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Changing organizational culture with scenario planning

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Abstract

This paper explores scenario planning as a tool to help change organizational culture. Changing the culture of the organization to adapt to changes in the environment is an important concern for most organizations—yet this change is often reactive. The authors present scenario planning as a proactive tool for developing alternative, possible cultures as an initial step toward effecting change. The following describes and clarifies the relationships between scenario planning and the cultural framework, along with research suggestions to determine the validity of this argument.

1. Changing organizational culture with scenario planning

A dynamic, adaptable, and vital organization is essential for survival. Scenario planning is one tool, among others, with great potential to develop these qualities in organizations. The attributes of an organization that successfully foster a dynamic, adaptable, and vital nature are often linked to deeper assumptions in the form of beliefs and values. Studies of organization culture and sensemaking assume a logical connection between norms, beliefs, and values and consequent actions. Organizations act on the basis of their beliefs. And there is evidence that members of an organization, as well as people in general, generally act in congruence with underlying norms, beliefs, and values [1,2]. These underlying norms, beliefs, and values are some of the building blocks of organizational culture and Schein

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refers to them as components of basic assumptions. Basic assumptions of an organization's culture emerge from the history and experiences of individuals and groups in an organizational context. While there are several definitions of organizational culture, a common thread includes a set of underlying assumptions and beliefs governing how individuals should act in a specific context [1,3–5].

When individuals act as members of organizations, they often base their action on the shared understanding of the organization's norms, beliefs, and values—a form of shared mental model. A logical connection links the idea of organizational culture to shared understanding or cognition of norms, beliefs, and values relevant to the organization. Thus, the value of understanding shared cognition when it is equated with organizational culture increases the value of understanding how organizational culture influences the actions of organizational members. Organizational culture has been a more rigorously studied phenomenon than shared cognition or shared mental models and this article will provide an argument for promoting organizational change through a change in the shared mental models of the organization (e.g., changing the underlying beliefs, values, and norms).

2. Problem statement and theoretical framework

In a review of the culture change literature, Sathe and Davidson [6] describe two levels of change—superficial and deep. Superficial change supports change initiatives through the compliance of members. Extrinsic incentives and disincentives drive compliance, as well as a need for self-preservation. Deep change involves modifying the underlying beliefs and values of the organization's members. Authors disagree about the ability of change agents to change deeply-held beliefs and values, but it is thought that they are malleable if exposed and examined [6]. Change agents encounter obstacles to organization change in the form of inertia and resistance. This assumes that mental models are extremely difficult to change and only levels of superficial change are possible [1]. The shared mental models of the organization are more difficult to change when the change effort works narrowly at the individual level or broadly tries to promote change without addressing individual-level models. Weick and Roberts [7] recognized this dilemma when they stated, "the preoccupation with individual cognition has left organizational theorists ill-equipped to do much more with the so-called cognitive revolution than apply it to organizational concerns, one brain at a time" (p. 358). The problem is as follows: *Efforts to change the culture of the organization based on shifting the mental models of a few key individuals are likely to result in failure.* Thus, this paper explores the idea of shared mental models underpinning organizational culture and describes how scenario planning may alter these models leading to altered organizational culture.

First, we define and discuss organizational culture as shared mental models of the organization and its environment. The argument is that in organizations, shared mental models influence and are influenced by the culture of the organization. Scenario planning is a means for making explicit the mental models supporting organizational reasoning and action. Once made explicit, these models can be challenged and alternatives developed. Thus, scenario planning is posited as a tool for changing organizational culture. The limitations of this view are discussed and the paper suggests future research and conclusions for analyzing this potential connection.

3. Culture in organizations

A complicated phenomenon to be sure, the concept of organizational culture has been borrowed largely from anthropology and applied in management studies and organizational sciences. There is no consensus in either discipline about exactly what the term culture indicates, however, Smircich [8], from an organizational perspective, defines culture as the social "glue" that holds an organization together. Social ideals, beliefs, and values are shared through culture and appear as myths, rituals, stories, and specialized language (p. 344).

Schein [1] defined culture as "A pattern of shared basic assumptions that the group learned, as it solved its problems of external adaptation and internal integration, … as the correct way to perceive, think, and feel in relation to those problems" (p. 12). In general, scholars agree that organizational culture includes the norms, beliefs, and values of the group regarding correct reasoning and action toward any given problem.

Culture is both a set of data (values, ideals, beliefs, and experiences) and the processes governing the interpretation of that data [9]. These informational databases, along with a set of control processes comprise the shared mental models related to an organization's culture. They are also the shared mental models that perpetuate the cultural process. Because of this interconnectivity between the shared mental models and culture, it is plausible that any changes to the shared mental models of the organization could begin to change the culture of the organization.

