IOSR Journal of Business and Management (IOSR-JBM)
e-ISSN: 2278-487X, p-ISSN: 2319-7668. Volume 18, Issue 7 .Ver. II (July 2016), PP 66-71
www.iosrjournals.org

Revisiting Data, Information, Knowledge and Wisdom (DIKW) Model and Introducing the Green Leaf Model

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Abstract: *The article examines the DIKW model. It shows its relevancy in the studying of Records, Library and Information Science as well as Knowledge Management, Communication Studies and Information and Communication Technology (ICT). It has been observed that the DIKW model does not cover all aspects of knowledge management. It actually limits the applicability of knowledge management. It does not really take cognisance of Plato's knowledge theory and does not really conform to constructivists. It actually put knowledge as straight jacketed. Knowledge cannot be conformed in a hierarchy. It has to be given room to actively show all its wings. The DIKW limitations have given birth to the development of a new knowledge model which shows that knowledge is at every level.*

Keywords: *Knowledge, data, Information, wisdom, DIK, DIKW, knowledge management, Information and Communication Technology (ICT), Green leaf model, Chipo Mutongi's Knowledge Management model*.

I. Introduction

The reason for this paper is to reflect over the laxity of attitudes over issues like knowledge management that sound rather philosophical and abstract instead of the so called practical matters. My point is that to be effective in such practical affairs one has to have a theoretical picture of the ideal program for water purification, as an example. Hence for one sold on the idea of knowledge management in administration, a model of knowledge categories like DIKW meaning; data information and knowledge by Muller and Maasdorp (2011) is an ideal position to begin.

Snowden (2000) argues the developing practice of knowledge management has seen different approaches, one arises from information management and sees knowledge as some higher-level order of information, often expressed as a triangle progressing from data, through information and knowledge. Weinberger (2010) avers that knowledge is not a result of filtering or algorithms. DIKW model, although it has made the study of Librarianship, Records management and Information and Communication Technology (ICT) easier, it cannot be futuristic as it does not encompass all the elements of knowledge and knowledge management.

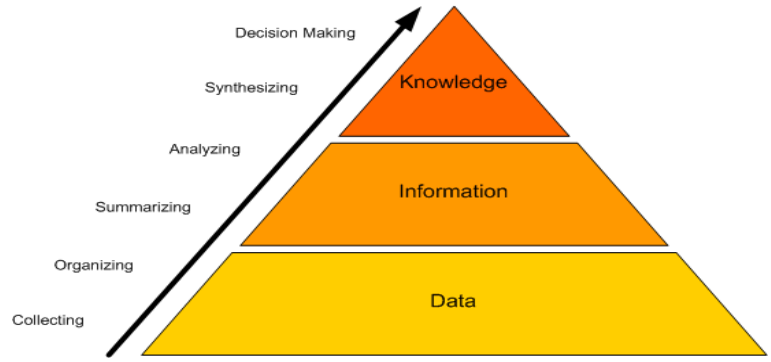
II. Objectives of the article

The objectives of this article are, to:

- Identify gaps in the DIKW model in order to fill those gaps
- Develop the knowledge model
- Come up with a new Green Leaf Model

III. Data, Information and Knowledge (DIK) model

The following diagram shows knowledge being purified from information.



(Source: Finck, 2005)

Figure 1: DIK Model

Muller and Maasdorp (2011) point out the dominance of the DIK model in information science. They have three conjectures as to why knowledge management practitioners and authors prefer the DIK model. The first one concerns information theory background, the second one is about simplicity, and the third one rests on accumulative worldview. Muller and Maasdorp (2011) assert that the possible explanation for the dominance of the DIK model in KM is that it is an effect of background in information theory or communication theory and because of its simplicity. That means that a mechanistic and positivist worldview is to be found at the base of the easy acceptance of the DIK model. Wiig (2004:73) highlights a discontinuity between information and knowledge. He states that the process, by which we develop new knowledge, uses prior knowledge to make sense of the new information and once accepted for inclusion, internalises the new insights by linking with prior knowledge. Hence, the new knowledge is as much a function of prior knowledge as it is of received inputs. A discontinuity is thus created between the received information inputs and the resulting new knowledge.

