Relationship between DSS categories and different methodologies

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Abstract

Decision support systems are information system that developed by utilization models, data, information, and collected knowledge for help the manager in solve the not made and simulated problems. Define a specific methodology for each project is needed. In this research by evaluation the decision support system and introduce well developed framework for category decision support system. We want to make a connection between these methodologies and classifications of this system.

Keywords: decision support system, developed framework, decision support methodologies.

1-introduction:

Decision support system are systems that developed by tools and technique to support high level management decisions. Among the most important advantages of decision support system can refer to quick and easy access to the information, quick calculation, simple use, simple user interface, further communication with manager, ability to offer complex reports, and save a lot of information.

The researcher of decision support methodologies believe that development process of these types of systems is with certain features and activities, that distinguishes them from trading systems development process. So development method of decision support system is with special consideration efforts and researches to define appropriate methodologies in area of decision support system. Although there have been ups and down, but been the subject of research in recent years. Researcher had conducted that related to analytically comparison and study and apply to identify strengths and weaknesses. The main methodologies were designed from 1978 to 1991. Within a few years of hiatus, in the years from 1996 to 2005 some other methodologies defined based on previous methodologies. Although more than 30 methodologies about development decision support systems had represented so far, however lack of a unified and standard methodology is beheld. The major problem of all existence special methodologies of development decision support system is project ability and it is eligible to apply for various scale system development during the past few years. Terms like used for business intelligence, data mining and etc. for the notification and supporter of decision makers Decision backup system is not a new consideration, but its complex and developed.

A good frame work shows some part of issue and also the relationship between them. In this article tries to introduce some frames for charting DSS like DSS data oriented, model oriented, knowledge oriented, communication oriented, inner organization, outer organization, based on web and its features. Frame use an organized theory and idea to show how ideas are related. The big deal is to design some titles to help ordering individuals and also data. Decision system is not a new topic. But it is complicated and also in changing process. A good frame work shows some part of issue and also the relationship between them.

In other word, today’s developments process of decision support systems for a multinational organization is different from that for a small organization. So every organization needs its own methodology for its projects and must define that.

This study continues as this way: in the second section we review the development decision support systems methodologies. In the third section we review the needs developed frame work. In fourth we introduce the developed framework. In part sixth we examine the relationship between this framework and
methodologies. In seventh part we check the related works and at the end we conclude.

2. A review of development decision support systems methodologies.

Various methodologies defined for decision support systems. In general there are three categories about decision support methodologies.

First group – based decision methodologies:  
This kind of methodologies is old and deals with issues of management decisions. In this kind of methodologies general steps defined for decision. So the major weakness for these methodologies is in attention to engineering consideration about design and construction a decision support system. The most famous methodologies of this group [7] functional mapping, [8] decision graph [9] decision oriented DSS development process can be noted.

Second group – based on systems engineering methodologies: These kinds of methodologies in the course of building a decision support system also helped by engineering software and other tools to define a specific process to develop the decision support system. So it has a bit of distance of general based decision methodologies. Nevertheless the methodologies of this group also remain we within the definition of life cycle, and abstracts away the details and phases of the intermediate steps. These methodologies: [10, 11] end user development, [12, 14] prototyping system development life cycle, are the most famous methodologies of this group.

Third group – accumulated methodologies: the methodologies of this group are combined with methodologies from 1, 2 group. These methodologies are combination of consideration relating to decision support and consideration of engineering software, and activities defined in their process are complete than two previous groups. Although this group of methodologies are more interested to the audience of this area nevertheless except some methodologies, yet these methodologies have a general description about their various phases and don’t attention to details and this matter make use them difficult [2].This group of methodologies are more famous for their more mature, more coverage the aspects of decision support systems, their effectiveness on decision support methodologies. General description of this group of methodologies is in table 1.

3- Reasons for requirement to developed framework

DSS is tries to give speed and improve the processes between persons who decide or related to decision – makers. For managers and designers of DSS it is necessary to be aware about the classification of decision support systems, so they can improve communication for development systems for awareness and support the decisions. There are large volume frameworks for categorizing decision support systems. More than 20 years ago Strive Alter introduced one of the frameworks. It seems need to more general frameworks compared to alter framework. Because, decision support systems from present his study and framework have become more widespread and diverse. In 1980, Strive Alter presented his categorization about decision support systems.

