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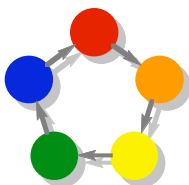


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# **A Knowledge Model for Situation-Handling**

A 2003 White Paper  
from  
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## **Overview**

Enterprise performance – the degree to which enterprise objectives are fulfilled – is determined by the effectiveness of separate actions performed by individuals, groups and departments and in the aggregate, by the whole enterprise's behavior. Organizational effectiveness is determined by many factors, the most important are the quality and availability of pertinent knowledge at points-of-action used to handle situations, i.e., to make sense of information, decide what to do, innovate, act, and evaluate the implications of approaches and actions. Other factors, not covered here, include mentalities or motivations of individuals and organizational characteristics that shape and channel individual actions into desirable and effective enterprise actions.

Important situations vary widely. Some are well known and require routine, even automatized knowledge. Others are complex and require extensive, at times abstract, knowledge and metaknowledge. In well-known routine cases, effective situation-handling involves many steps and requires different kinds of knowledge to support the primary tasks of Sensemaking, Decision-Making/Problem-Solving, Implementation and Monitoring. Similar steps are required for both simple and complex personal situation-handling cases and for organizational situation-handling. This paper presents a knowledge-focused situation-handling model for people and organizations. Its purpose is to guide efforts to strengthen knowledge-related capabilities as they are built with the aid of deliberate and systematic management of knowledge-related practices and processes – Knowledge Management (KM). The model is based on feedback systems perspectives.<sup>1</sup>

Many business problems are appreciably knowledge-related as are many business opportunities. Unfortunately, there is a shortage of insights into business-related knowledge processes. The situation-handling model provides an aggregated framework to understand knowledge-based activities.

Whereas enterprise success may rely on innovating faster than competitors, this model mainly portrays processes associated with delivering competent work. The model does not deal explicitly with learning or innovation mechanisms. Nor does it detail the mechanisms within the primary tasks.

## **Introduction**

It is generally accepted that good knowledge produces good enterprise performance and that better knowledge leads to even better performance. Exactly how, is normally not specified or explored and most knowledge management (KM) efforts are conducted without considering the knowledge-related processes that underlie operational and strategic behaviors and performances. That is almost as detrimental as flying blind and has led to many KM failures. This paper's purpose is to outline some of the mechanisms and processes in which people and organizations engage as part of work. To handle situations, people obtain information about situations, perceive what they are about, decide how to handle them and implement appropriate actions while attempting to maximize their own and their enterprise's interests.<sup>2</sup>

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<sup>1</sup> For more on systems perspectives see Ackoff & Emery (1972), von Bertalanffy (1969), Checkland (1999) and Haines (1998).

<sup>2</sup> Suchman (1995).

Actions of any kind result from decisions that may range from automatized and tacit to deliberate and explicit.<sup>3</sup> Decisions to act are based on the nature and requirements of the situation-at-hand, the applicability and quality of available knowledge, the ability to implement them and many other factors. Quality of information is one. Decision-making has been studied and described by many authors, particularly during the last 50 years. However, making the decision is only one of several tasks that people perform when confronted with situations that require interventions or lead to other actions, including internal adaptation or problem avoidance such as outright flight.

We assume a process where a person receives information about a situation, identifies what it is about, finds a way to deal with it, deals with it and ascertains that it is done satisfactorily. However, in most cases, the situation is ongoing and is subject to repeated or continuous information gathering, sensemaking, decision-making and implementation of actions. When dealing with situations where people make decisions that result in actions, we say that they engage in *situation-handling*. In all areas of life, situation-handling is important. During a normal workday, people engage in hundreds or even thousands of small individual situation-handling episodes, most are personal, nonconscious (tacit) and automatic and require a few seconds, others require more work and some require extensive teamwork and collaboration and can have long durations. Clearly, in order to achieve high grade enterprise performance, these personal situation-handling episodes must be as effective as possible. Individually they must be effective and in the aggregate they still must be effective. The latter requirement immediately brings to the fore the need for appropriate enterprise practices and organization systems and procedures that promote and take advantage of the effective consolidation of good individual actions.

From a KM perspective, understanding of personal and organizational situation-handling, including decision-making and problem-solving, is important to manage knowledge successfully. This understanding requires insights into areas as diverse as situation-handling practices, cognitive sciences, knowledge transfer methods, microeconomics, management principles and supporting information technology. Such insights are required to diagnose knowledge-related operations to determine drivers and conditions, conceptualize KM initiatives, implement capabilities and assess and monitor utilization of knowledge-related resources and practices. Frequently, acquiring the requisite understanding of knowledge-related mechanisms on the personal and organizational levels takes KM professionals into new fields and requires of them to view work and operations from perspectives that may be new to most.

Within the enterprise, business functions consist of interconnected dynamic systems or processes of many types as is the case with processes within the world in general. Most can be manipulated or influenced by external action, some, when tightly organized, can even be controlled to some extent. The dynamic behavior of these systems generate changing conditions – situations and events – that directly or indirectly affect products, services, people, departments, enterprises, customers and other stakeholders and thus may require attention to make their behavior acceptable. These situations need to be managed by initiating actions to change or manipulate them. They can be handled to fulfill personal or enterprise goals and objectives.

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<sup>3</sup> Many tacit decision-actions are automatized and are executed the same way. They can be said to be *mimetic actions* while deliberate and explicit decision-actions – *polimorphic actions* – deviate from the routine and are adapted to the situation and context. See Collins & Kusch.

A person handles situations by identifying what they are about, by making decisions about what to do with them, by implementing the decisions – the selected actions – and monitoring what is happening, explicitly or implicitly. However, what constitutes a “*situation*” is far from clear, particularly when it evolves gradually as most situations tend to do.<sup>4</sup> It may be difficult to identify the beginning of a situation or determine when it has ended. Most situations are quite dynamic and change substantially over time as caused by internal dynamics and external actions. A situation may consist of a single occurrence, a sequence of events separated in time, such as when an insurance underwriter is working a case in small time chunks whenever new information arrives, until a final action is implemented. Or, a situation may consist of a condition that changes dynamically over time and is handled repeatedly until no more attention is required.<sup>5</sup> Medical situations may follow such a pattern. Many other, often complex, business situations also follow this pattern. Among examples are handling prolonged negotiations of labor contracts, research and development to create a new manufacturing process, or the process of developing a customer relationship in the commercial loan business.

As situations evolve, sensemaking will be repeated, new action options are developed and executed – at times before implementation of prior actions are completed or their effects are known. The handling of these situations become an exercise in “steering” very complicated and dynamic problems, often with insufficient information and understanding. Nevertheless, such situations are handled and can be handled better with improved understanding of the situation-handling process.

As discussed further below, situations that involve regular work can vary considerably in difficulty from being simple routine to highly complex. We argue that more complex work is often also more valuable and it therefore becomes important to develop competence in people who are asked to deal with these situations. They will need good and pertinent knowledge, not only within their conventional work domain, but also within a wider domain to understand how their actions affect – or are affected by – adjacent and up- and down-stream processes or functions. Competent workers need broad perspectives of options and implications, for that they need good world knowledge and methodological skills.

### ***A Customer Service Example***

Susan Stark, a customer service manager, is informed that a key customer has returned a recently shipped high-technology instrument with the indication that it does not work correctly. From additional information and previous experience, Susan quickly recognizes that the instrument in question indeed has quality problems and she needs to decide how to deal with it in a manner that is practical and supports the enterprise intent and strategy and satisfies her personal performance goals.

Three immediate action choices come to mind. In sequence of how she thinks of them, the choices are: **(1)** Cancel the purchase order and let the customer place a new purchase order when a new instrument is needed; **(2)** Repair the product and return it to the customer; or **(3)** Manufacture and deliver a new, problem-free instrument as soon as possible. In turn, she tacitly and

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<sup>4</sup> Professor Sue Stafford, personal communication (2002).

<sup>5</sup> Garvin & Roberto (2001).

automatically perform a quick mental simulation to explore the acceptability of each outcome based on practical considerations, client needs, the company's policies and objectives and what works well for herself and her department.<sup>6</sup> By examining what she is about to do from the perspectives of her enterprise's intents – its strategy – she rejects choices (1) and (2) and decides that the best approach for the company is to manufacture a new item. She implements her decision by ordering and expediting the building of the new instrument. Furthermore, she informs the customer personally of what her company will do to correct the problem. This situation-handling process is outlined in Figure 1.