3.1 DIKW model

Some authors like Rowley (2007) added wisdom to the DIK model and this then does not leave knowledge at the top. It would seem as though wisdom is greater than knowledge of which both might be equally important. Knowledge here is seen as a thing or entity that can be managed and distributed through advanced use of technology. Thus technology becomes an enabler but not knowledge and not information. The other knowledge approach sees the problem from a sociological basis which sees knowledge as constructed by the knower through interactions and experiences with the world. This approach sees knowledge as a human capability to act due to one's interaction with the world (Snowden, 2000:241). There is no need for sometimes knowledge hierarchy in this perspective but there is need for a conducive environment that someone would be able to interact with the environment. In this case mistakes are allowed as it results in obtaining knowledge and wisdom due to the learning from mistakes and mistakes of others.

Jonathan (2004) observes the relationship between wisdom to knowledge and knowledge to information to form a hierarchy. This hierarchy also suggests that one can affect the other and even can be changed into another. These ideas have stuck and have been analysed and discussed in many different forums, including Al Gore's Digital Earth in 1998 (Gore, 1998) which discussed "turning raw data into understandable information." Yet despite this wealth of analysis, the concepts themselves, not to mention the transitions between them still resist clear definition. Indeed, the very existence of the hierarchy itself is rarely questioned in current thinking on the topic despite the distinctions between each stage. The model clearly appears to have proved a both useful and enduring model in order to better understand the distinction of these concepts. However it is questionable whether all information leads to knowledge and whether all knowledge leads to wisdom.

The DIKW sequence is helpful as it makes the study of information science and Information and Communication Technology (ICT) easier. It shows that information is a refinement of mere data. Information thus is the value extracted from data. But once the idea of information overload started taking root (popularised in Alvin Toffler's 1970 *Future Shock*), there was need for a way to characterise the value extracted from information. Weinberger (2010:5) posits that "we looked for something that would do to information what information did to data". Ackoff (1989) suggested knowledge as the value of information but this might not always the case. The emphasis in all these cases is on knowledge being "actionable" because of the business context, and on knowledge being a refinement of information because that is how people extracted value from data. This is different from Plato's definition of knowledge or the traditional account of knowledge. According to the traditional account knowledge is not filtered from information. In this, case, the DIKW concepts does not really apply. The real challenge is not the DIKW's use of the word "knowledge" but its implication that knowledge derives from filtering information.

3.2 Gaps on the DIKW Model

There are gaps on the DIKW concepts. Knowledge according to the social constructivists, results from a far more complex process that is social, goal-driven, contextual, and culturally-bound. People get to knowledge especially "actionable" knowledge by having desires and curiosity, experiences, mistakes and interactions with the world. In this regard it points that knowledge is not really determined by information, for it is the knowing process that first decides which information is relevant and how it is to be used in this case knowledge comes first. Thus one has to be knowledgeable about the information. This brings out the knowledge of information literacy. It can also be argued that for one to come up with the data and to analyse the data one has to be knowledgeable about that data. This shows that knowledge is at every level. The DIKW concept is not really an affirmation of Plato's theory of knowledge which regards knowledge as, "justified true belief". According to Plato, knowledge has been something like the set of beliefs that are true and that we are justified in believing. The DIKW hierarchy implies that knowledge is derived from filtering information.

However, Plato's knowledge theory has its own limitations. It can also be argued that regarding knowledge as justified true belief and infallible might not be true in some cases as knowledge changes with time and circumstances. What used to be true ten years ago might no longer be true today. Today's treasured knowledge might be tomorrow's ignorance. Some years ago a person who could have contracted the HIV virus was least expected to live for more than ten years but with the antiretroviral therapy, today, a person can live for so many years and who knows tomorrow a cure could be found.

