainly obtains the interpretations by using other articles in a particular research area. Meta-ethnography is one of the most popular synthesis methods. Noblit and Hare [14] has introduced these methods to all in the year of 1988 and continued to develop in the fourth coming years [13]. The main motive of meta-ethnography is to form a whole by individual studies as ingredients. To accomplish this goal Meta-ethnography recommends three main phases: 1) analysis of reciprocal translations, that is findings of different primary research studies will be transformed into each other to generate new concepts, metaphors and themes 2) reputational synthesis, that is contradictions and differences between different studies will be identified and explained and 3) line-of-argument synthesis, that is a picture of whole phenomenon under the study. By taking into considerations these three phases, Meta-ethnography involves seven steps as follows:

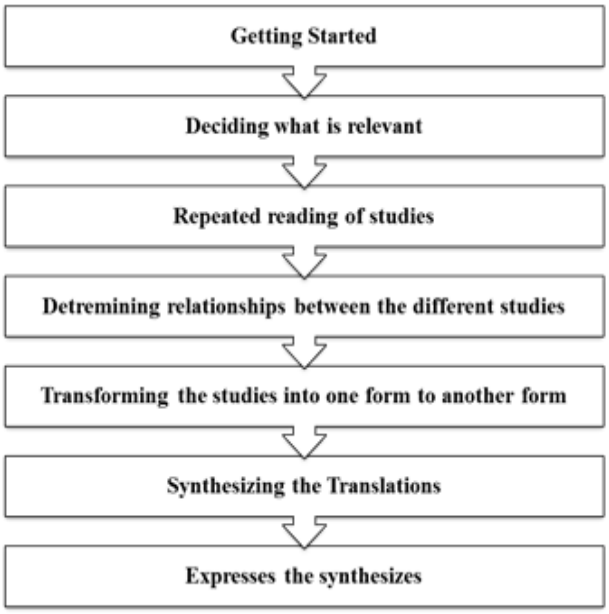

Fig.6: Meta-ethnography phases

In this paper, Meta-ethnography was conducted for the impression of conceptual model in consideration of relationship between different decision styles interfering in the actual performance of BI and BI system. In the next step, four basic articles were selected and the key components identify which were the data for the synthesis. Finally the analysed concepts were synthesized. This proceeds with the formation of final framework which correlates different decision making styles and different aspects of Business Intelligence.

VI. FRAMEWORK IMPLEMENTATION

In consideration the meta-ethnography method the research of four related studies were analysed. As a part of framework creation Table 1 defines the logical relationship between the factors of organization impacting on Business Intelligence two basic dimensions that is cognitive complexity and people's orientation.

Basic Dimensions of decision style model	**Factors affecting BI studied and identified by author's**
Cognitive Complexity	Decision process engineering culture(using structured, fact-based and standard decision process)[15]
	Culture around use of information analytics(using an analytical framework)[15]
	Structured or unstructured decision making process[2]
	Decision Type (structured or unstructured)[16]
People's Orientation	Leadership style(autocratic, participative Laissez-faire)[17]

Table 1: Relationship between Dimensions and Factors affecting BI

Directive: Directive style holder individuals tend to acquire information and data by sensing and they prefer to receive the summarized and brief reports with limited amount of data verbally. Therefore in extracting data they depend on individuals. They use intuitions, their years of experiences and certain rules that they follows for analysing the information. They prefer in gathering of data internally. They need security and control over the data very highly.

Analytical: Analytical decision makers are well known for their careful analysing of every aspect of their given problems by utilizing large amount of data. As an outcome, not only are pure facts most important for analytical managers but they uses all types of information from all the sources available to make the decisions. A BI system with better interaction with the other systems and also provides better set of information could be helpful for this kind of decision makers. Information evaluation in this style is through abstract thinking based total amount of data. Hence the intuitive level of thinking is limited in this category of decision makers. Creativity in solving of problems, clear focuses on technical decisions and necessity for the control over the data and information are the other relevant aspects of this style's decision makers.