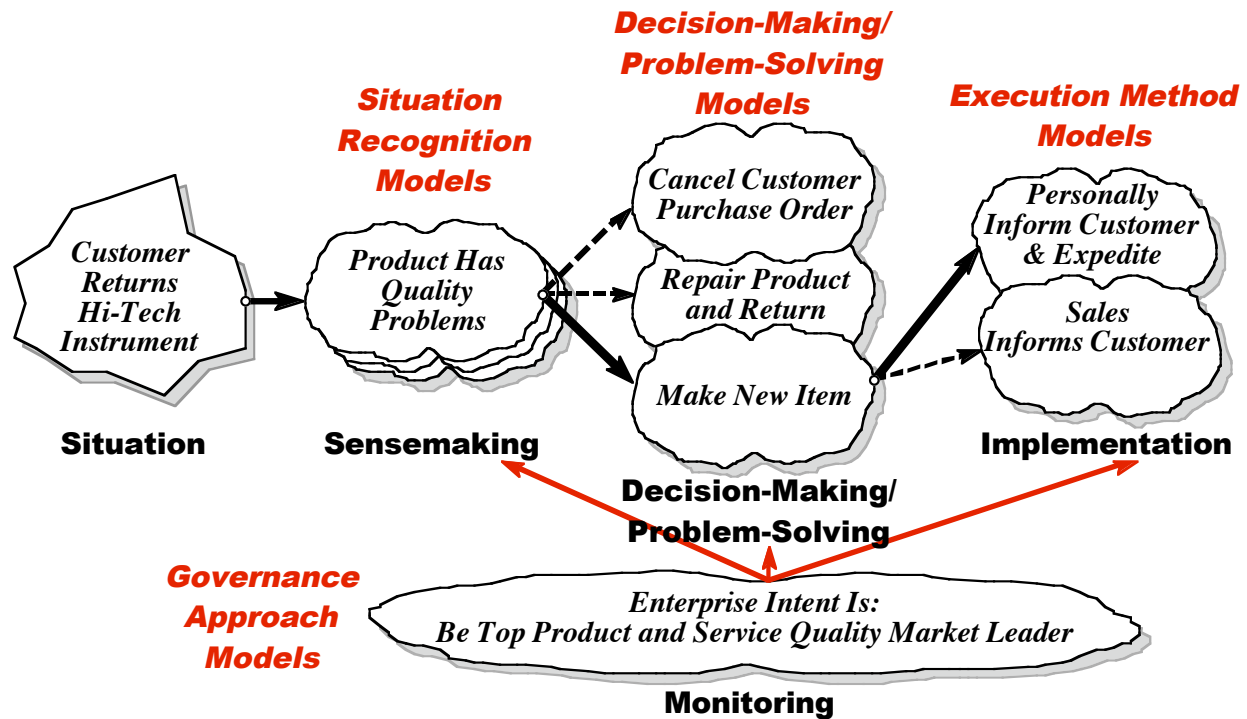


Figure 1. Situation-Handling by a Manager Who Decides How to Handle the Return of a High Technology Instrument by a Customer.

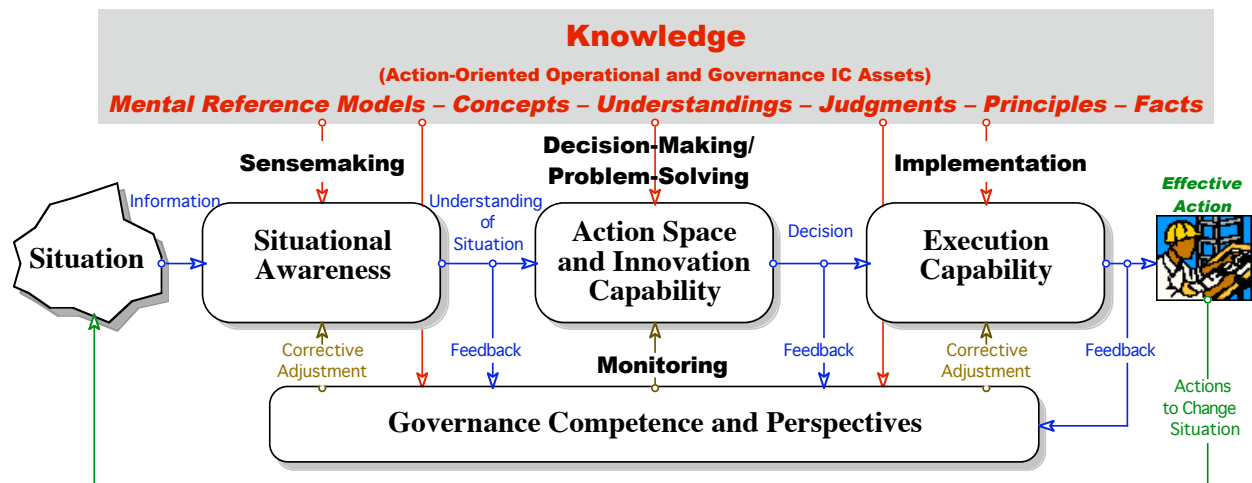
### The Situation-Handling Model

People handle situations more or less effectively to satisfy enterprise goals, to gain personal advantage and for many purposes. They may attempt to control, influence or change the situation outright when that is possible, adapt to it when it is not, or pursue a combination of adaptation and external change – interventions – to move conditions in the desired direction. We divide situation-handling into four primary tasks: (1) **Sensemaking**; (2) **Decision-Making/Problem-Solving**; (3) **Implementation**; and (4) **Monitoring**. A schematic overview of the relationships between these four tasks is indicated in Figure 2. This figure also indicates the *functional capabilities* needed to operationalize each primary task: *Situational Awareness*; *Action Space and Innovation Capability*; *Execution Capability*; and *Governance Competence and Perspectives*. The proficiency of these capabilities is highly dependent upon the extent and quality of knowledge that

<sup>6</sup> Klein (1998 & 2002).

is possessed by people or otherwise made available to tackle the tasks. If knowledge is limited or the competence is otherwise reduced, the capabilities become constraints that will reduce the effectiveness of the overall situation handling. Figure 2 indicated some connecting variables and paths along which information and knowledge enter the process.

The concept of “Situational Awareness” initially originated with evaluation and characterization of World War I fighter pilot behaviors.<sup>7</sup> The concept of “Action Space” as used here was introduced to us through the work of Dr. Ragnhild Sohlberg of the chemical and energy company Norsk Hydro ASA in Norway.<sup>8</sup> The work on tacit and explicit decision making that supports the discussions below is reported by Bechara *et alia* based on work performed in Dr. Antonio Damasio’s group at University of Iowa<sup>9</sup> and by Dr. Gary Klein of Klein Associates.<sup>10</sup> The larger body of research provides foundations for understanding many nonconscious aspects of decision making.<sup>11</sup> Given these and other sources, we can explain many characteristics of the four primary tasks and their functional capabilities as presented in greater detail below.<sup>12</sup> The increased understanding also leads us to realize how we have misunderstood the way people handle situations and make decisions by believing that decision making is a rational and often conscious set of deliberations.<sup>13</sup> These generally held misconceptions have misled – and still mislead – development of many KM-related management practices with results that are quite disappointing.



**Figure 2. The Personal Situation-Handling Model – from Situation and Sensemaking to Implemented Effective Action.**

<sup>7</sup> See for example Endsley (1997), Nofi (2000) and Wickens (2002).

<sup>8</sup> Ragnhild Sohlberg, Ph.D., personal communication (2000).

<sup>9</sup> Bechara *et alia* (1997) and Damasio (1994, 1999 & 2003).

<sup>10</sup> Klein (1998 & 2002).

<sup>11</sup> For an excellent and readable overview of recent understandings of tacit decision making, see Stewart (2002a).

<sup>12</sup> Many researchers have contributed greatly to this field. See for example Amosov (1967); Anderson (1981, 1983); Argyris & Schön (1974); Baddeley (1992a & 1992b); Bobrow & Collins (1975); Boden (1990); Damasio (1994, 1999 & 2003); Gazzaniga (2000); Gazzaniga & Ivry (2002); Halpern (1989); Ivry & Robertson (1998); Janis (1989); Johnson-Laird (1983); Kahneman, Slovic & Tversky (1982); Kahneman & Tversky (2000); Krogh, Ichijo & Nonaka (2000); Lakoff (1987); Lowen (1982); Michalewicz & Fogel (2000); Miller (1956); Neves & Anderson (1981); Pinker (1997); Polanyi (1966); Posner (1989); Sanford (1985); Schön (1983 & 1987); Sharkey (1986); Singley & Anderson (1989) and Wegner (2002).

<sup>13</sup> Wiig (1993) presumed erroneously that decision making generally is an orderly and rational process.

As indicated above, situations rarely are single events. Instead, they are ongoing situations that require repeated attention and multiple actions. As situations evolve, for example as result of obtaining more information about a business opportunity, or as a result of the situation itself changing – by itself, or by being changed by the actions executed to manage it – new information, new considerations and new actions need to be pursued to manage it. Figure 3 illustrates some of the complexity associated with handling ongoing situations.

