Knowledge Temple of Decision Making

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Knowledge Management (KM) is a discipline that is as much art as it is science. Like the conversations that take place in stodgy art galleries over the definition of censorship, opinions on the definition of knowledge management are many and varied. As art aficionados write articles advocating vehemently for one perspective or the other, so do practitioners of KM. However, one aspect of KM about which there is little debate is that information and knowledge must be available to decision makers. The debate centers on the means and methods to best accomplish this. KM doers should care less about arguing and more about building a KM construct that bridges information gaps. They should study how to best deliver necessary information and knowledge to the people who need it. A key component to the availability of information and knowledge is the underlying design and structure of the information and knowledge management system. Before any software product is purchased, the basic model, framework, and relationships among data, information, knowledge, and decision making must be clearly understood. This bottom-up approach is organizationally specific and will vary between entities. It is essential for good decision-making. Allegorically, building a robust knowledge management environment and decision support framework is very similar to the methodical design and systematic building construction process: plan, design, build.

Great building projects often are based on some module. Phi, is the 21st letter of the Greek alphabet. In mathematics, Phi is an irrational number approximating 1.618 that represents a special ratio commonly known as the "golden ratio. Two quantities are in the golden ratio if their ratio is the same as the ratio of their sum to the larger of the two quantities, such as a > b > 0, $\frac{a+b}{b} = \frac{a}{b}$." [1] The very first time Phi was used in mathematics is unknown. However, the Egyptians may have used it as early as 2500-2000 BC in the construction of the pyramids at Giza, though this has not been proved. The first documented use of Phi was by a Greek sculptor and mathematician named Phidias in about 450 BC. After Phi was identified, it became fascinating to the ancients because they began to discover how often it was found in nature. Phi occurs in the natural growth patterns of petals of flowers, the shell development of the nautilus, in the shape of the human ear and other proportions within human bodies. It has been referred to as God's number because it recurs so often within the natural world. In more recent times, musical scales and the spirals of hurricanes and some galaxies have been shown to also follow the proportions of Phi. Due to its widespread observation in nature, Phi became known as a proportion that demonstrated stability, balance, and proportion in nature, as well as in manmade structures.

[1] Wikipedia. Golden ratio. (7 June 2018). Online at: https://en.wikipedia.org/wiki/Golden_ratio

Artists and architects within the last few hundred years have actively employed the use of Phi in their works. Leonoard Da Vinci and Salvador Dali were two artists that used Phi to define the proportions of some of their paintings. Le Corbusier, a famous French architect of the late 1800s and early 1900s who helped define the modern architectural era, used Phi extensively. Their use of the golden ratio is the result of the generally accepted notion that the visual representation of Phi is pleasing to the eye. It's use in the visual arts and architecture produces a pleasing proportional layout that in reality produces a strong stable structure. A famous early 20th century American architect, Frank Lloyd Wright, said, "Form follows function – that has been misunderstood. Form and function should be one, joined in a spiritual union." [2] The notion of a framework or module like Phi, should also inform and influence concepts of design when developing new information management (IM) and KM systems. That framework consists of data, information, and knowledge in a mutually supporting relationship.

Initiating an IM/KM framework is not a simple as purchasing a new piece of software whereby the system is supposed to have an IM/KM decision making model baked into its structure. This methodology is sold to countless organizations because it seems logical and makes the process easy. Problems may surface months after the purchase where the organization slowly comes to realize that the new system panacea they thought they were getting is not meeting their needs. Thoughtful analysis, planning, and design are essential to establishing a solid decision-making model and must be conducted well before an organization makes a system procurement decision. A KM practitioner has to be capable of guiding stakeholders and leadership throughout a system acquisition process, whether this be through the expenditure of capital resources on a major new software product or the monumental task of entirely retooling the organization's decision-making processes. Develop an IM/KM framework first, then find or develop a system that meets those specific requirements. A major factor in a project of this nature is to identify the essential as opposed to the unnecessary.

As in an old-fashioned mousetrap, there are no superfluous parts. So, it should be in a KM model. The model must provide a solid foundation for capturing or accessing essential data, curating and collating data into information, and finally transitioning information into essential knowledge products sufficient for consumption by decision makers. Additional features and automation within a system may be desired but should be incorporated only after the initial model is completed. Similar to the mousetrap, the ancient Greeks constructed their temples with an irreducible level of complexity. Essential components of an ancient temple included the foundation, the columns, the entablature, the pediment, which supported the roof. Remove one feature and the structure cannot stand or will not perform its intended function.

Too thin, too wide, unbalanced are all criticisms of art and architecture. Problems of balance, scale, and proportionality have always been challenges for the designer. For a decision support system designer, it is no different. Aligning organizational level processes and existing decision-making frameworks is difficult work. It is often very challenging to develop a decision support

[2] Guggenheim. (7 June 2018). Online at: https://www.guggenheim.org/arts-curriculum/topic/form-follows-function.

system that is able to strike the right balance between data management (DM) and collection, information access and knowledge product development. Generally, and with few exceptions, system designers are able to accomplish only some of these design characteristics because they have a tendency to focus on the few at the expense of the many. There are interactions between them all and all must be considered. Beginning with a top-down or a bottom-up approach may be organizationally dependent, but either can work if done properly. Whether top-down or bottom-up some common themes will exist. The information and knowledge project manager must involve leadership. They must interview key decision makers to determine what information they currently consume. They will need to take inventory of information technology systems and processes throughout the organization and document them all. They will need to , map the flow of the information and knowledge to key decision-makers and examine the timing of information flows and if there is data to support the development of information products.