DIKW model may not always be consistent with constructivists who believe that knowledge is constructed by the knower with interactions and experiences with the environment. Knowledge is not always determined by information. There is a gap with the DIKW hierarchy is that it is a pyramid. Placing knowledge in a hierarchy reduces its potential and gives the impression that knowledge is much less to wisdom which results from it not given its full value. Knowledge is more creative, complex and far more discontinuous therefore placing it in a form of a hierarchy limits its capabilities. If the DIKW follows the positivism root, it therefore shows that it is aligned to quantitative approach. Knowledge and its management cannot ignore the qualitative root. Qualitative paradigm should be considered in knowledge management since knowledge is difficult to define and to measure beyond any dispute. Krough, Ichijo and Nonaka (2000:5) support this sentiment because they argue that "knowledge is one of those concepts…extremely meaningful but hard to pin down". The DIKW model does not take a wholistic approach to knowledge management. It leaves different perspectives of knowledge management.

The DIKW model might work easier in explicitly knowledge. It is very difficult to apply it when dealing with tacit knowledge because it is difficult to document it or to articulate it. This then leaves a question. How can knowledge be anaysed in a hierarchy? In that case we would need the people with their knowledge to demonstrate their knowledge. This aspect is not clearly brought about by the DIKW model. It follows that the model works when dealing with explicit knowledge. The News beat just before news hour in Zimbabwe can be used to illustrate this. The Drummer, Douglas Vambe being the originator of the drumbeat might try to put the notes on how to beat the drum, someone who tries to follow those notes will not be in a position to come up with exactly the same beat. It is reported that, his is the African drumbeat whose cross-rhythms have sent shocks waves in Zimbabwe and beyond. It is the drumbeat that enthralled even United Nations, forcing the world body to declare the beat, World heritage material (Herald 01/03/2003). It then points out that one cannot separate knowledge from the knower especially if it is tacit knowledge. This makes organisational knowledge provide competitive advantage as it is difficult for other organisations to copy the knowledge.

IV. Recommendations

Due to the limitation found in DIKW model, I suggest the following development of the knowledge model.

Knowledge Model

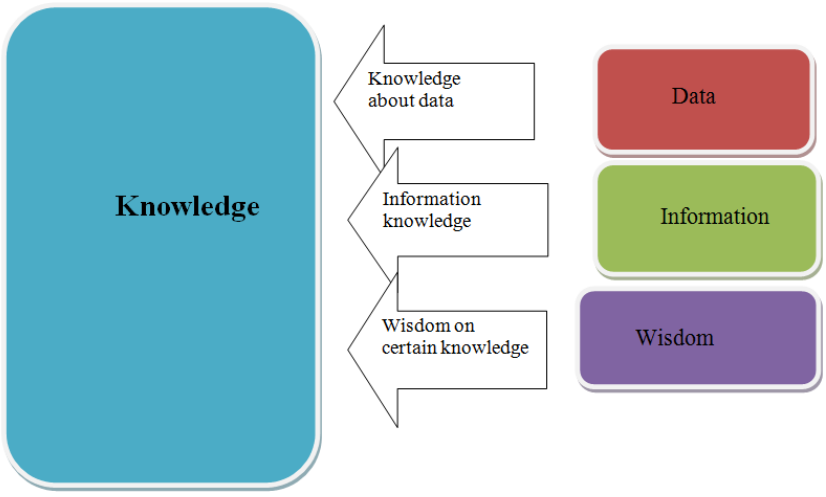


Figure 2: Knowledge Model

The diagram above indicates that for one to come up with the right data and to effectively organise the data, he/she has to have knowledge regarding that data. The creation, acquiring, organizing, evaluation, dissemination of information as well as using information requires knowledge in information management. Different applicability of wisdom requires knowledge.

It then follows that knowledge cannot be put in a hierarchy as for everything to function there is need for knowledge. Knowledge is found at every part, section, process, levels and stages. It should the nerve of organisations as without it organisations will not survive.

