IPEA Conceptual model:

Drawing a parallel between CRISP-DM methodology and SIMON's decision-making model

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Outcomes

- Institutional knowledge
- Importance of Management information systems (MIS)
- Translation capability
- Design effectiveness
- The DIKW model

Outcomes (continued)

- Decision making
- Effective decision making
- The various models of decision-making
- CRISP-DM methodology used for data mining.
- The IPEA conceptual model constructed by drawing parallels between Simon's decision making model and the CRISP-DM data mining methodology as tool to assist the information analyst.

Methodology

- The approach of the study uses pragmatically eclecticism and compares the individual phases of the two models, and a logical conclusion is drawn based on the findings.

- Use of the most appropriate tools to investigate a phenomenon (Onwuegbuzie & Johnson, 2004, 2006; Onwuegbuzie & Leech, 2005; Tashakkori & Teddlie, 1998).

Introduction

- Competitive socio-economic environment
- Management requires actionable, timeously and accurate information

- Capable information analysts
- Understanding of Institutional knowledge

Institutional Knowledge

- Collection of facts, concepts, experiences, insights, and “know how” acquired over time by a person or group of people within an organisation including the in-depth understanding of processes and procedures within the institution (Holt 2003:18).

- Rosen as “the body of knowledge, formal as well as informal, that is essential to the continuous and effective functioning of the agency/business at all levels”.

Importance of MIS

- Highlighted more than 30 years Ward (1968:21)

  "*any business, whatever the nature of the products or service it offers, can be considered as an information machine, and as management spends much of its time making decisions with inadequate information the idea of having access to complete management information sounds a few stages removed from paradise*."

Importance of MIS

- System responsible and delivers information that is needed for the effective management of organisations.

- Academically the term MIS is universally used to denote an assortment of information management methods assisting the human decision-making process as it is related to the automation or support of these systems. O'Brien (1999:76)

Importance of MIS

- Successful use of information for decision support depends on a MIS that assures the quality and availability of relevant data that can be restructured for use by the decision makers. McLaughlin and Howard (2004:8)

- Quality of data limits the ability of the end user to make the correct decision. Weltzer et al. (2005:60)

Importance of MIS

- Wand and Wang (1996:1)

  "poor data quality can have a severe impact on the overall effectiveness of an organisation."

- Users are removed from personal experience with data and they are without the appropriate knowledge that would be beneficial in judging the appropriateness of the data for the decision to be made. Fisher et al. (2003:170)

Cognitive knowledge internalisation

- Effective management information
- Access knowledge databank
- Appropriate interrogated information
- Tacit knowledge
- Knowledge of the organisation
- This tacit knowledge provides historical context
- Business understanding within the data mining process model