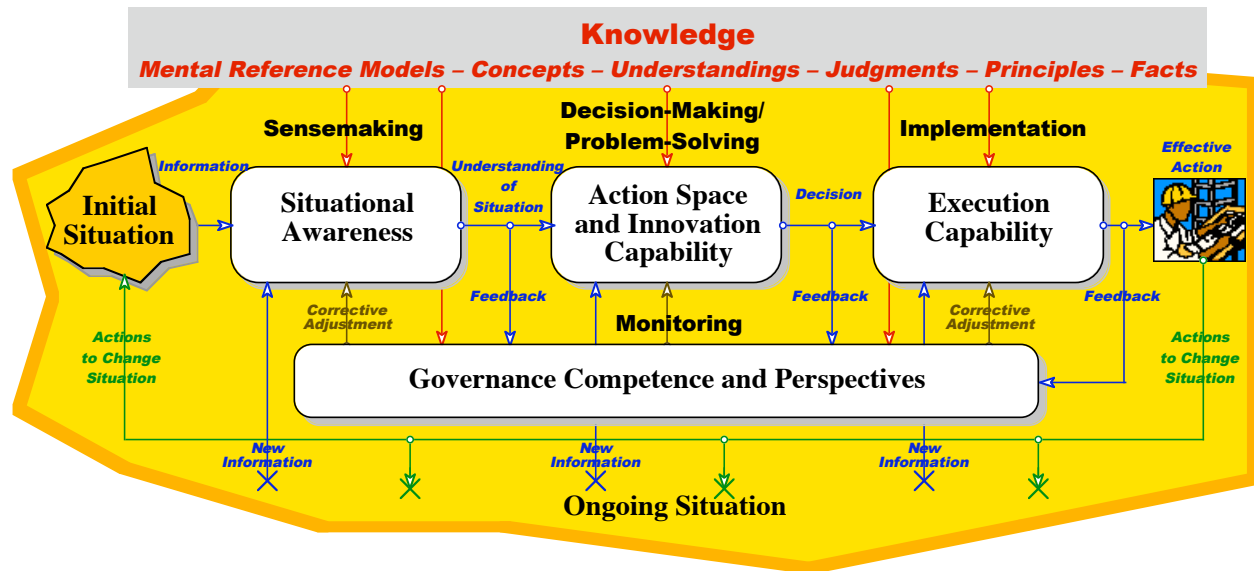


Figure 3. The Personal Situation-Handling Model in an Ongoing Situation.

## The Customer Service Example Revisited

Let us examine what Susan does. She uses her previous knowledge which she has stored in her mind as tacit mental reference models and other types of knowledge. Using her mental Situation Recognition reference models that are part of her Situational Awareness capability<sup>14</sup> to make sense of the situation, she understands the situation to be routine. Since she thinks she understands the situation, she applies her mental Decision-Making/Problem-Solving reference models that are part of her Action Space and Innovation Capability and makes the decision automatically and rapidly – within about six seconds.<sup>15</sup> As part of the Decision-Making task she performs mental simulations guided by Monitoring and her Governing Approach reference models and it is this process that led to rejection of the first two action options. She implements her decision routinely by being highly familiar with corporate practices, systems and procedures and having good networking contacts with the people in manufacturing. Part of this knowledge she possesses as Execution Method reference models included in her Execution Capability.

Throughout, the manner in which Susan performs her Sensemaking, Decision-Making/Problem-Solving, and Implementation tasks is supervised by her Monitoring task and her Governance Competence and Perspectives capability – her mental Governance Approach reference models. This executive function operates in the background – mostly nonconsciously and automatically –

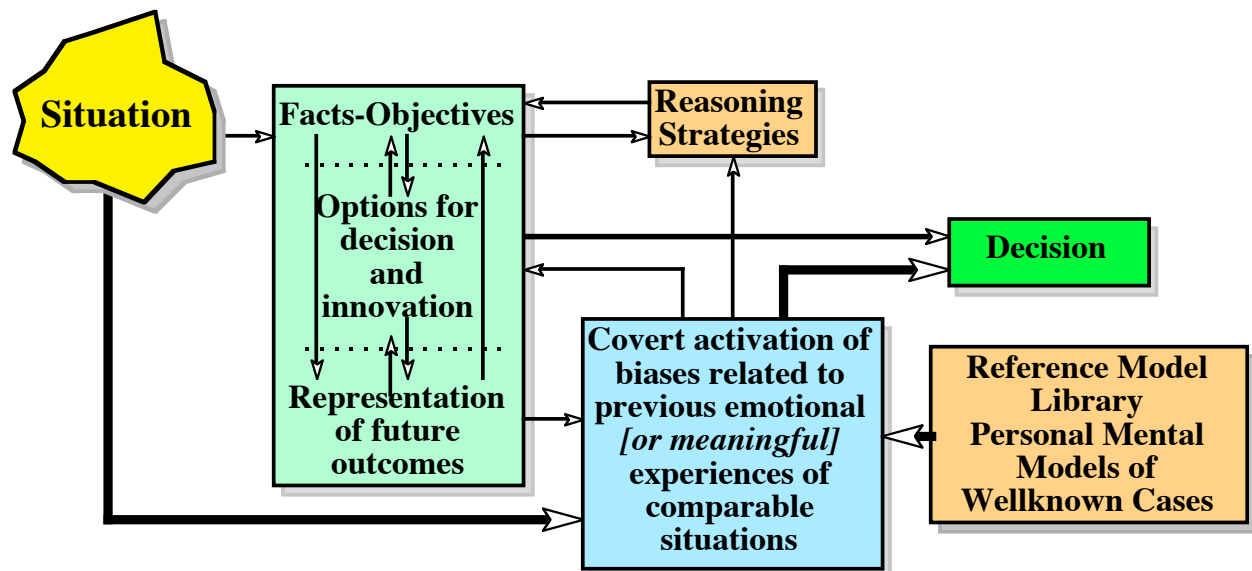
<sup>14</sup> See the next section and Figure 2 for description of situation handling capabilities.

<sup>15</sup> Decision making based on tacit mental models – both for routine and many non-routine situations – take on the average six seconds as discussed by Klein (1998 & 2002).

and influences information interpretation, decision choice and implementation effectiveness. As a result, the overall situation-handling has supported the enterprise intent for how to deal with important customers. The corporate situation-handling is rapid, routine and flexible and falls in line with implementing the enterprise strategy and satisfies Susan's own professional values.

### Situation-Handling Relies on Memorized Stories

During the last part of the 20<sup>th</sup> century it was often accepted that Decision-Making in general resulted from application of logical reasoning strategies.<sup>16</sup> However, recent research shows that such behavior generally is only correct for novices or people who struggle with unfamiliar problems and hence engage in Problem-Solving which often requires conscious and structured synthesis and analysis. As Bechara *et alia* demonstrate, for decision-making experienced people use “*covert activation of biases related to previous emotional [meaningful] experiences of comparable situations,*” as indicated in Figure 4.<sup>17</sup> People use directly executable or adaptable examples of prior situations that they have memorized or learned about. They use mental reference models that in effect are tacit stories encoded at different levels of abstraction to respond to familiar situations by imitating previous behavior. That behavior might be a repetition of their own prior actions when the mental reference models reflect their own experience, or it might be imitating someone else's behavior when they reflect recounted stories.<sup>18</sup>



Adapted from Bechara et al., Science 28 Feb, 1997

**Figure 4. Making Decisions often Depends on Experience with Comparable Situations. For Most Decisions, the Dominant Decision Path Bypasses Explicit Reasoning and Proceeds Directly to Attempts at Imitating Past or Known Situation-Handling.**

<sup>16</sup> See for example Janis (1989), Janis & Mann (1977) and Simon (1977a & 1977b).

<sup>17</sup> Bechara *et alia* (1997).

<sup>18</sup> Little (some say nothing) is known about how knowledge is actually encoded in our minds. Therefore, many of the knowledge characteristics discussed in this paper represent speculative, qualitative, illustrative and operational aspects of knowledge.

## ***The Four Situation Handling Tasks***

### **Sensemaking and *Situational Awareness***

Any time a person encounters a situation, she observes it by receiving and accepting information about it and uses her knowledge to make sense of it from the accepted information.<sup>19</sup> She normally will already have an understanding of the general context. During the Sensemaking task, she uses her *à priori Situational Awareness* capability to understand the situation. The quality of her Situational Awareness determines the extent to which the current situation, its context and environment are first observed and then perceived and the accuracy with which the resulting perception – the understanding of the situation – mirrors reality. Without appropriate Situational Awareness she does not have sufficient understanding of the situation and its context and cannot make proper sense of it. Inadequate Situational Awareness limits the ability both to observe and perceive the situation adequately and in such cases becomes a Sensemaking constraint.

In part, the Sensemaking task relies on knowledge in the form of Situation Recognition Models as described later. Additional forms of knowledge are also used. These include facts, concepts, rules, expectations, etc. In people, Situation Recognition Models are primarily mental reference models that can exist in the mind at different conceptual levels. The models can be concrete for routine tasks, more generalized operational models for familiar but less automatized tasks, or generalized scripts and schemata for broader families of tasks. Many reference models are also possessed as two kinds of metaknowledge – procedural and declarative metaknowledge. These provide abstract strategies, features and structures applicable to the domain and serve as basis for operationalization in the new context.

In organizations, the corresponding structural knowledge can consist of shared beliefs, stories, or even embedded knowledge in practices and organized systems and procedures. In some enterprises, these models can be reference cases embedded in automated case-based reasoning (CBR) systems and other kinds of automated reasoning systems. The reference models can also be embedded in operational and management practices and in systems and procedures.

Many factors can affect Sensemaking negatively. Attention is an important factor that determines the degree to which situations are observed and prioritized.<sup>20</sup> Also, the person – or the enterprise – may refuse to accept information that describes a situation. That may happen when information is considered to be unbelievable for some reason or if it describes a threatening situation that the person want to avoid and may therefore tacitly ignore.<sup>21</sup>

### **Decision-Making / Problem-Solving and *Action Space and Innovation Capability***

Given an understanding of the situation, a person's ability to make decisions about how to handle it is guided by her *Action Space and Innovation Capability*. If a situation is perceived to involve conditions beyond her or the organization's operational experience and knowledge, it may

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<sup>19</sup> The process of receiving and accepting information is by itself complex and relies upon effective handling of subtasks that range from obtaining information, sensing data, decoding data to build information, analyzing information, comparing information with what can be expected, determining information reliability to accept/reject information and so on.

