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Wikis: A Tool for Effective Management Decision

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Abstract: ***In this paper, we propose a tool for Management Decisions. The proposed tool makes use of Wikis as a dynamic, collaborative and database platform which ensures that before management decisions are taken, input from every stakeholder is taken into consideration, analyzed and weighed against alternatives. Wikis are known to have produced positive and desired results in collaborative learning. This paper therefore harnesses the properties of Wikis to develop a conclusive and collaborative system that allows management decisions to be made from a pool of database coming from stakeholders. The paper also uses known web technologies to develop the supportive structures for the Wiki tool platform. A theoretical example and data is also given to substantiate the use of the tool. The implementation of the proposed tool in Management Decisions will improve the goal of management and the stakeholders to a large extent.***

Keywords: Wiki, stakeholder, knowledge base, control strategy, operator set rules

I. INTRODUCTION

Every establishment is governed by its administrative arm and the success of such establishment is anchored on good administrative management decisions. Administrative sectors of establishments are always challenged as they are often faced with Management Decision which is aimed at improving results. In most cases, decision is usually in the hands of employee of labour, administrative unit heads or board of directors. Sometimes wrong Management decisions are made and better options are often not noticed or ignored because of lack of consultation among the stake holders in such unit. It is a known fact that in every establishment, the opinion of the field workers or agents often matter. Unfortunately, those whose suggestions matter most are usually not noticed. Another stumbling block to better Management Decision is that in most cases, decisions are made impromptu without putting into cognizance the fact that some issues may need a thorough consultation and re-visitation of files for facts before proffering an answer to them. In meetings for instance, questions which affects the establishments are addressed as rhetorical questions and submissions are made on a laisser-faire attitude. Some solutions to situations can only come after due consultation and objective reasoning. This is what is usually lacking in our establishments today. The Wiki tool proffers a solution to this by bridging the gap between the 'Administrative administrators' and the under dogs of the establishment. The Wiki tool also addresses the challenge of distance. One can make his/her input anywhere in the world without necessarily being physically present at meetings. The goal of Management decision is to improve the decision making process by using all available information to increase the precision, consistency and agility of decisions and making good choices taking known risks and time constraints into consideration. (Rouse, 2012). Harrison (1999) classifies decision making into programmable and non-programmable. Programmable structured decisions follow clear delineated procedures while non-programmable decisions occur where there are no existing procedures and practices in place to resolve problems and address issues. In such situation, the organization relies on collaborative input based on research and facts.

II. THE STAKEHOLDERS IN MANAGEMENT DECISION

Teale et al (2003) proposed that management decisions are made by a decision body of the organization which is made up of individuals, collective groupings, and other stakeholder entities within the organization. On the other hand, Freeman (1984) identified organizational stakeholders as all those who are affected by an organization decision. Mitchell et al (1997) proposed that stakeholders to management decision could be identified by the following three distinct factors:

a. Level of Power and authority:- How high is the stakeholder to influence decisions,
b. Level of Legitimacy:- what could be the social and moral authority and influence of the stakeholder that could impact on management decision?.
c. Level of Urgency:- What is the stakeholder's level of immediate implication in the firms activities?

They concluded that a stakeholder who combines these three factors could influence management decision. Unfortunately, these recommendations considered only the managerial perspective. We cannot neglect the personnel who may have the relevant data, information, facts and knowledge on the issue that leads to a conclusive decision. That is why

Escoubes (1999) after reflecting on this, recommends five more elaborate factors to be considered for stakeholders in management decision. The factors recommended by Escoubes (1999) are identical to those of Mitchell et al (1997) because both recommends set criteria for ***selection*** of stakeholders. The implication is that stakeholders who do not meet the set criteria will not be selected and the certainty of the appropriate selection of the desired stakeholders is not also assured. Another bottleneck in their recommendation is that even after identifying and selecting the stakeholders, management decisions are taken in impromptu meetings. This does not give the highly limited selected stakeholders the opportunity to dig for facts from previous events and records. The decisions are normally based on what was said during a management meeting. The issue therefore is not about how many factors that are considered before management decisions are determined or the nature of the stakeholders in person but rather what is important is the relevance of the stakeholders to that particular problem. Hence, the dynamic nature of the decision body to management decision gives a leeway for us to accept that the stakeholders in management decision should simply be the members of the organization who have something to loose or gain in the organization. Management Decision making therefore is **NOT** a one man affair nor is it left in the hands of a selected few that were chosen based on some criteria. Management Decisions are taken from existing facts, information, knowledge, history, events and policies within the organization so as to produce a positive change and generally increase the organization control and eligibility.