4.1 Chipo Mutongi's knowledge management model or the green leaf model

The limitations of the DIKW model has made the author of this article to come up with the green leaf model which is recommended in the knowledge management.

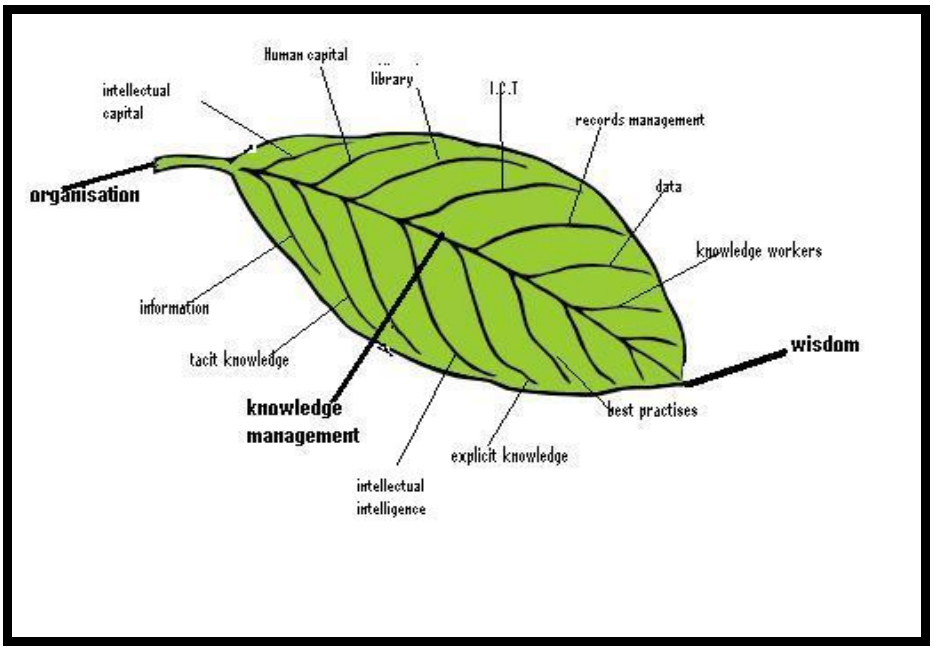


Figure 3: Chipo Mutongi's Green leaf model

The green leaf symbolises life. The green leaf model indicates that the organisation is alive and healthy just like a living organism. The green leaf has the components which include data, tacit knowledge, explicit knowledge, intellectual capital, intellectual intelligence, ICT (Information and Communication Technology) which give birth to Artificial Intelligence, library, records management, information, best practices, human capital and knowledge workers**.**

4.1.1 Organisation

The organisation is the stem. A stem is a branch which connects a fruit, flower, or leaf. In this case the stem connects to the leaf which produces knowledge management due to the proper use of data, tacit knowledge, explicit knowledge, intellectual capital, ICT (Information and Communication Technology), intellectual intelligence, records management, library, information, best practices, human capital, knowledge workers and the end result will be wisdom.

4.1.2 Knowledge management

Knowledge management on the green leaf model is pointing to the **midrib** which is the central part of a leaf and it helps carry the leaf. A **midrib** protects and makes the leaf stay in an upright position and to keep the leaf strong as well providing protection from the wind. It helps in transporting food nutrients and water to the whole part of a leaf. The midrib transports water and photosynthesis via primary xylem and primary phloem. Photosynthesis is the process in green plants and certain other organisms by which carbohydrates are synthesized from carbon dioxide and water using light as an energy source. Most forms of photosynthesis release oxygen as a by- product. Photosynthesis in this context will be imparting **information** and **knowledg**e for the effective and efficient function of the organisation. **Midrib** is the primary vein located in the centre. From this vein branch the secondary veins, and from these veins branch the tertiary veins. These secondary veins include data, tacit knowledge, explicit knowledge, intellectual capital, intellectual intelligence, ICT (Information and Communication Technology), records management, library, information, best practices, human capital, knowledge workers which when appropriately applied and utilised will result in wisdom. The organisation through knowledge management acts like a **midrib**.