<sup>20</sup> For a thorough discussion of the role and functions of attention, see Davenport & Beck (2001).

<sup>21</sup> See for example Sherman & Cohen (2002).

not be possible to make regular decisions about how it should be handled. In these instances, deciding the desired action cannot be determined by regular Decision-Making through operationalizing previous experience memorized as mental reference models. The desired action must be determined through more complex Problem-Solving processes. For simplicity, we can illustrate four levels of situation understanding with corresponding Decision-Making/Problem-Solving modes as indicated in Table 1.

When novel or less known situations are encountered, these may need to be handled differently as indicated in Figure 4. In complex Decision-Making, Klein points out that if the first automatically obtained action option seems to lead to unacceptable consequences, alternative approaches are generated and tested through “mental simulations” until an acceptable action option is obtained.<sup>22</sup> This can be a quick and simple process with one or a few iterations that can be completed in seconds. For difficult situations, it can also result in an elaborate Problem-Solving process that can stretch over long periods of time.

### Action Space

The Action Space denotes the realm – the “space” – within which the person is competent, willing, comfortable or otherwise prepared to make decisions and act. The Action Space is not a passive domain with fixed boundaries. It is formed by the creative capabilities, methodologies and personal attitudes, mentalities and motivations that allow people to consider novel actions and innovate within the boundaries of what they find to be permissible and acceptable. A person’s Action Space is closely related to her Governance Competence and Perspectives with its goals, values, permissions and constraints. A competent person will understand the context and nature of new and slightly different situations and readily initiate and pursue options and innovate within her Action Space and Innovation Capability. However, at times she may be uncomfortable and unwilling to consider actions outside this domain and that prevents effective behavior.

Consider the example of Ian, an assembly worker who experienced consistent problems when using parts supplied by another department. The problems could possibly be with the parts or with how they were incorporated into the assembly. Ian was not comfortable with diagnosing the situation by himself to determine what should be done in the enterprise’s and his own best interests. Hence, he followed accepted procedures and reported the issue to his supervisor who then handled the problems “by the book.” This resulted in considerable delays and costly production upsets. This episode was representative of many persistent problems within the plant.

Later, after Ian and his coworkers were provided with more complete contextual knowledge and increased motivation, authority and independence Ian developed a broader Action Space and Innovation Capability. He now feels comfortable to analyze the situation and when needed to contact the other departments directly to fix problems quickly and productively without added supervisory overhead.

This is one example from a company that was plagued by production delays and other problems. After analysis and examination of best practices in other companies, assembly workers and other groups received education and broader operating scope with greater responsibilities.

Unfortunately, personal and organizational constraints often cause better and more effective actions to fall outside both workers’ Situational Awareness and their Action Space and Innovation

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<sup>22</sup> Klein (1998 & 2002).

Capability. That hinders effective Sensemaking and Decision-Making/Problem-Solving and impacts enterprise performance. Similar constraints exist in the other capability areas and limit the situation handling effectiveness and thereby contribute to impaired enterprise performance.

<i>Understanding of Situation</i>	<i>Dominant Decision-Making/Problem-Solving Mode</i>	
<b>Situation is unimportant</b>	<b><i>No Decision, No Action</i></b>	
<b>Situation is routine and well known</b>	<b><i>Simple Decision-Making</i></b>	
	<b>Mental Models Used</b>	<ul style="list-style-type: none"> <li>• Concrete situation-specific Decision-Making reference models with close correspondence to the situations-at-hand</li> </ul>
	<b>Task Performed</b>	Reference models are operationalized tacitly and executed automatically to generate desired Action Options
<b>Situation follows generally known scripts and abstract patterns</b>	<b><i>Complex Decision-Making</i></b>	
	<b>Mental Models Used</b>	<ul style="list-style-type: none"> <li>• Primarily abstract situation-specific and methodological Decision-Making reference models (scripts, schemata, metaknowledge)</li> <li>• Concrete situation-specific Decision-Making reference models</li> </ul> all with characteristics similar to situations-at-hand
	<b>Task Performed</b>	Reference models are operationalized and executed consciously (at times tacitly) to generate desired Action Options
<b>Situation is unknown and important</b>	<b><i>Novel Problem-Solving</i></b>	
	<b>Mental Models Used</b>	<ul style="list-style-type: none"> <li>• Concrete situation-specific Decision-Making reference models</li> </ul> all with characteristics similar to situations-at-hand <ul style="list-style-type: none"> <li>• Abstract and generalized methodological and situation-specific Problem-Solving reference models (metaknowledge scripts, schemata)</li> </ul>
	<b>Task Performed</b>	<ul style="list-style-type: none"> <li>• Methodological reference models guide Problem-Solving process tacitly for smaller and simpler situations and consciously for complex teamwork situations</li> <li>• All reference models are operationalized and executed to generate desired Action Options</li> </ul>

**Table 1. Situation Understanding Governs the Mode of Decision-Making/Problem-Solving.**

## **Innovation Capability**

Innovation Capability denotes the degree to which a person's attitude, motivation and knowledge inspires her to pursue creation and search for novel and more effective alternatives.<sup>23</sup> By being innovative, she invents opportunities that may not be obvious, she reframes, generates and tests solutions to better attain enterprise goals as well as her personal objectives. When engaging in simple Decision-Making she may allow herself to experiment by tacitly modifying the

<sup>23</sup> See for example Boden (1990), De Bono (1978 & 1992), Halpern (1989) and Paul & Elder (2000).

routine reference models with new ideas or ideas from other, similar situations. She may use the opportunity to learn how her work might be done better. In these cases, the competent person applies critical thinking when engaged in Decision-Making/ Problem-Solving. Critical thinking is important in the three other primary task areas as well.

The extent and effectiveness of both Action Space and Innovation Capability are functions of personal knowledge and as such, are determined by what the person knows and understands about how to handle related situations, the way she understands them and how far she is willing to go to ascertain that the best decision option is determined. These capabilities are also functions of personal motivation and available resources along with the understanding of the authority and permissions that are delegated by the enterprise. When capabilities are more limited than the scope of the person's work responsibilities they will reduce her operational effectiveness and therefore become constraints on making effective decisions.

## **Decision-Making**

Most situations are sufficiently well known to be handled with decision-making. In these cases people have prior understanding possessed as mental reference models that they use to arrive at a decision option that they can carry out in action.

People use qualitative or fuzzy pattern recognition and metaphoric reasoning to locate and apply the mental reference models that are most similar to the situation at hand. For well-known situations, the mental models are likely to describe routine and concrete tasks and may be operationalized by direct execution. Less known situations will not correspond directly to past ones and mental models – if any exist – may be possessed at higher abstraction levels as scripts, schemata or metaknowledge. In these cases, which are the norm, the new situations are handled – decisions are made – actions are implemented by adapting and operationalizing the reference models that most closely resemble the new conditions.<sup>24</sup> The adaptation and operationalization often requires creativity and may lead to innovation. This, we argue, is an important form of innovation.

## **Problem-Solving**

Many situations require creative Problem-Solving. Situations that are less understood cannot be handled effectively by rapid Decision-Making and Implementation of routine actions. Because these situations are not well known, reference models or patterns for desired actions may not exist and Problem-Solving is required.<sup>25</sup> Good Problem-Solving uses methodological mental models to guide the process and relies on application of critical thinking. For unfamiliar or unknown situations, the models may consist of methodological metaknowledge. In addition, good topic domain knowledge, knowledge of adjacent domains and world knowledge are all needed to support innovation. Lack of either knowledge results in repeated trivial and reactive actions whereas innovative and proactive actions are of greater worth to the enterprise. In difficult situations, Problem-Solving often becomes an iterative process. For example, the decision maker may need to return to the situation to obtain more information to generate a better understanding. During this process, it is frequently found that the situation itself, or the perception of it may be changing, further complicating the Problem-Solving task. The Decision-Making/Problem-Solving

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<sup>24</sup> We are indebted to Argyris & Schön (1974) for introducing their Theories of Action with the view that people have mental maps – mental reference models – with regard to how to act in situations.

<sup>25</sup> See for example Gilhooly (1988) and Schön (1983 & 1987).

tasks largely rely on knowledge in the form of Decision-Making Models and Problem-Solving Models as described below.

### **Implementation and *Execution Capability***

Implementation of decisions is a major problem in enterprises as well as in all walks of life.<sup>26</sup> The expected results from first-class decisions, excellent strategies and good intentions are frequently not realized because they were not implemented appropriately. In many instances good decisions are not implemented as intended because of limited personal or organizational *Execution Capability* which then becomes a constraint.

Once a decision is made or selected, it must be carried out – implemented or executed – since in effective processes, decisions are expected to result in actions. If decisions are not properly acted upon and implemented, Decision-Making becomes a hypothetical exercise of no consequence. The effectiveness of Implementation depends upon the Execution Capability which includes the specific knowledge needed to understand the decision and its intents, general concrete and abstract knowledge of how to implement actions implied by the decision, availability of resources and many other factors. The effective performance of the Implementation task relies on knowledge in the form of Execution Method Models, other types of Intellectual Capital (IC) assets and general resources.<sup>27</sup> In the organizational domain implementation may involve large and complicated efforts that require extensive supports from specialized and competent personnel, systems and other resources.