We humans communicate by means of symbols to which we ascribe meanings. For example, we use many kinds of symbols: characters, numbers, diagrams, icons, spoken words, music, facial expressions and gestures. Computer science may be defined as the study of the automation of symbol processing [5,7]. This involves the design and construction of symbol processing machines (hardware) and of the instructions that control the machines (software).

III. DECISION MAKING FRAMEWORK AND TOOLS

Every decision is aimed at a positive expected end. It usually involves a sequence of checks and balances, meditations, forecasting and sometime with some elements of risk and guess work. The relationship between a problem, problem-solving and solution constitute a problem-decision task domain architecture depicted in figure 1.

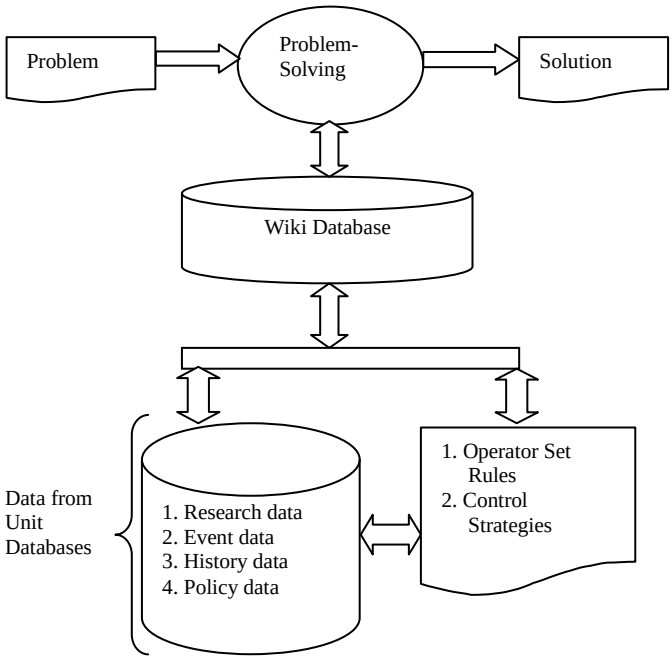

Fig.1 Problem-Decision Task Domain Architecture

A problem-Decision task domain that leads to a goal is defined to be a two component entity *G(P, W)* where
P = problem at hand
W = Wiki =(D, PS), D = $\sum_{j=1}^{n}(unit\ databases\ of\ the\ Organization)$
and
PS = $\sum_{i=1}^{n}(Operator\ set\ Rules) + \sum_{i=1}^{n}(Control\ strategies)$.

A. Problem (P)

This is the entity of interest on which certain operator set rules and control strategies are applied with an expected solution which is usually positive. In Management decisions, a typical example of a problem at hand scenario is that for an instance, an administrative head of a milk producing organization may wish to decide on the most suitable approach to combat the threatened monopoly of their good which the firm had enjoyed for some time. This problem will generally trigger a series of events in the task domain aimed at proffering a solution. It should be noted that in real life establishment, P ≥ 1. The implication is that an organization may have 1 or more than 1 problem at hand which may

require urgent attention. A problem requires solution and it is the administrative head of the organization that presents these problems for the stakeholders to deliberate. For the purpose of this work, we assume therefore that problems emanate from administrative heads and presented to stakeholders.

B. Wiki Database (W)

The term "Wiki", is an Hawaiian word meaning "fast" or "quick" (Mauimapp, 2008). Cunningham (2002), the developer of the first Wiki software called 'WikiWikiWeb', originally described it as "the simplest online database that could possibly work. Similarly, Rodrigo (2007) defines Wiki as a programming language pattern enabling people not only to access the data of a Web site but also to change it. We shall define Wiki simply as "a website in which stakeholders can contribute to Management Decision by adding or modifying suggestions using a simplified markup language or a rich-text editor". The Wiki database the current task-domain (which is the problem at hand) and the data tools required for decision taking. It therefore constitutes of problem at hand and data input from various exhaustive stakeholders. The major characteristics of wikis explored in Management Decision include:

i. **Editable pages**:- The pages of a wiki site are editable, hence it allows for contributions and modifications from stakeholders.

ii. **Multiuser participation**:- A wiki site is designed to support multi-users. Their participation within the site increases the group processing and collaborative research.

iii. **Incremental knowledge creation and enhancement:-** As new pages are added by stakeholders, the database of information is gradually expanded, revealing hidden operator set rules and control strategy, hence new concepts and new content are added to enhance Management decision.