A researcher cannot generally collect every data point needed to resolve a problem. Instead he relies on only a subset of the data in the world, a sample. The sample is what forms the foundation for decision-making. If an essential piece of data is not identified or captured during the initial collection of sample data, then the decision-maker will be making decisions based on an incomplete picture. Furthermore, even if the right sample is captured, but is not sequenced properly or essential elements are hidden from view for some reason, it would be as if it was never captured. Another factor of concern is the age of the data. In other instances, a researcher may have the right data, it may be incorporated into an information product, but if it is not fused with other essential details from related peer information domains, then the consumer is again working with a partial picture. This condition can mislead the decision-maker by skewing his lens of understanding. Each of these dangerous situations contribute to an IM/KM/decision-making framework that is too thin, too wide, or unbalanced. The goal is to capture the right subset of data, deliver the right information, at the right time, to the right person, in the right format so that leaders can quickly evaluate various courses of action and make fully informed decisions.

Professors Nita Miller, PhD and Lawrence Shattuck, PhD developed a Dynamic Model of Situated Cognition in 2003 as seen in Figure 2. This model describes the acquisition of data from a world where it is impossible to collect all data points relative to a certain problem. Data is passed through sensors and displayed by a number of command and control (C2) systems. It is interpreted by human operators based on various lenses of bias and understanding. Information is then presented to decision makers who interpret it based on their own lenses. Senior leaders draw on their experiences to understand and make projections of future activities that address issues that influence their decisions. This model clearly describes the challenges of system design, information presentation, and the

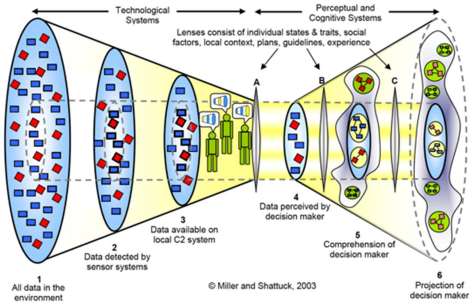

Figure 1: Miller/Shattuck Dynamic Model of Situated Cognition

development of effective knowledge products used in decision making. A system out of balance at any point in this data to decision cycle could degrade decision making instead of improving it. A design philosophy that incorporates a comprehensive front-loaded and iterative approach to design of systems is summarized in a 2008 Harvard Business Review article entitled "Design Thinking" by Tim Brown. [3] Whether one is creating a system for the first time or redesigning an existing one, thoughtful analysis of data, information, and knowledge flows must be considered early and often throughout the process.

Once the foundation of obtaining the right data has been set, the analogy of the temple, allows for the columns to represent various functional areas within the organization. One column may be the accounting department, another marketing, another logistics, production, etc. These will, of course, vary with the type of organization. A more detailed look inside these functional areas, within the columns reveal that the functional areas use not one, but a number of information technology systems to manage their work. Each of these systems has a specific purpose and fulfills some particular information requirement of the section. However, there may be many systems within that section that perform the same or very similar functions. This redundancy, while offering the user a choice, may be creating inefficiencies with regard to system support. If two systems perform the same function, it may be wasting company resources to maintain both. The opposing condition is that employees need to perform some action that a system could facilitate, but one does not exist for that purpose. In this case, either the action does not get performed, a manual method is used, or another unrelated system is used as a work-around. The short answer to such a condition is that a systems analysis may be necessary. It is essential to fully understand the systems that the organization uses before deciding to remove or add to the inventory. System training is a key part of this process and cannot be neglected. Finally, it is very important to ensure that someone has been designated to manage all systems within a functional area, not to mention another level of scrutiny being conducted at the organizational level. This has to be done and reported to leadership every few years to ensure that an efficient collection of the organization's systems is maintained.

There can be a tendency to put too much emphasis on the system itself. Think of the system as a conduit or a pathway that delivers essential products to a consumer. It's not the wire that is so important, it's the electricity it carries. It's not the pipe, it's the water. However, the wires and the pipes can neither be avoided nor ignored. Both electricity and water are essential utilities to the function of the modern home, but if all electrical outlets and water faucets terminated in the linen closet, the house will suffer from functionality and access issues to these vital resources. Just as pre-planning and thoughtful design-work can provide a comfortable distribution of electricity and water throughout a home, so it is in the thoughtful distribution of data, information, and knowledge throughout an organization.

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[3] Brown, T.: Design Thinking. Harvard Business Review, 84–93 (June 2008). Abstract online at: https://hbr.org/2008/06/design-thinking

Frank Lloyd Wright intuitively claimed that architectural form and function are one. It is also true of a well-designed and functional decision support system. The Knowledge Manager must conduct a thorough analysis of requirements before any system design phase takes place. This homework will reveal important aspects of existing systems that may need to be purged from the inventory or reveal large capability gaps that should be filled. This is exactly how the ancient builders used Phi to inform the design of their monuments. It is interesting to notice the vast array of ancient designs that used Phi. For example, a Greek temple and a modern building by Le Corbusier look nothing alike, but they used the same module. Similarly, a decision support system may be based on different processes and use different software, but they can both be based on the foundation of data, solid information management, and knowledge development processes. The choice to use a module in design does not strictly control the final outcome, it simply ensures that various essential elements are considered during design and prior to construction. This both assists the designer in developing a structure that is as stable as it looks. Additionally, an analysis of organizational processes, existing systems functionality, and stakeholder/leadership information and knowledge requirements form the framework for any new DM/IM/KM system. This framework is the support structure into which data, information, and knowledge should be inserted to enable the most effective decision support model possible for the organization.