### **Monitoring and *Governance Competence and Perspectives***

Monitoring is about pursuing desired directions and accountability of actions. The situation-handling process is overseen from start to finish by the executive Monitoring task which obtains regular feedback from Sensemaking, Decision-Making/Problem-Solving and Implementation. Based on values, beliefs, principles, goals and other objectives, Monitoring provides guidance for interpretations, decisions and actions and delivers corrective adjustments to the other tasks when required. It takes into account projection of implications and different perspectives of the results from the other tasks.

The effectiveness of the Monitoring task is limited by the *Governance Competence and Perspectives* capability which provides the ability to assess the performance of the primary tasks and provide corrective adjustments if needed. Whereas Figure 2 makes implicit reference to the kinds of knowledge needed for situation handling, it does not include the meta-monitoring functions that oversee and gauge the performance of all four tasks, including Monitoring itself. Meta-monitoring includes functions that potentially may intervene in, or change the situation-handling process structure or principles. In the same manner as for the other tasks, the Monitoring task relies on model knowledge in the form of “Governance Approach Models” as described below.

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<sup>26</sup> See for example Bossidy & Charan (2002) and Flood *et alia* (2000).

<sup>27</sup> For discussion of intellectual capital see Edvinsson & Malone (1997), Stewart (2002b) and Sveiby (1997).

## **Mental Reference Models**

There are competing theories for how people learn, store, recall and reason with mental models and other knowledge. In this paper we presume that people engage in a combination of model reasoning and deductive/inductive/abductive reasoning.<sup>28</sup> Much personal learning – the building of mental models – takes place in the form of implicit learning when people are not aware that they learn or what they learn. As Cleeremans explains: *“Implicit learning is particularly prevalent when we repeatedly experience the same situation or situations that are similar in some sense. In these cases, we may develop understanding of underlying patterns and other aspects of the material. Even when learning consciously (as when being taught) we are not aware of implicitly developing important insights.”*<sup>29</sup> Similar models are expected for organizational learning as well.<sup>30</sup> We also adopt the operational view that different and distinct short-term and long-term human memory functions serve specific and dedicated purposes.<sup>31</sup> Given these presumptions, the mental models that a person possesses are primarily tacit and are represented in the mind in different ways governed by the person’s learning and thinking style. By mostly being tacit, the models reside in nonconscious long-term memory and are recalled as part of the priming process. For example, as part of Sensemaking, a person receives, structures and organizes information about a situation before making sense of it. Her priming memory employs pattern matching and metaphoric reasoning – mostly nonconsciously – to recall past knowledge of similar and relevant situations, typically in terms of mental reference models. In Sensemaking, we can think of these models as being part of the person’s Situational Awareness. As indicated above, much of our reasoning is qualitative and probabilistic and influenced by our values and biases. This we believe, is the general mechanism by which relevant mental models are recalled for all the sub-tasks associated with this task. Similar mechanisms are employed in Decision-Making/Problem-Solving, Implementation and Monitoring.

For situation-handling, the mental models are used as references to past experiences – hence **mental reference models**. Mental models that refer directly to experiences with past situations may to a large extent be located in episodic memory. Generally, these models are not interpreted as to what they mean. That is, features, mechanisms, principles and implications inherent in these episodic experiences have not been extracted, reflected upon or thought through and therefore are not available in our minds. Meanings are internalized only after having passed through conscious or nonconscious analysis and interpretation. Other mental models whose meanings are interpreted may reside in whole or in part in semantic or procedural memories. Examples of internalization include methodological mental models and educational story models – and other mental models which are interesting in some manner and have been subject to mental analysis. For our purposes, we believe that memory location of mental models and their characteristics are not important although these maps build the bridge to cognitive psychology and may help our understanding. What is important, is that mental models are present and vary in specificity and depth and are used as references for the situation-handling and other mental tasks. It is also important to know that

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<sup>28</sup> Within the discipline of Psychology the debate on how people reason is still an ongoing battle although it appears that most researchers conclude that people employ many different strategies with which to reason. Our view here again is influenced by Argyris and Schön (1974).

<sup>29</sup> Cleeremans (2003).

<sup>30</sup> Argyris & Schön (1996).

<sup>31</sup> See discussion in Wiig (1993).

we can assist people in building mental libraries of reference models by providing them with stories and anecdotes – such as stories that portray concrete and specific situations and stories that illustrate general principles in addition to general education. The degree to which stories and case histories are memorized and internalized are direct functions of how important or interesting they are to the receiver and how often they are repeated. Dull events and stories and stories that illustrate the obvious are not remembered well, although they may continue to reside uninterpreted in episodic memory.

Enterprises also employ reference models as may be implied from the discussion above. Some models are culturally embedded as stories or conventions of “this is the way work is done here” that people share. Others, and perhaps more important, are included in the enterprise’s structural IC in the form of practices, systems and procedures, enterprise policies and the manner in which the enterprise and its work processes are organized.

### **Mental Reference Models Are Stories!**

The importance of stories has long been understood by social scientists and has been the basis for transmitting cultural insights in most societies from beginning of time. From recent cognitive science insights into decision making, there are direct indications that encoded stories have direct relations to many types of mental models on the personal levels. There is also an emerging realization that stories play important roles in capturing, retaining and utilizing operational and theoretical knowledge in business.<sup>32</sup> This realization has significance for many aspects of KM – such as how knowledge is shared among people, how knowledge is acquired and institutionalized, how effective education is performed and how knowledge diagnostics is conducted.

Mental reference models are represented by encoded procedural or cause-and-effect constructs from stories which have been distilled to extract salient features and patterns which then are remembered. It appears that most people find it easier to remember complicated relationships and conditions when they are presented, integrated and structured in the form of stories. The stories provide both a context and a framework. It is more difficult to remember isolated knowledge items such as principles or rules. People may remember personal experiences as static events or as evolving situations – as stories

For the most part, people cannot recall the stories in their memory on demand. Most stories are tacit and normally unavailable to conscious thought. However, given a particular situation, priming memory brings relevant stories to bear, either as conscious thought, or as tacit patterns used to guide automatic actions. We use pattern recognition and other reasoning strategies to recall memories that resemble the situations-at-hand. In this way, people use mentally encoded stories automatically and nonconsciously to handle situations as part of their Situational Awareness, Action Space and Innovation, Execution Capability and Governance Competence.

***Stories, we argue, provide the origin and basic structure of most mental reference models.***

Personal experiences of many kinds are encountered or communicated effectively from one person to another in the form of stories. People use stories to recount how to handle complicated problem situations, take advantage of opportunities, deal with dilemmas, observe moral and

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<sup>32</sup> The importance, roles and nature of stories in business are treated by Denning (2000); Kotter (2002); Ready (2002); Snowden (2000); Solomon (2000) and Wright (2000).

ethical principles, avoid conflicts and many other aspects of business, social and personal life. Stories are also used to communicate how to apply methodologies and practices to deal with a host of small and large challenges including Problem-Solving and Implementation of large projects. As is well known, stories are useful for communication of metaknowledge and metaphors.

People find it easy to use stories to describe concrete situations and events. They still use stories when the point they wish to make is abstract such as when emphasizing the potentially undesirable consequences of an unethical act. People find it much harder to make explicit the general and abstract principles and lessons that underlie the moral or teachings of the story. That step, hard as it is, is often necessary to help recipients identify the general idea and build the intended understanding – the intended knowledge. However, it appears the most effective approach to transfer deep concepts is discussion and dialog about what the story tells.

### **Why Are Stories so Important?**

Much, perhaps most, of what we know is in the form of isolated knowledge elements. In our minds, we often have linked these isolated elements with other knowledge elements. We synthesize to create a weave – a mental model, a story-like construct for a particular context. To serve this purpose, mental models take many forms and may be encoded descriptions of a static scene, a dynamic episode, a complex situation and so on. The importance of stories has significance for many aspects of KM – such as how knowledge is shared among people, how knowledge is acquired and institutionalized, how education is performed and how knowledge diagnostics is conducted.

The importance of being told stories to build personal mental models lies in the fact that synthesis is a creative act. Whereas we may know all the individual knowledge elements that may apply to a situation or context – the principles or theory – it requires complex synthesis and innovation to weave them together to an effective pattern that will be appropriate for some purpose. This is why it so hard for a mechanical engineering graduate who knows all the theoretical principles to design a working machine before she has formed a “story” in her mind of how all the details fit together. It is much easier to receive a story that provides a structure into which the weave can be created for a specific context and purpose and memorized as a pattern. In many societies stories are listened to time and again, the mental models are internalized and become stronger with each repetition – and become part of what is firmly believed.