C. Unit Database (D_i)

This consists of event data, history data, research data, and management policies. In management decision, most of these data come from unit databases of stakeholders. When these data are made available, the stakeholders use them as tools on which the operator set rules act upon.

D. Problem Solving (PS_i)

In problem-solving, we identify two components which are the tools that are used by the stakeholders in making decisions. The components are:

a. Operator set Rules:- This consists of sets of rules that could be used to manipulate the facts/data coming from the various unit databases. Examples of these rules include; possible inferences from event data, history data, research data, management policies all coming from the various unit databases. The credible data facts from the unit databases reveal a multiple range of inferential combinations that may lead to positive decisions on issues. Stakeholders usually fall back on such data before suggestions to problems are made. The inferences deduced from the Operator set rules are the input and suggestions of stakeholders to management decision. They also present the ground for arguments and comparison of other stakeholders' input.

b. Control Strategies:- The inferences arising from the various data sources (operator set rules) are collated from stakeholders and highlighted. At this stage, it is paramount to decide what operator rule to apply and where to apply it. The control strategy tools aims at achieving the desired goal by applying an appropriate sequence of operator rules to the problem. Several different operator rules could be considered and the effect of each alternative sequence noted.

IV. PROCEDURE FOR MANAGEMENT DECISION MAKING USING THE WIKI PLATFORM

In management decision making, the Wiki is employed as a platform to reach every stakeholder and collate their input. According to Jones (2003), the overriding goal of a wiki is to become a shared repository of knowledge with the knowledge base growing over time. Wikis ensures a dynamic platform for collaborative reasoning and effort and takes into cognizance every input/contribution made by the stakeholders. Wiki platform is really required in Management Decision making. In order to ensure effective management decision making, we recommend the following procedure using a Wiki platform:

Stage 1 Introduction of the Problem

The management administrator of the organization will be responsible to present the problem to the Wiki platform. The Wiki site and platform will be accessible to only the stakeholders of that organization and every stakeholder log in to access or get informed on any existing problem forum. The advantage of this is that the management administrator may not necessary start by calling for a meeting but to introduce the problem at hand so that stakeholders could contribute. Once an existing problem is introduced, stakeholders begin to contribute, but they do this after due research on the matter and adequate review of history data and event data. The essence of this is to ensure that information or contribution made by stakeholders is backed with proven facts and not mere rhetoric statements made during management meetings. At this stage, the problem at hand (p) is defined and presented for suggestions at the Wiki website platform of the organization. The next stage will be the problem solving and tools needed for the solution. The activities in Stage 1 are illustrated in Figure 2.