Seven categories that they are still up for debate some of DSS, but not necessary for all of them. It is how that decision support systems can classify according to general operation that performers, apart from the issue, functional area, and shape decision. Seven classes that he presented from the DSS are including: file receiver systems, data analysis systems, information analysis systems, accounting and financial models, descriptive models, optimization models, suggested models. For keep the number of categories in a controllable framework can and should be merging. Alters’ typology led into three board types of backup systems. Years that three primary types of alters DSS had named data-oriented and next three types named model-oriented. Alter also suggested a type of DSS that named smart DSS or knowledge – oriented. The aim of present DSS developed framework is to help persons to collect, evaluate, and choose for support and inform to decision – makers.

4- Representing developed framing:

If someone classify decision support systems that used more than other, has a good help to category a large number of software packages and systems.

Framework focus on a main dimension with five types of DSS and 3 laterals demonstrate. Primary dimension is the completing the dominant technology or decision support system stimulant. Next dimensions included of: target user, special purpose system, initials developed technology. Some DSS classified as combine-oriented system with more than a DSS part.
5- Classification decision support system:

First group – data-oriented DSS: The data-oriented DSS are the first kind of overall decision support systems. These systems are consists of file receiver and management reporting system, storage and data analysis systems, executive managers information systems and the systems that support the distance systems. Business intelligence systems are sample of data-oriented DSS. Data-oriented DSS emphasis on access and change ability in structured large database, specially use in time series of data within the company and often extend data.

Data warehouse systems that let to changing data by computer tools, or create and deploy for perform a specific task, or provide more efficient by general tools and other factors.

Second group- model oriented DSS: It’s consists of systems that use accounting and finance models descriptive models and optimization models. The model oriented DSS emphasis on achieve to model, create and change it. Base levels of performance are possible by simple statistical and analytical tools. Model-oriented DSS utilize data and factors that provided by the decision makers to help them in analysis of the situation, but sometimes the data are not concentrated. The large database usually not to need model oriented DSS.

Third group-knowledge oriented DSS: Finding new terms for this group is still ongoing. The best term for this case is knowledge oriented. Sometimes it seems be more appropriate and even better to use the Alters’ term ‘management expert system’. The knowledge oriented DSS can suggest or command do some tasks.

This DSS are individual computer systems that have expertise in solving specific problems. The term ‘‘expert’’ contain have knowledge in a field, ability to understand the problem in that and have skill to solve problem such as these. Data mining concept, applies in this case. This relationship refers to analytical applications that search the hidden patterns in database. Data mining is a process that produce data of piles of data that their content are relate. The used tools for create knowledge oriented DSS, sometimes called <<intelligent support decision methods >>. Its can be use up of data meaning tools that have main data and knowledge components fourth group – document oriented DSS: Recently, a new kind of DSS, as document oriented DSS or knowledge management system created to help the managers in marketing, document management, and unstructured web pages. A document oriented DSS integrate variety of storage and processing technologies preparation a perfect, retrieved, and analyzed document. Web provided access to huge volumes of database (database are combining of text documents, pictures, sounds and mores). Procedures and policies, catalogue of production features, historic documents of company, are samples of documents that available by document oriented DSS, and also contain of minutes of meeting, the company notes and important agreements. A search engine is powerful auxiliary tool for decision making, and in communication with document oriented DSS.

Fifth group – group and communication oriented DSS:

Group decision support systems (GDSS), have been discussed long ago but this time can be define board categories communication – oriented DSS or groupware. Fifth of total of decision support systems, is include of communications and this is techniques for decision support and assistance and there is not in Alters’ classification. So it’s necessary to introduce these systems as a specific DSS. Group DSS, is a type of mixture decision support system that emphasis on use communication and decision – making models. Group decision support system is interactive system based on computer that tries to make it easy to solve the problem of decision makers that works together. Groupware support the electronic communications, timing, share documents, and other activities that associated with group productivity and decision support.

A large number of capabilities and technologies as group DSS, e-mail, billboards, and video conferencing, are in this category of framework.