Conceptual: The Decision maker with these styles most probably prefers to gather the information by using their intuitions and discussions with other peoples. They well known as innovative, creative and highly people oriented. During decision making, they focus widely on broad aspects of problems and solve it through providing multiple options by getting back to multiple resources. They are well known for highly risk taking and flexibility in decision making.

Behavioural: They are like social animals. They mainly focus on social concerns, supporting and communicating with subordinates. They receives the information and data during decision making process by sensing, listening to others and interacting with others inthe organization and outside the organization also and they analyse this information using their feelings and instincts. They hardly takes the risk as because they low tolerance for ambiguity while decision making.Following chart shows each decision making style and impact of capabilities of BI on these styles.

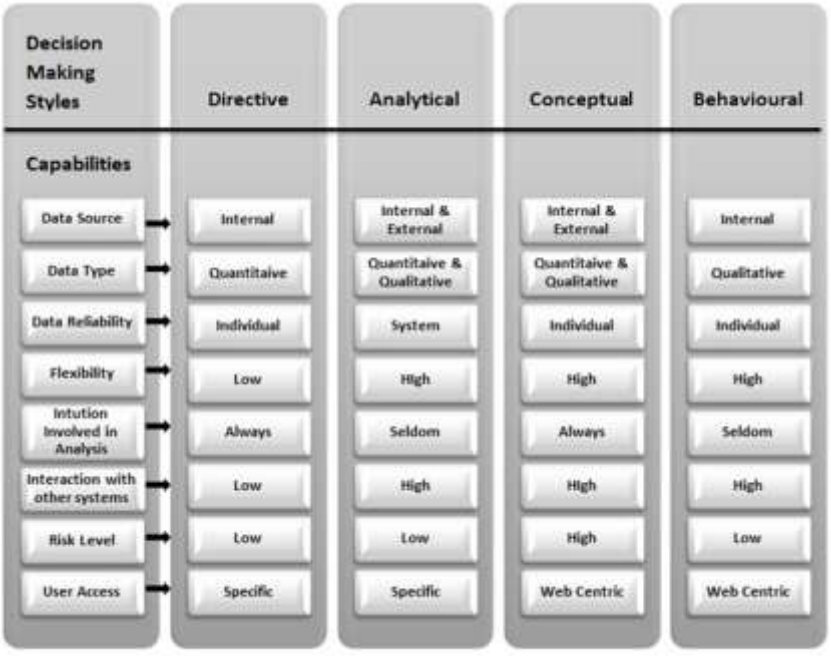

Fig. 7: Chart for comparison different decision making styles with respect to their BI Capabilities:

VII. CONCLUSION

In this paper, we have discussed different decision making styles & BI capabilities in bidirectional relationships between them. Despite increasing applications of BI in a Business organizational decision making, it is so much important to consider the way of decision maker to fulfil the needs of the managers or the persons who is seated at higher level in hierarchy in an organization. There are so many researches have been done on the success of BI which considers only the technical factors. Hence, the BI system user plays a critical role in the path of success of BI. By taking into consideration this logic, our contribution is to take into consideration the customer's/end user's needs and their expectations for designing an effective BI system for decision making.

The proposed framework is based on the generalised theory of decision making styles by Rowe and Mason [1] therefore it could be applied for all types of users besides managers. Rowe provided a standard category [1] classifying some of the professional individuals and their position in the organizations with respect to this decision style model. From this study it is clearly understood that BI could be easily applied in any kind of organization and for any kind of individuals (professions) based on their style of decisions.
In following chart all the individuals are mentions with their style of making a decision.

Left Brain	Analytical (+) Directive
	Type of : Individuals from Science,Finance and Law
Right Brain	Conceptual (+) Behavioural
	Type of : Individuals from Psychology,teaching and art
Idea Orientation	Analytical (+) Conceptual
	Type of : Senior Executives and Leaders from Organization
Action Orientation	Directive (+) Behavioural
	Type of : Sales Persons,Enterpreneurs
Executive	Conceptual (+) Directive
	Type of : Cross Over executives
Staff	Analytical (+) Behavioural
	Type of : Technical managers
Middle Management	Directive (+) Analytical (+) Conceptual
	Type of : This is Flexible Management style.

Table 2: Type of individual and their style of decision making

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