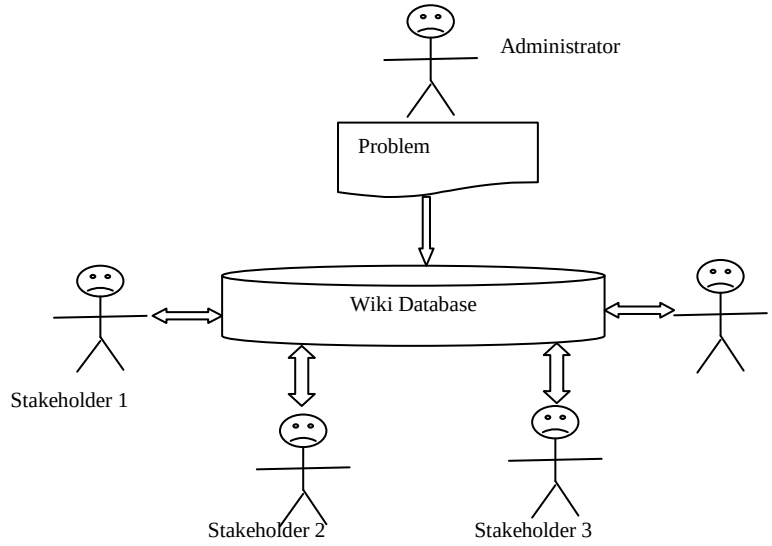

Fig.2 Architecture of Management Decision Stage 1

Stage 2 Research and consultation: Team work and collaboration

Once the problem is presented at the Wiki site platform, stakeholders begin to make suggestions. This stage requires the stakeholders to look at existing data, history, previous events and also consider the effects of certain decision on the consumers of service. It could come as past experiences, fears and worries, ethics and morals e.t.c. Every stakeholder is therefore faced with both examining existing data and collection of data on effects. What every stakeholder brings to the Wiki database therefore is given as D = (stakeholder's unit database information) and PS = (operator set rules of the organization) + (Control strategies of the set rules). After due consultation and research each stakeholder is expected to present a submission at the Wiki Database using the Wiki platform. In collaborative learning, one major feature is that each stakeholder is allowed to make input and at the same time he/she has to listen to others. As it is normally said, 'No man can exist as an island'. Team work and collaborative learning often yield better solution to a problem. The activities of stage 2 are illustrated in figure 3.

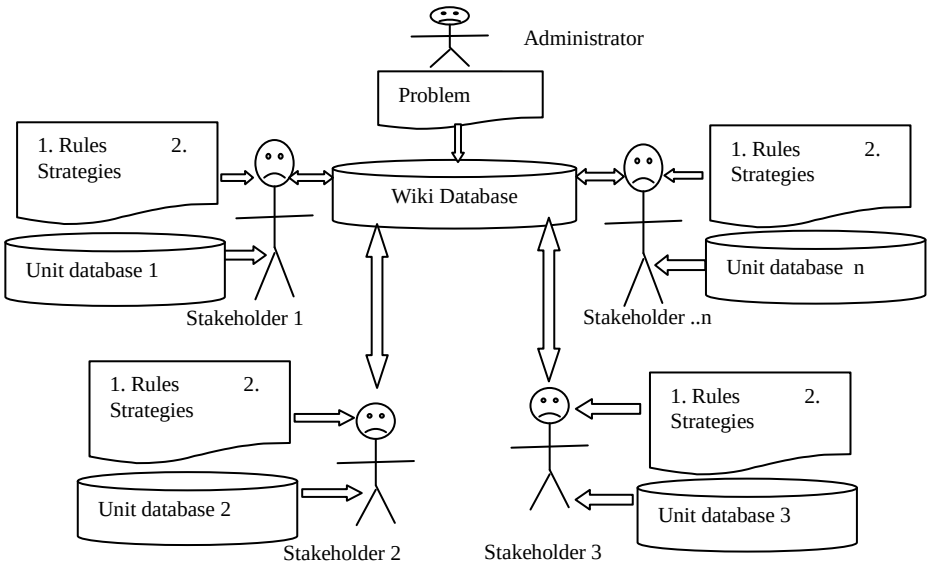

Fig.3 Architecture of Management Decision Stage 2

Stage 3 Review of Ideas and opinions: Decision based on Wiki Database. At this stage, it is expected that the initial problem P originating from the management administrator to the Wiki database W, has yielded a set of possible solution in the form of D and PS which represents the rules and control strategies on the rules coming from the stakeholders and their unit databases. This is the stage where all input is critically reviewed and weighted in order for decision to be made on an issue. The cons and the pros are considered, the interest of the firm/institution is also considered. Finally decision could be made. Known Decision making models such as 'RAT' (Levi, 1997) and the 'Three Phased model' (Langley et al, 1995) could be applied at this stage if necessary but the most important achievement here is that at this stage, all the necessary facts and data from all a sundry are put up in the organization's Wiki database without neglecting the minute details. The three stages above summarize the five core concepts in Management Decision which are: operational decisions, business rules, predictive analytics, decision analysis and optimization.

V. A TYPICAL MANAGEMENT DECISION IMPLEMENTATION USING THE WIKI PLATFORM

In order to ascertain the effectiveness and reliability of the Wiki platform in Management Decision, an experiment was conducted. The experiment is simply meant to compare between the use of Wiki in management decision and the traditional approach which does not require a Wiki platform. Although, the experiment does not compare the Wiki platform with any specific existing management Decision method, but it reveals that results obtained are more improved and shows the attitude of stakeholders towards the use of Wiki platform in management Decision.