Sixth group – within and outside the organization DSS: Customers and suppliers are the almost new aims for DSS users that cause of new technology and rapid growth of internet. This type of DSS that targeted for user outside the organization we called it within organization DSS. Internet has created connection like for many variety of within organization that also consists of DSS. Within the organization DSS provides the access to the internal network of organization, and also provides the advantages and authority to use a special DSS. Companies can create a data oriented DSS to access suppliers or model oriented DSS for access to customer to design or select a product.

They are the most outside organization DSS that are for personal use in a organization, as independent DSS, or for group of managers in company as group DSS, or designed for widely use in commercial. The
prefix “outside” means that DSS is used in a particular organization, and the prefix “within” means DSS is widely used.

**Seventh group –DSS with special performance or public purpose:** most DSS are designed for support specific business function or use in variety of marketing industries. These decision support systems called special performance DSS or particular industry DSS. A special performance DSS as a budgeting system may purchase from a vendor or ordered for use in general purpose. The seller develops DSS for functional area of business like marketing and finance.

Some DSS designed to assume the task of deciding in specific industries like scheduling crew in an airline. a DSS with a specific task has important role in solving daily problems or repetitive decisions . the DSS with specific function or task can classify and understand based on components of prevailing DSS as a model oriented DSS , data oriented , suggested DSS. A DSS with specific function or task keep up and guide knowledge relevant to a decision about tasks that organization offers (for example: production task or marketing) these DSS classify base on the goal. Specific performance DSS helps to group or person that does specific decision.

DSS software with general goal , support tasks like project management , decision analysis , or business planning most decision support with general goal , sometimes know as generator DSS.

The generator DSS designed based on the way that can be used in the creation or product in the faster utilizations, they are not complete utilization and not have a specific language, but contained in a mixture of language, user interface, reporting abilities, graphics comforts, and facilities like them and they can give them to users, to whenever its needed in order to build a new DSS [15]

**Eight group-based on web DSS:** eventually, development of this technology may be in range of central computer, a local network, or web-based structure. All a general DSS that discussed can extend by web technologies, these system called web-oriented DSS. A web-oriented DSS is a computer system that shows the information of decision support or provides decision support tools for managers.

The marketing analyzers used web explorer as Mozilla or internet explorer. The server computer that is host of DSS programs connect with user’s computer. In most companies, web-oriented DSS has same meaning with internal network or extensive trade DSS. Internal network support altar number of manager who use the explorers in network space. managers are accessing to databases , and analyzing tools increase used for create within the organization DSS that support customer and distributers decision . web or internet technologies are guidelines for create DSS , but some outside organization DSS create with elementary programming language, like enabling technology for central computers. When target users are customers and other external users. it seems that the term “within organization” is suitable for this DSS when all users have internal DSS for company , the term of “outside organization “ is appropriate descriptor .As noted , the decision support systems can category base on DSS gal . Most of DSS have more limited, more focused, and more special dual than general goal.

It is can be use of DSS components dominant, targeted users, goal, and developed technology for classify a special system. For example can create a model oriented DSS, within the organization, product design based on web.

**6- Relationship between DSS categories and methodologies:**

According to the definition model oriented DSS and regard to three group methodologies, this type of DSS it is among the first batch of classification of decision support system.

The first methodology just help to decide and indeed deals with general issues that is correspond with the data oriented DSS. Model oriented DSS used models for furtherance goal, so take place in second category of methodologies because have been established based on model. Because the knowledge-based DSS are advanced and expert, and help to decide and also command they belong to third category of methodologies.

Third category of methodologies are combined with two other categories , so it’s more complete and with model and analysis that perform by software engineering tools works better in suggest to managers.

Document oriented DSS must helped by software engineering to help the managers , because use of this DSS storage and document management , and process needed to software analysis that software engineering tools are related to second category of methodologies.
- Group DSS and communication oriented are the third category of methodologies. Because they are the combination of communications.
- Inside and outside organization DSS used both of model oriented and data oriented, use internet and communications too, by conclusion these can be image that belongs to third category.
- DSS with special performance or public goal regard to these DSS use in project management and decision support analysis and programming belongs to third category. Since needs to both of design model and software engineering.
- Web-based DSS, because this DSS used in network, and network built up according to models and communications are belongs to third category that are complete category of methodology.