MIS effectiveness

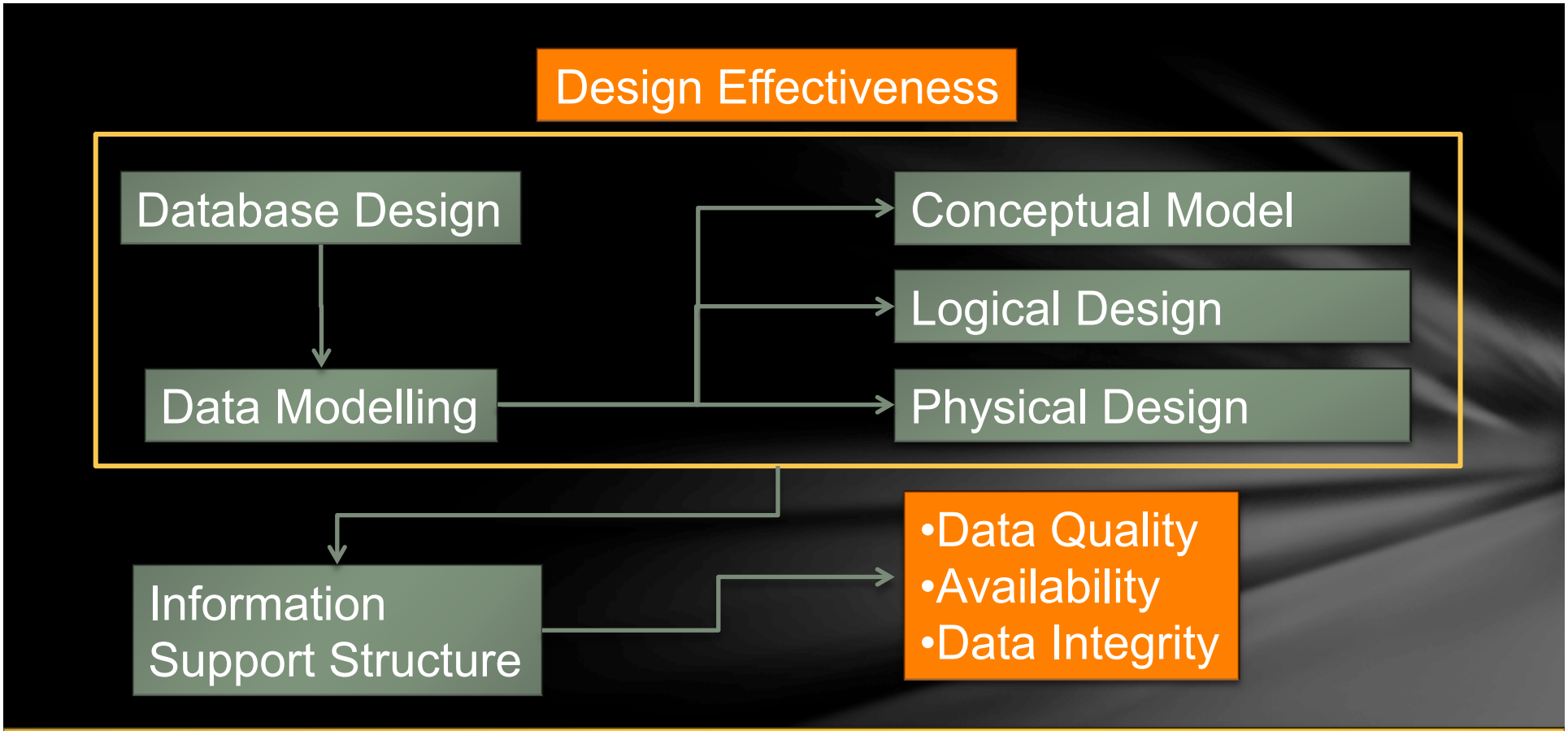
- Accomplishment of objectives and that it is not only of concern to management function, but also to the user, developer and internal audit personnel involved in MIS implementation.

- Scholars addressed and defined MIS in various sectors, few academic studies have focused on the impact and availability of tools to the information analyst to work efficiently and effectively.

- Translation capability, infrastructure and design effectiveness to enable them to accomplish the desired outcome.

Translation capability

The process of translation is termed ‘translation capability’ refers to the level of competency by the information analyst to extract institutional knowledge from organisational repositories of knowledge.



Information Support Structure

Affecting:

- Data Quality
- Availability
- Data Integrity

DIKW Model

Data

Known Fact

Information

Systematically organised data

Knowledge

Actionable information

Wisdom

Ability to act practically

Knowledge Dimension

- Time
- Context
- Frame of reference
- Intention
- New knowledge created in time

Effective decision making

- Thought process of selecting a logical choice from the available options.
- Effective decision making, forecast the outcome of each option as well, and based on all these items, determine which option is the best for that particular situation.
- The moderating effect of Leaderships' abilities to interpret and apply this Information should not be underestimated and can make or break effective decision making.
- Data quality informs MIS and findings support the notion that effective MIS contributes towards effective decision making in public higher education nstitutions in South Africa.

Decision making models

- The model of bounded rationality (Simon, 1979)
- The instrumentalist view (Lindblom, 1959)
- The organisational procedures view (March, 1988)
- The political view (Pfeffer, 1981)
- The garbage can model (Cohen, March and Olsen, 1972)
- The individual differences (Keen & Scott Morton, 1978)
- Naturalistic (Klein, 1998)
- The multiple perspectives Churchman's (1971)

Decision making models

- Simon's rational model on decision making (Simon, 1977) is preferred in this conceptual model based on existing logical similarities of the 4 step phase approach,
- A parallel is argued between CRISP-DM data mining methodology and Simon's model on decision-making namely that the process of data mining is in itself a continuous decision-making process which contributes to creation of new tacit knowledge from existing knowledge.

Simon's rational model

The rational model (Simon, 1977), describe assumes a rational and completely informed decision maker and comprises of a number of steps:

Intelligence: finding occasions for making a decision;

Design: inventing, developing and analysing possible courses of action;

Choice: selecting a particular course of action from those available; and

Review: assessing past choices.

Data mining

- *Turban, Sharda and Delen (2011) define data mining as a process that uses mathematical, statistical and artificial intelligence techniques to identify useful information and subsequently knowledge or patterns from large sets of data.*
- *Cross Industry Standard Process for Data Mining (**CRISP-DM**) is recognised as the "de facto standard for developing data mining*
- *Based on polls voted as the preferred methodology for data-mining in all polls outscoring the closest competitor by 20%..*

Data mining model

Business Understanding - What business.

Data Understanding - What data is required.