A. Data Collection

The survey was conducted using 58 penultimate students of the Department of Computer Science, University of Nigeria, Nsukka. The survey was done as a class work during an ICT related course in the Department. A simple interactive website called *wikidemic* was developed and hosted free for the purpose of this experiment. The Wiki site was constructed using the following technologies:

- Asynchronous Java script and Xml support (Ajax):- This was used in retrieving stakeholders input from the tables without reloading the web pages.
- Web Browser Support:- The Website was designed to run smoothly on internet explorer and Mozilla firefox.
- Text Editor Support:- The TinyMCE text editor java script library provided an editor and formating platform for stakeholders.
- Markup language support (HTML) and Scripting Suport:- HTML codes were mostly used together with PHP codes to display information in the survey website.
- Database Support:- The database component of the website was implemented using MSQL

B. Survey Methodology

The students were given a task. The task was to select the best teacher for an award from the University. Firstly, using the traditional approach (without Wiki), the 58 students were asked to use their class representatives to select the teacher believing that the judgment of the representatives would suffice. Secondly after the traditional approach, the 58 students were also asked to log on to the *wikidemic* site as stakeholders and make input to the selection of the best teacher. Having exposed the 58 students to the two approaches of management decision, a questionnaire was distributed to the 58 students to fill. The aim of the questionnaire is to test the effectiveness of the Wiki approach to management decision. The students are to fill the questionnaire based on the experiences encountered in the class example. Each of the two approaches reveals some weaknesses and strength which the students encountered. A copy of the questionnaire is given in appendix 1.

C. Survey Layout

The questionnaire comprises ten questions aimed at eliciting the better approach to management decision. The questions were targeted to elicit the following key words; Participation, Speed, Quality, Contribution, Utilization, Commitment, Accuracy, Smoothness, Hitches, satisfaction. The five point Likert-type scale (5 = Excellent; 4 = Very Good; 3 = Good; 2 =Fair and 1 = Nil) was used in the construct of the questionnaire. The students were supposed to rank each of the two approaches according to what their experiences. At the end only 36 out of the 58 distributed questionnaires were usable for the analysis. The total score corresponding to each approach is obtained for the 36 questionnaires. The layout is given in Table 1.

Table 1: Data Layout of the Survey

S/N	Traditional	Wiki Based	Traditional × 2	Wiki Based × 2
1	27	30	54	60
2	27	25	54	50
3	27	28	54	56
4	29	27	58	54
5	20	22	40	44
6	25	25	50	50
7	28	27	56	54
8	30	24	60	48
9	32	29	64	58
10	30	29	60	58
11	27	29	54	58
12	26	31	52	62
13	33	37	66	74
14	31	29	62	58
15	28	29	56	58
16	23	24	46	48
17	23	30	46	60
18	25	28	50	56
19	33	28	66	56
20	30	33	60	66
21	28	26	56	52
22	25	27	50	54
23	31	28	62	56
24	32	35	64	70
25	31	30	62	60
26	27	36	54	72
27	27	32	54	64
28	27	31	54	62
29	29	28	58	56
30	33	35	66	70
31	24	32	48	64
32	24	29	48	58
33	28	36	56	72
34	30	33	60	66
35	29	26	58	52
36	23	23	46	46

D. Analysis of the Survey

The analysis was carried out in SPSS as a dependent/correlated paired t-test. The results of the test are shown in Table 2, 3 and 4.

Table 2: Result of the Paired Sample Correlations

		N	Correlation	Sig.
Pair 1	Traditionaltotaltimes2 & Wikitotaltimes2	36	.457	.005

Table 3: The Paired Sample Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Traditionaltotaltimes2	55.67	36	6.423	1.071
	Wikitotaltimes2	58.39	36	7.526	1.254

Table 4: Result of the Paired Sample Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Traditionaltotaltimes2 - Wikitotaltimes2	-2.722	7.331	1.222	-5.203	-.242	-2.228	35	.032

From Table2, it could be seen that the correlation between the two approaches for the 36 students who took part in the exercise is 0.457. From Table 3, we see that the mean of Wiki approach is 58.39 and higher than that of the Traditional approach which is 55.67. The mean difference between the two approaches is 2.72. It could also be seen from Table 4 that since the significant value for change in the two approaches is 0.032 which is less than 0.05, we can conclude that the change in mean between the two approaches is not due to chance variation and can actually be attributed to the approach used for decision making.

VI. CONCLUSION

A Wiki approach to Management Decision has been presented. The relevance of this approach to quality Management Decisions cannot be over emphasized. The structure framework required to setup a Wiki platform for Management Decision has also been given. An implementation based on a comparative analysis of the usual approach obtainable in our society (Traditional approach) was also carried out and the results reveal that the mean of the Wiki approach is higher than that of the Traditional approach. It suffices to say therefore that the Wiki approach to Decision Management generally could give better results as compared to our Traditional everyday approach.

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