Smircich [8] identified five core intersections of culture theory and organization theory. These were, (1) cross-cultural or comparative management, (2) corporate culture as systemic relationships, (3) organizational cognition, (4) organizational symbolism, and (5) unconscious processes and organization. Even though the details and foci of each perspective are different, the common thread is the notion of culture built upon the attributes of group sharedness and assumptions about how the world works.

Overall, the purpose of organizational culture is to guide the actions of the individuals in the organization toward a more successful relationship with their environment. Current thinking considers culture as a process, in addition to an attribute of the organization [9]. As a process, culture sets the rules and boundaries of the organization's ability to adapt. As long as this process successfully affects adaptation, the culture is successful. If the point comes that the organization cannot adapt successfully because the culture is restrictive, the organization is unsuccessful. To ensure that the organization successfully adapts to the environment, the culture of the organization must allow itself to overcome its inherent constraints. Scenario planning is one method to help an organization overcome the trap of a restrictive culture.

4. Mental models

Mental model theory (MMT) initially developed as an explanation of human thinking whereby people deduce inferences about a situation. Legrenzi and Girotto [10] analyzed two common phenomena predicted by MMT—the tendency to focus on the initial model of a situation and the difficulties of reasoning and making choices under uncertainty. In the first condition, individuals often fail to consider alternative models in their reasoning thereby perpetuating the same deductive inferences about causality. MMT predicts the focusing effect that narrows the decision field to one, or very few, models of a situation.

The problem arises because a single model only affords a person an abridged set of information presented in a singular manner. MMT also presents a solution in the form of un-focusing the process. Un-focusing is the process of making alternative models explicit and aware.

Mental models include the biases, beliefs, experiences and values of individuals and are constantly interacting with patterns of perception, thought, and action. Further, as a result of action and learning, mental models may evolve, leading to a different way of understanding and acting in the world. In short, mental models affect experience and are affected by experience. The general concept of mental models is widespread in the literature though agreement on precise definitions and constructs is lacking. At the conceptual level, most researchers agree that mental models are cognitive structures representing knowledge. Mental models are simplified structures that help individuals acquire, process and respond to information more efficiently. These models explain how the mind structures information and knowledge [11]. Rouse and Morris [12] described the purpose of mental models as a framework for explaining and predicting future situations, and thus a guide for action.

Researchers have generally studied mental models as factors in strategic decision-making and the performance of individuals, groups and teams [11]. There are both differences and similarities between these two streams of research. For the purposes of changing organizational culture, both directions are important and scenario planning could affect the decisions defining future directions of the organization and the implementation of new direction throughout the organization. A change in direction fosters a change in culture.

Allee [13] stated that mental models are "important cornerstones for building knowledge and defining some of the cognitive processes that support change and learning" (p. 11). Originally introduced by Forrester [14], mental models are the lenses through which we see the world. Mental models incorporate our biases, values, learning, experiences and beliefs about how the world works. Senge [15] defined mental models as "deeply ingrained assumptions, generalizations, or even pictures or images that influence how we understand the world and how we take action. Very often, we are not consciously aware of our mental models or the effects they have on our behavior" (p. 8).

Doyle and Ford [16] explored the concept of mental models in detail: "Mental models are thus the stock in trade of research and practice in system dynamics: they are the 'product' that modelers take from students and clients, disassemble, and reconfigure, add to, subtract from, and return with value added" (p. 4). After providing a comprehensive literature review of the terms from both the systems dynamics and cognitive psychological perspectives, and some discussion in *Systems Dynamics Review*, Doyle and Ford [16] eventually offered the following revised definition of mental models: "A mental model of a dynamic system is a relatively enduring and accessible, but limited, internal conceptual representation of an external system (historical, existing or projected) whose structure is analogous to the perceived structure of that system" (p. 414). Further, Weick [17–19] has argued consistently that mental models guide, shape, and provide the basis on which individuals interpret and make sense of organizational life.

The cognitive psychology literature focuses on mental representations. Representations refer to the way humans build "stand-ins" for reality in their minds. "One of the functions of representations is to stand in for things outside the system; once a system has

representations, it can operate on them and not need the world'' [20] (p. 297). The concept of representation can best be introduced by considering that the mind and brain are involved in ''coordinating the behavior of an organism in its environment'' [20] (p. 297). In order to coordinate such behavior, an organism must create some working understanding of its environment and it does so by constructing a mental representation, or model of that environment [21].