I

Data preparation - Data to be used for analysis.

Modeling - Selection actual modeling technique.

P

Evaluation - The actual evaluation of the model.

E

Deployment - A strategy for deployment.

A

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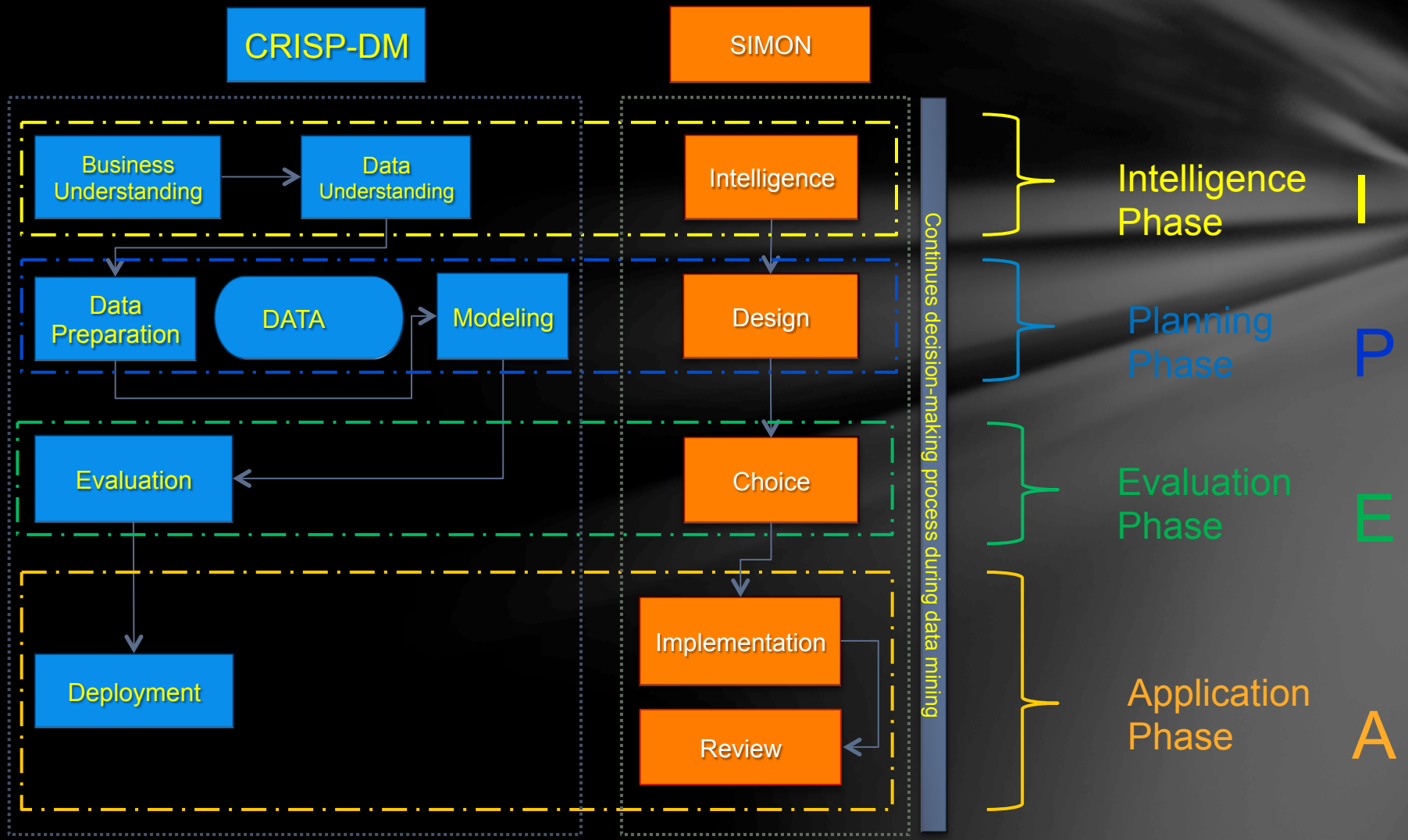

Turban et al. (2011), Chapman et al. (2000), Simon (1978).

Conclusion

- Similarities in the conceptual model - parallel between Simon's model of decision-making (1978) and CRISP-DM (1996) data mining process model life cycle can be drawn, and as result that the process of data mining itself encapsulates a decision-making process by itself based on the same principles as Simon's decision-making model.
- Based on the literature review of both these models as well as a literature review of a combination of these models, no such comparison has been done until this study.
- The IPEA model contributes to the set of tools and a better understanding to enable the information analyst to understand their role, infrastructure and tools available to them, in an enhanced effort to support effective decision making

Thank you

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