As an example of a mental model, Alice, an insurance underwriter, is asked to produce an insurance policy quote for a retail business with which she has no prior experience. She knows a great deal about risk analysis techniques, about general business risks and she also has good general knowledge of the retail business. Alice knows all the principles and theory. However, she does not know how the knowledge elements, other mental models and considerations should be applied to the retail business in the particular geographic location. Her coworker has seen a similar case before and tells her a story of how she approached her situation. In relating the story, she also points out that she made misjudgments and tells the reasons for those. As a result, Alice is able to weave together the approach for how to handle the situation – to interpret the business and situational information, build the methodology for analysis, problem-solve the quote and create the proposal details – all performed within the company’s guidelines and intent and to the satisfaction of her own professional judgment.

## ***Situation-Handling Knowledge***

In order to handle situations competently, people need good *topic domain knowledge*, knowledge about job-related tasks, to deal effectively and competently with work. When a person has extensive knowledge, she is able to deal effectively and routinely with many tasks. However, work is not always simple, routine, and repetitive. Most workers need to deal with tasks that can range in complexity from logical extensions and less common variations of routine situations, all the way to unusual challenges outside the scope of their normal jobs.<sup>33</sup> With the increasing job complexity brought about by globalization and general progress, it is difficult to prepare people by providing them with advance topic domain knowledge for every possible situation. Instead, they can be provided with just-in-time knowledge if that is available for the situations with which they need to deal.<sup>34</sup> Another approach is to prepare people to tackle more complex work, first by providing them with abstract script and schema knowledge within the topic domain. Such knowledge becomes more general as the abstraction level increases from operational mental models, to scripts, to schemata, and lastly to general principles. Abstract knowledge of this kind prepares people to handle wide ranges of situations of increasing complexity. A further step is to provide people with teachable metaknowledge, particularly procedural metaknowledge and declarative metaknowledge that allows them to tackle very general situations and problems.

As indicated above, people possess most situation-handling knowledge in the form of mental reference models. Organizations have similar reference models but in the form of structural IC assets. The four types of situation-handling models are:

- **Situation Recognition Models** are used for Sensemaking and provide characterizations of memorized events. Applicable Situation Recognition models are recalled through priming when comparable situations are perceived. People possess large libraries with tens of thousands of Situation Recognition models that incorporate encoded information of situations they have encountered or learned about.

A major problem with Situation Recognition models is that they for the most part represent past experiences or expected circumstances. New, unexpected and important situations may go unrecognized. Organizations may use scenario planning and other methods to develop Situation Recognition models for novel conditions.

- **Decision-Making/Problem-Solving Models.** This mental library of reference models covers a large domain and guides Decision-Making/Problem-Solving. These mental reference models range from quite concrete action models to abstract and metaknowledge models. They include a wide range of abstraction to provide simple rules for handling of routine and well known situations by rote, to procedures for more complex Decision-Making which may need creation of innovative actions, to methodologies for novel Problem-Solving. Selection of which mental models that are called into action depends on the particular level of situation familiarity and understanding that resulted from Sensemaking for the target situation.

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<sup>33</sup> We distinguish between six categories of work complexity:

1. Routine Situations (simple, repetitive, and well understood situations);
2. Logical but less common variations (transformations) of Routine Situations;
3. Complex, yet expected extensions of routines integrated with external factors;
4. Unexpected challenges (conditions), but with a mix of routines and external factors;
5. Totally unexpected situations and non-routine challenges, yet within the larger job scope;
6. Unusual challenges outside job scope.

<sup>34</sup> See Davenport & Glaser (2002).

The mental reference models for Decision-Making/Problem-Solving, particularly for more complex situations, are often broad and abstract. Good decisions require broad perspectives including assessments of potential implications and therefore must deal with uncertainties and approximate (fuzzy) reasoning.

- **Execution Method Models** are used for Implementation and provide guides to implement the desired action generated by Decision-Making/Problem-Solving. Many Execution Method models are complicated and take into account trade-offs between available resources and decision objectives. Some also include aspects for how to deal with constraints of different kinds. All seem to provide dynamic perspectives on the evolving Implementation process.

Mental reference models for effective Implementation are in general more detailed and less abstract than those for Decision-Making/Problem-Solving. In part, this is caused by needs to pay attention to details to ascertain that the decisions are executed appropriately. Another aspect points to the goal-oriented mindset required for successful Implementation, particularly on the organizational level, where implementers need to control progress, motivate team members, run interference and secure resources and replan when required.

- **Governance Approach Models** are used for Monitoring and provide both principles and guides for evaluating the situation-handling progress. These models contain goals and objectives for the particular situation that is handled. They also contain expectations and meta-methods for performing Sensemaking, Decision-Making/Problem-Solving and Implementation of desired actions. Beyond this, we also find meta-monitoring models that govern the monitoring process itself. One example is how a person reflects and learns from handling situations. For people, Governance Approach models may primarily be tacit understandings of what is expected and allowed and which consequences are acceptable

### Examples of Approaches to Develop Mental Models

There are many important approaches to help people build mental model libraries. Examples include:

- **Knowledge Sharing by Storytelling** has always been part of individual and societal transfer and sharing of concepts, principles, judgments, beliefs, traditions and other insights. Stories are also used to communicate operational and methodological knowledge. Industry and business storytelling is part of everyday knowledge sharing among collaborators, Communities-of-Practice and most other parties. Whereas the stories themselves may be explicit and part of structural IC assets, effective storytelling allows listeners to internalize messages and build personal mental models of value for future considerations and actions.<sup>35</sup>
- **Aircraft Simulators** allow pilots to learn to handle a wide variety of challenges. Repeated exposure to both routine and unexpected situations lets pilots internalize – and to some extent automatize – mental models for how to handle the diversity of situations. For pilots the tacit automaticity is important for competence since many demanding flight events happen quickly and cannot be handled consciously. Also, by handling events nonconsciously and automatically reduces the mental burden on conscious working memory which may be needed for other purposes during problem events.
- **Business Simulations** are important tools to assist managers, supervisors and line personnel gain insights into how to handle various business situations that they may encounter. Business operations at every level is challenging and always a question of exercising critical thinking,

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<sup>35</sup> See Denning (2000); Kotter (2002); Ready (2002); Snowden (2000); Solomon (2000) and Wright (2000).

integrative skills and making well-judged trade-offs between multiple objectives. Everybody recognizes these requirements for senior managements. However, to a surprising extent, it is also requirements for assembly workers, cafeteria personnel and the company's sanitation people.

Developing the mental models needed for integrative and objectives trade-off considerations and actions is considered hard and low priority and often neglected with the result that workers – particularly at lower levels of the enterprise – are often ineffective. Whereas people may know the details, they lack the integrating mental models. We find that targeted and simple business and operations simulations and games prove to be ideal learning environments to remedy these problem.

- **Apprenticing, Learning-on-the-Job and Shadowing** have been well established over the centuries to help people build competence for specific jobs. That the resulting competence rests on libraries of mental models have not been understood until recently. By being part of the daily and varied operations over long periods of time and being able to absorb, internalize, explore and perform work themselves, they build extensive and directly applicable mental models. However, they may only be prepared to deal with business-as-usual, since their experience mostly relates to past and present practices. At times, people who learn on-the-job will mainly build knowledge of “that is the way it is” and have limited understanding of the underlying mechanisms making them vulnerable when confronted with novel challenges.

One aspect of learning-on-the-job involves a coach who shows a apprentice how to perform a task and then lets the apprentice perform the same task herself. In this process, the apprentice internalizes the procedure as an operational mental model, often tacitly.

- **e-Learning** has become an important tool for education. It is ubiquitously available anywhere and anytime and at relatively low costs. When the e-based material is complemented with human coaching, retention is reported to very good. e-learning systems are effective tools for building mental models when they include case stories, topic-focused games and simulations. In addition, they also need to provide basic supporting knowledge elements such as concepts, principles, methods and facts.

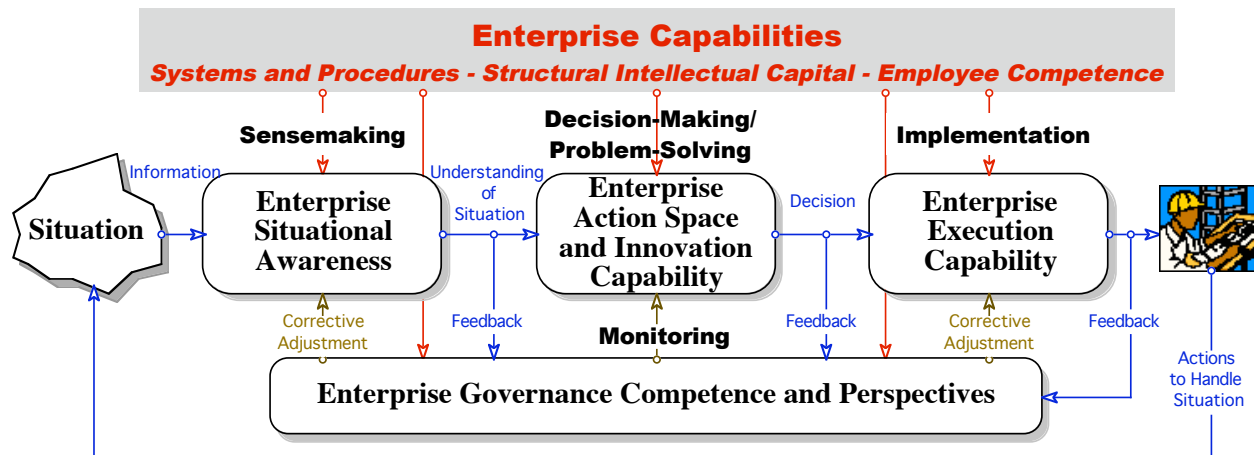
When teaching with stories, simulations or games it is important that recipients have sufficient backgrounds to understand the particulars and significance that are communicated. For example, in business simulations, before a person can benefit from a realistic scenario that asks her to operate a company in a competitive environment, she needs to possess rudimentary understanding of accounting, taxation, marketing, etc. The better the knowledge is in the details of business, the more she will benefit from the simulation. A large number of detailed general business processes, principles and facts can be taught with stories, games and simulations. Examples include balance sheets, taxation considerations, accounting procedures, production management, personnel management, customer relations and logistics, just to name a few. Stories can also be used to teach highly specific tasks such as maintenance and diagnostics of specialized equipment.