Freyd [22] suggested that mental representations are also dynamic. That is ''perceivers are sensitive to implicit dynamic information even when they are not able to observe real-time changes'' [22] (p. 427). The significance of Freyd's [22] research is its suggestion that the human mind is itself anticipatory in its perception and construction of events. That is, the human mind naturally anticipates possible future sequences of actions (scenarios) based on immediate perceptions.

4.1. Shared mental models

Van der Heijden [23] has advocated the idea of shared mental models and he incorporated the idea into a model of what he termed a strategic conversation. ''An effective strategic conversation must incorporate a wide range of initially unstructured thoughts and views, and out of this create shared interpretations of the world in which the majority of the individual insights can find a logical place'' (p. 42). The strategic conversation creates the organizational dialog through which individuals can reveal, analyze, share, and reconstruct their mental models, thus opening their minds to consider new possibilities. ''If action is based on planning on the basis of a mental model, then institutional action must be based on a shared mental model. Only through a process of conversation can elements of observation and thought be structured and embedded in the accepted and shared organizational theories-in-use'' (p. 41).

Using scenarios to alter mental models for the purpose of strategic learning is one way in which scenarios and scenario planning provide new insights and different ways of seeing the world such that knowledge about implicit processes and functions can be shared and challenged. Another key feature in scenarios and scenario planning regarding the transfer of tacit, implicit knowledge is in their aim to uncover the structure within which actions take place.

Drawing from the work of Asch [24], Weick and Roberts [7] outlined four defining properties of group performance, namely, (1) individuals create the social forces of group life when they act as if there were such forces, (2) when people act as if such social forces exist, they construct their actions within a system of joint interactions, (3) actions constructed within this system in fact, create a system of joint interactions, and finally, (4) the effects of these interrelated activities vary as a function ''of the style as well as the strength with which the activities are tied together'' (p. 364). In essence, this system can be thought of as a group fulfilling prophecy. That is, individuals perceiving a system of interrelated thought and activity will act in a manner that promotes further interrelated thought and activity, such that eventually, this interrelated thought and activity becomes the shared model of reality—it is created and co-created by the people involved.

The essence of the argument presented by Weick and Roberts [7] is that individuals who perceive a system of interrelated thought and activity, and therefore act in a manner that perpetuates such interrelated thought and activity that it becomes reality, in fact constitute and create organizational culture itself.

5. Scenario planning

Scenarios are narrative stories that follow particular paths into the future based on research, trends, and the key concerns of the managers who will use them. "Scenario planning is a disciplined method for imagining possible futures that companies have applied to a great range of issues. Royal Dutch/Shell has used scenarios since the early 1970s as part of a process for generating and evaluating strategic options" [25] (p. 25).

The use of scenario planning in organizations has exploded since Royal Dutch/Shell's reported success in using scenarios to avoid the impacts of the oil crises in the 1970s and 1980s. More recent applications of scenario planning have expanded to include urban planning [26], healthcare [27], and small businesses [28]. Non-profit and governmental agencies have also started to take note of the benefits of scenario planning [29]. One of the key espoused outputs of any scenario planning project is a change in the individual mental models of the participants. The rigorous application of scenario planning allows individuals to construct alternative futures and to examine the beliefs and values that support or contest those futures.

Changing culture in an organization is a large-system intervention. The field of organization development offers several methods for planning and implementing large-system interventions (e.g., search conference, open space technology, conference model, work out, real time strategic change or RTSC). These interventions are usually employed in reaction to an environmental jolt or internal crisis [30]. A more proactive perspective to these methods could employ scenario planning to challenge current perceptions of the environment or organization through the examination of future states in which current organization beliefs and values (culture) become less effective.

Culture is one of the design components of organizations. It is one of the components used to process environmental inputs into effective outputs. It seems plausible that if the organization can adapt more effectively to changes coming from the environment, then it can be more effective at processing changed inputs. Anticipating changes or enacting changes is a strength of scenario planning. Changes in the inputs usually necessitate changes to the organizational components. Anticipating change allows the organization to change components in anticipation of changes—rather than in reaction to changes.

5.1. The scenario planning process

This section details the scenario planning process according to Schwartz [31]. This process includes 8 steps, namely, (1) identify the issue, (2) identify key factors, (3) research driving forces, (4) rank key factors and driving forces, (5) develop scenario logics, (6) develop scenario details, (7) consider implications and (8) identify indicators. Each step is described with the aim of providing a general framework.

Identify the issue: The importance of identifying the key issue or decision in practical business situations seems obvious and clear. But a lack of articulating the key issue or decision has resulted in problems or failure in the scenario process.