4.1.3 Library and Records management

This is the institutional memory. The knowledge which can be captured should be made available in the library and records centres. This makes the organisation have a sustainable competitive advantage and would not lose a lot when some human capital which includes knowledge workers leave the organisation. Their expertise might have been captured through videos and other means. Procedure manuals would also have been produced by the experts in every area of the organisation. The institutional memory would have aspects of artificial intelligence which is the robotic way of doing things. The past, present and future trends can easily be identified hence leading to informed decision making for the betterment of the organisation.

4.1.4 Intellectual capital

Intellectual capital is intangible, knowledge-based assets. These intangible assets like tacit knowledge**,** should just like tangible assets measured and given monetary value in the accounting processes and balance sheets.

4.1.5 Artificial Intelligence

Artificial intelligence is building machines capable of acting and thinking like human beings. Thus, it is a robotic way of doing things. The organisation should have the artificial intelligence such that it will not lose much when the human capital which include the knowledge workers leave for various reasons which might include resignation, illness, retirement and death.

4.1.6 Best Practices

Best practice means the most effective way to do things be it in Information and Knowledge Management, Financial Management, Accounting, Marketing, Human Capital Management, Research and Development, Health and Engineering. It is a commitment to using the best practices in any field by using all the **information**, **knowledge** and **Information and Communication Technology** at one's disposal to ensure success. **Knowledge management** enhances best practices. Best practices are also a form of how knowledge that can be transferred through doing something appropriately, resulting in shared best practices in an organisation.

4.1.7 Wisdom

Wisdom is the ability to make sensible decisions and give good advice because of the experience and knowledge that one has. In the green leaf model wisdom is shown as the outcome when proper knowledge management is in place. Thus, the organisation will then be able to apply wisdom as a result of proper knowledge management hence resulting in efficient and effective performance, products and services.

4.1.8 How to apply the model?

The organisation should be managed through the midrib system which is knowledge management that acts just like a midrib in making the organisation stronger through proving the right air, food and nutrients for the organisation such that oxygen can be breathed out that would be inhaled by the human capital for the effective operation of the organisation. The human capital also breathes out carbon dioxide that would help the leaf to stay health and green. This means that the human capital have also a pivotal role to play in the knowledge management. Thus there is a feedback process. The midrib which is knowledge management is the "spinal code" will sustain all departments and sections be it financial, accounting, Information and Communication Technologies (ICT), marketing, Human Capital Management and engineering. Thus all sections in the organisation should be knowledge based and this trigger performance. This creates the networked culture and doing away with the "silo" culture. Everywhere, where information and knowledge reside will be linked. This enhances immediate feedback as information and knowledge are centrally connected.

The green leaf model co-ordinates various sections, activities and people and this ultimately destroy the negative attitude syndrome of information and knowledge management as information and knowledge management is the driver of everything. The organisation will stay sustained through the midrib which is knowledge management. Those sections, departments, people and activities will also feed from and into the midrid. In so doing there is networked communication as well as networked information and knowledge flow. The organisation becomes innovative, creative, responsive and successful. This would enable the achievement of organisational objectives since knowledge management, wisdom and best practices would be used resulting in continuous improvement and there will be promotion of knowledge leaders.

V. Conclusion

The paper provided a glimpse into the implications and limitations of the DIKW model which was developed to the DIKW model. The DIKW model makes the study of information Science and Information and Communication Technology (ICT) easier. However, It narrows the study of knowledge and Knowledge

Management. It leaves the constructivist aspect of KM and does not really confirm to Plato's knowledge theory and the constructivists. Putting knowledge in a hierarchy on its own belittles knowledge. Knowledge is bigger than the DIKW hierarchy and is found on the data, information, knowledge and wisdom levels. It is found at every section, department and stages in organisations. Knowledge is the oil that makes the organisation survives in this competitive environment.

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Profile of author and photograph

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