## ***Enterprise Situation-Handling***

From a systems perspective, enterprises have situation-handling and organizational capabilities that are similar to those on the personal level. To achieve their objectives effectively, enterprises rely upon their employees personal knowledge and structural IC assets. For most organizations, departments and business processes, we can use the situation-handling model as the framework to identify the functions that perform the four primary tasks.

The enterprise situation-handling primary tasks are similar to those of personal situation-handling as we indicate in Figure 5. However, their functional characteristics and underlying mechanisms are different. Although complicated, they are regularly open to observation and analysis. To a large extent, the enterprise capabilities are determined by the organization's employees' personal proficiencies. However, they also are shaped by structural resources such as systems, procedures, operational and managerial practices, organizational structure, availability of structural knowledge and quality of information at the point-of-action. These resources are partly possessed by individuals but also delivered through structural IC. Other factors such as managerial and enterprise attention and priorities influence the ability of the enterprise to act appropriately and effectively in many situations.<sup>36</sup>

The view of organizational situation-handling in this framework provides an important tool for knowledge diagnostics, one of the least understood aspects of knowledge management. By identifying the requirements for the major tasks to handle specific situations and challenges, one can quickly understand strengths and weaknesses in the different functions of the Enterprise Situational Awareness, Enterprise Action Space and Innovation Capability, Enterprise Execution Capability and Enterprise Governance Competence and Perspectives. Such insights also provides vehicles for understanding knowledge- and resource-related problems and opportunities. The situation-handling model provides important support for organizational knowledge diagnostics by providing functional structure, definition of elements and identification of tasks and variables.



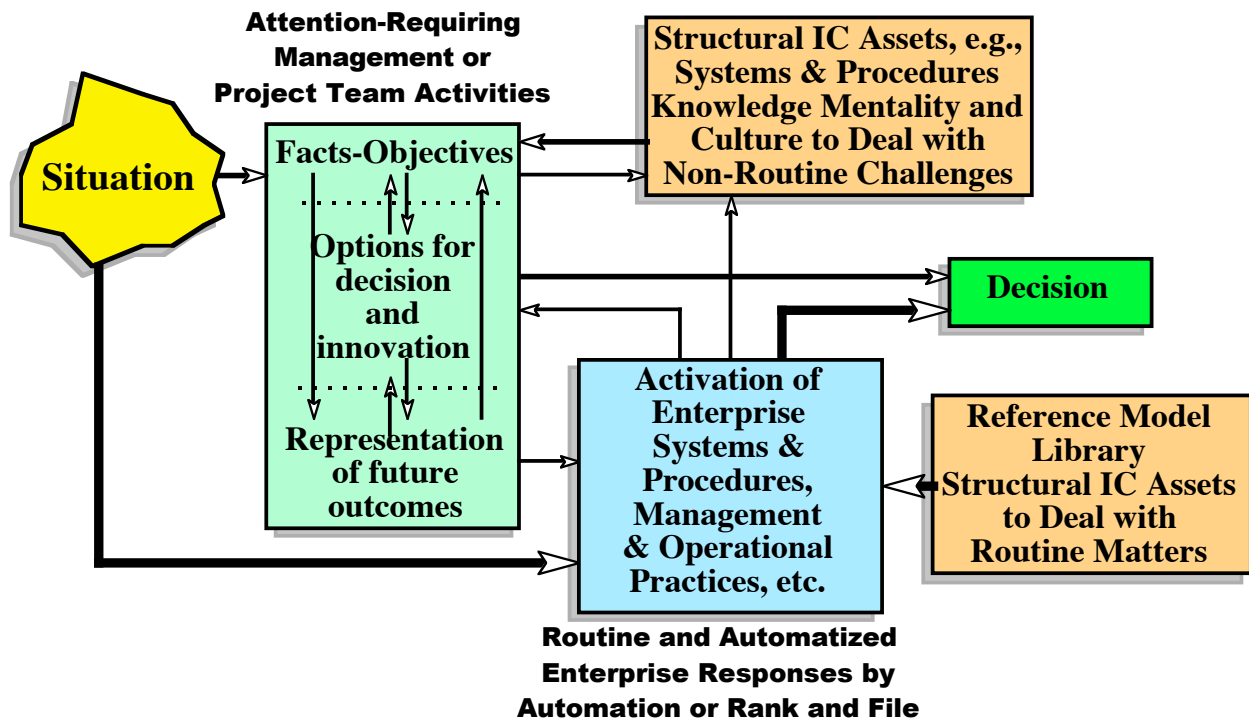
**Figure 5. Organizational Situation-Handling Depends on the Enterprise's Capabilities.**

In the enterprise, routine situations – day-to-day business operations such as manufacturing, payroll, financial transactions or basic order fulfillment – are handled automatically or by people who work with the systems and procedures, within the organizational structure and according to the manner in which work is organized. All these mechanisms are designed to handle work effectively and efficiently to fulfill enterprise objectives. In reality, most of these mechanisms bear little resemblance to the mental mechanisms in people. However, from a more abstract systems perspective, they perform functions that are quite similar to the personal case. For decision making this is illustrated in Figure 6. Instead of knowledge and mental models, the

<sup>36</sup> Davenport & Beck (2001).

enterprise draws upon general capabilities like employee competence and behaviors, structural IC and the embedded capabilities in systems and procedures.

Situation information, we emphasize, is very different from reference models and other knowledge assets. Effective situation-handling requires good personal and structural IC assets and good information about situations. Hence, effective information management becomes an important aspect of the enterprise's ability to act effectively in both routine and complex situations. This particularly becomes of importance for dealing with unexpected events where the need for comprehensive information may be required to understand the situation appropriately.<sup>37</sup>

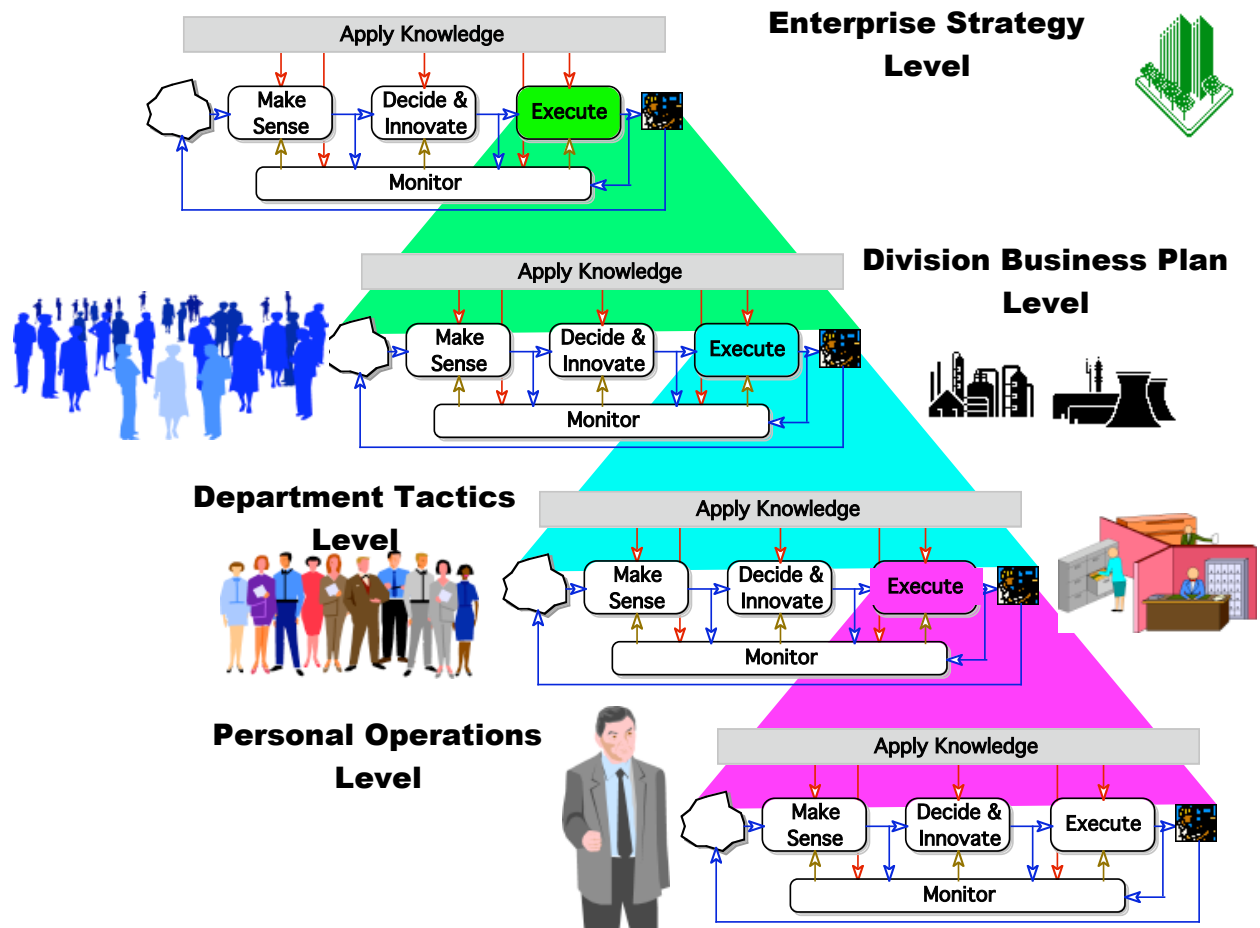


Adapted from Bechara et al., Science 28 Feb, 1997

**Figure 6. In the Abstract, Enterprise Decision-Making Is Similar to the Personal Domain. Simple Work May Be Automated or Tackled with Routine Procedures by Rank and File. Unfamiliar or More Complex Work Needs Problem-Solving, Often by Project Teams.**