**7-related works:**

Data oriented DSS, document oriented, and knowledge oriented needed technical data base. Model oriented DSS may use a simple data base, but model elements are so important. Even data oriented is running the designer have to notice to users interests in using DSS at new and unpredictable situation. Although important difference creates because of special tasks and extent DSS, but all of the decision support system have technical elements and mutual goal that support decide. Database of data oriented DSS is a collection of historical and current structured data from different sources that organized for easy achievement to analysis.

Data elements can be developed in such a way that unstructured documents be in document oriented DSS, and also knowledge in a form of rules and templates be in knowledge oriented DSS.

To create understanding of structured data or document in database use of decision support management tools that are computer tools. Statistical and analytical models are the main elements in model oriented DSS.

Each model oriented DSS following special goal and for this reason different models must be use, select the appropriate models is one of the important issues in design. Also the program that used for create specific models must organize required data and users relationships.

Information derived from models also sometimes analyzes and evaluate by decision makers. Knowledge oriented DSS use special models for processing roles or defining relationship in data DSS architecture and elements of network design specify how organize hardware, how software data distributed on system. And how the system elements integrated and connected together. Now, the important issue is that how can access DSS on web explorers, in internet inside companies, and also on internet.

Networking is a key pivot of communication oriented DSS.
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<th>Name of methodology</th>
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| Gochet              | • According to third category of methodologies defined a methodology based on architecture and covered short comings in term of architecture.  
• By definition on concepts creates container , containerized and core of architecture that support separation of policy from mechanism nicely , and provides independence of the life cycles because by this order container and containerized development performs as independent  
• Architecture oriented : development is based on system architecture ,container architecture (data sources), containerized (decision support system), and core (interface between the container and containerized)  
• This to create a strong relationship between the issues related to DSS and software engineering issues. | • Is not based of activity, and to define the architecture not well define activates.  
• Don’t define required rules and products to methodology activities.  
• Don’t notice some important aspects of decision support development like consideration related data sources. |
| Design cycle        | • Based on supplementary prototyping.  
• Rockon as grandfather of other decision support methodologies, and while is old but it is very implemented. | • Its activities and levels are not fully defined –  
• Don’t define roles and necessary products for methodologies activity  
• Don’t notice some important aspects of decision support development, like consideration related to data sources. |
| Romec               | • Based on supplementary prototyping  
• Frequent feedback and interaction between individuals, during the development process to solve shortcomings. | • Activities and levels are not fully defined.  
• Do not define roles and necessary products for methodologies activity.  
• Do not notice some important aspects of decision support development, like consideration related to data sources. |
| Dse                 | • Based on supplementary prototyping ,  
• Based on interaction between decision maker and computer creator.  
• Frequent feedback and interaction between individuals, during the development process to solve shortcomings. | • Do not define roles and necessary product for methodology activities.  
• Do not notice some important aspects of decision support development, like consideration related to data sources. |
| BIR                 | • Architecture oriented  
• Supplementary prototyping  
• Review meeting at the end of release version.  
• Due the legacy system to operation of the reusable assets.  
• Define essential roles and activities in the way of development. | • Weakness can’t be found. it seems BIR is complete methodology in area of decision support system development. |
| DSS-Unified process | • strength : defined base on RUP methodology  
• Based on supplementary prototyping. | • Weaknesses cannot be found. |

Table 1. Aggregation methodologies of decision support system development
Conclusion

For perform each project, definition of methodology is needed. This matter is applies about decision support system development. In this study by review decision support methodology and provide a framework for category these system, we have established good relationship between these two categories. Nevertheless mythologies of decision support system development have not reached puberty and mainly remain in the defining the life cycle.

The area of decision support system suffering of widespread use of DSS word in different ways. Apprise and communication use same definitions. Each decision support system not similar, and both of researchers and managers needs to a framework of concept to support the decision makers by information technology this article provided a framework for name and category system that support deision makers. A special decision support system most discuss and explain based of four descriptors. Factor or factors of dominant technology, targeted user, specific goal of system, and developed primary technology.

References