In any enterprise, situation-handling occurs on many levels. Top managements need to handle competitive, regulatory and strategic situations, often quite aggregated without opportunities to deal with implementation in detail. Normally, implementation – execution – of the desired actions must be delegated to lower organizational echelons. A four level delegation of implementation is depicted in Figure 7. From this perspective, delegation of decision implementation results in a whole new situation that must be interpreted, decided upon, and implemented while monitored throughout. The effectiveness of execution becomes a function of available knowledge and other capabilities. In addition, it also becomes a function of how well the upper level decision is communicated and understood by the lower echelons.

<sup>37</sup> It has often been found that experts often require little, but selective information to handle situations while people dealing with unfamiliar situations, such as novices, require a much larger complement of information to handle it.



**Figure 7. Enterprise Situation-Handling Takes Place on Many Levels.**

In unexpected, less known and more complex situations, enterprise situation-handling becomes increasingly ad-hoc. Under these conditions Sensemaking is particularly important and requires thinking of the unexpected – “thinking outside the box.” Many enterprises are caught off guard as a result of misunderstanding situations and misinterpreting perceived consequences. Their Situational Awareness has been limited – the enterprise’s reference models and the mental reference models of its employees have been limited – and therefore have become constraints in ways that lead to problems. Along the same lines, when enterprise management teams are faced with difficult situations that fall beyond their previous experiences – such as accidents or management failures – they may immediately execute self-preserving responses based on human reflex models instead of engaging in proactive Problem-Solving that examine implications from broader perspectives. Also, in many enterprises the information management function lacks the means, or have not been designed, to deal with issues beyond the expected. As a result, in these cases, the enterprise’s intelligence assets lack the capabilities to deal with unanticipated challenges, hence leaving the enterprise vulnerable.

The effective communication of concepts and intents – bridging of purpose – from one person or functional entity to another is an area of concern in most enterprises. There are many examples of

these problems as indicated by Bossidy & Charan.<sup>38</sup> After a decision is made, the implementation team or department – at the same organizational level as the decision maker or at a lower level – often do not fully understand the concepts or other underlying intents behind the decision. As a result, execution effectiveness suffers.

### ***What Does It All Mean?***

Initially, many ask: “Why is the situation-handling model important? Which valuable insights does it provide? Why should we be concerned with such level of detail?” There are many answers to these questions, all having to do with being able to improve the effectiveness of people and whole organizations. Whereas this paper is cast from the perspectives of KM, the situation-handling model pertains to most people-focused, organizational and technology-based action-oriented systems, be they simple and small or complex and large. From a systems perspective the model is a variant of a regulatory feedback system. The model – as all models – is a simplification. It does not depict specialized processes, many feedback loops and other functional pathways associated with learning, innovation, dealing with uncertainty or evolving situations although some aspects of these are mentioned.

The situation-handling model depicts the Sensemaking to action Implementation process to the best of our current understanding. It treats the process from a particular perspective in a simplified and aggregated fashion that leaves room for other interpretations. Many premises included in this model are still under investigation by the scientific community and may well revise our understanding and thinking.

### **Why is the Situation-Handling Model Important?**

The primary importance of the model is that it outlines the structure of the situation-handling process from beginning to final action. The model incorporates understanding from recent research and practical experiences. It also incorporates the role of stories for equipping people and organizations to become proficient and by tying the integrative effects of stories to the building of mental models and structural IC assets. In addition, the model provides a framework for analyzing and synthesizing personal and organizational action-oriented processes.

Many of today’s business problems are knowledge-related. So are many of today’s and tomorrow’s business opportunities. Unfortunately, there is a shortage of insights into knowledge-related processes and mechanisms that affect business performance with the result that many problems are unrecognized and many opportunities are missed. The situation-handling model provides an easily explainable framework to understand knowledge-based action-oriented activities that are of direct importance for business.

### **Which Valuable Insights Does the Situation-Handling Model Provide?**

The model explains the nature of action-oriented functional operations and partitions the process into four primary tasks. It explains the general resource requirements, operations and limitations of these tasks from the knowledge perspective. In its focus on knowledge, it identifies in the

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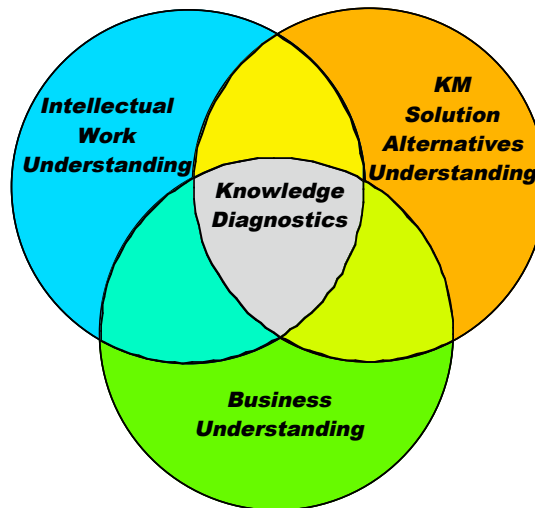
<sup>38</sup> Bossidy & Charan (2002).

aggregate the nature and roles of personal mental models and organizational reference models for performing the primary tasks.

The situation-handling model becomes a vehicle to provide everyone within the organization with a general insight into the roles of personal and structural IC assets for delivering competent work. Such widely distributed insights is key in organizations that pursue knowledge vigilance and build knowledge-aware intangible assets management mentality among its employees. Such mentality creates a knowledge-friendly culture and fosters collaboration and IC assets focus in planning and daily operations. The model integrates understanding from several fields into a single structure. It borrows from Cognitive Sciences, Management Theory and Science, Information Technology and Management and Social Sciences.

### **Why Should We Be Concerned with Such Level of Detail?**

When analyzing causal effects behind operating and other business problems, the understanding of the underlying factors and how to deal with them is directly dependent upon the depth of insights into situation-handling mechanisms. We believe that competent knowledge diagnostics requires considerable expertise about the details of knowledge-related processes. The situation-handling model provides important support for organizational knowledge diagnostics by providing functional structure, definition and identification of the main process tasks and variables. As indicated in Figure 8, the model supports knowledge diagnostics by providing specific comprehension of intellectual work understanding with additional insights into KM solutions.



**Figure 8. Knowledge Diagnostics Requires Combined Insights into Intellectual Work Mechanisms, Knowledge-Related Solution Alternatives and Business Processes.**

A new generation of KM systematically and deliberately provides understanding, knowledge and empowerment of individuals and enterprise departments alike. Understanding the mechanisms that are made explicit by situation-handling models provide significant insights. By analyzing activities within the enterprise, its work functions, personnel capabilities and competence from the perspectives of the situation-handling framework, it is possible to utilize KM techniques (tools, practices and initiatives) to improve the enterprise's effectiveness. It is possible to improve knowledge diagnostics, practical knowledge transfer by for example learning on-the-

job and focus on communicating with stories in addition to asking people to memorize facts and principles. It is important to secure availability of pertinent knowledge at the point-of-action and just-in-time, provide synthesis of effective knowledge-related efforts and foster new practices, to name a few.

The limitations that employees and organizations may experience in the four primary task capabilities constitute important practical issues in any organization. Fortunately, many limiting factors in personal situation-handling can be alleviated by increasing employees' task and general knowledge. Of particular importance are the personal understanding of enterprise goals and insights into how they, as individuals, benefit in the short- and long-term from working effectively.

Organizational situation-handling can be enhanced by building structural IC assets in many different forms within the enterprise. Experiences indicate that action-oriented enterprise policies and practices increase both personal and enterprise Action Space and Innovations and Execution Capabilities resulting in improved business performance. When guidelines and policies are flexible and people understand the desired enterprise direction, they pursue enterprise intents to greater degrees by innovating and adjusting actions to fit circumstances. With such understanding, employees truly participate to implement enterprise strategy through their ability and motivation to act effectively.

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