Identify key factors: Key factors are the result of interviews with a cross-section of people within the organization. Interviews are designed to elicit the strategic organizational agenda of executives and managers. Often, line workers and others in the organization are

interviewed to get additional perspective. Remarkable people (experts in various disciplines completely unrelated to the issue under examination) are also often used to foster new thinking.

Research driving forces: Driving forces are "the elements that move the plot of a scenario, that determine the story's outcome, the motive, the things that influence the outcomes of events" [31] (p. 15). These driving forces are identified through research external to the organization. These forces might include things like population demographics, social trends, or new and innovative technologies.

Rank key factors and driving forces: In this step, scenario planners work with members of the organization to rank the key factors and driving forces in terms of their importance and potential impact on the organization. The primary issues are then ranked again according to (1) uncertainty and (2) potential impact.

Develop scenario logics: The results of the ranking exercise are placed on two axes along which the eventual scenarios will differ. The development and selection of the general scenario logics according to the matrix resulting from the ranking exercise provides the basic plot or defining situation for each scenario. The logic of a given scenario will be characterized by its location in the matrix. "It is more like playing with a set of issues until you have reshaped and regrouped them in such a way that a logic emerges and a story can be told" [31] (p. 172).

Develop scenario details: Step six, fleshing out the scenarios, returns to steps two and three. Each key factor and driving force is given attention and manipulated within the matrix developed in the scenario logics of step four. Plausibility should be constantly checked from this point, for example, "if two scenarios differ over protectionist or non-protectionist policies, it makes intuitive sense to put a high inflation rate with the protectionist scenario and a low inflation rate with the non-protectionist scenario" [31] (p. 178). Implausible scenarios accomplish little in the minds of organization decision-makers because they are simply not believable or relevant to the issue under examination.

Each scenario, once developed in detail, can be thought of as a theory about the future. Moving forward in the scenario planning process required the investigation of current decision-making and action in light of each of the scenarios developed. Thus, at this point, the scenario *construction* process is complete. The remaining steps consider the robustness of varying organizational courses of action.

Consider implications: Step seven examines the implications of the developed scenarios. The initial issue or decision is "wind tunneled" through the scenarios. It is important to examine the robustness of each scenario through questions such as: Does the decision look good across only one or two scenarios? What vulnerabilities have been revealed? Does a specific scenario require a high-risk, bet-the-farm strategy?

Identify indicators: The final step is to select "leading indicators" that will signify that actual events may be unfolding according to a developed scenario. Once the scenarios have been developed, it's worth spending some time selecting identifiers that will assist planners in monitoring the course of unfolding events and how they might impact the organization [31].

6. Integrating scenarios and organizational culture

The use of scenarios in promoting alternative models of interrelated thought and activity among teams in organizations seems obvious, but a satisfying discussion of exactly how

this transpires is missing from the scenario literature. We know that scenario planning requires close interaction, debate, dialog, and challenging one's assumptions as well as those of others. So, how can this process alter the shared mental models governing the organization?

A comparison of definitions alone should be enough to convince management scholars of the link between collective mind and organizational culture. While this article has illustrated the dominant views of culture, clearly there are some variations between the intricacies of shared mental models and culture in its broadest sense. However, each of these views has implications for the impact and importance of the notion of culture in today's organizations. At this point it is logical to consider the varying roles that scenario planning might play in the culture and shared mental models of an organization.

Scenario planning, as a form of simulation, may run parallel to the existing cultural context of the organization. It is a method to figure out the actions, beliefs, and knowledge required in a new cultural context without disrupting the existing context. Change in the existing cultural context occurs when the learning acquired in the planning context is introduced into the existing cultural context [9].

Resting on the view that culture is a structure of specific and unique knowledge, the organizational cognition view is gaining credibility as a general view of complex organizations. The work of Morecroft [32–34] suggests that a view of organizations themselves as direct products of the people and thinking of which they are comprised is an effective way of looking at them. From the cognitive perspective, in order to change the culture of the organization, the thinking (mental models) that creates the organization must be changed. By introducing new forms of knowledge and new ways of thinking, the structure of the organization's culture begins to change.

Good scenarios are rooted in the deepest concerns of the managers who will use them [35,36] and thereby incorporate symbols of things of utmost importance to those making decisions about the future direction of the organization. Well-written scenarios will also incorporate symbols of importance to the organization into the plots and storylines that carry the organization into various plausible futures. For example, the scenarios constructed for Royal Dutch/Shell in the 1970s centered on different decisions and policies that OPEC might have enforced according to various factors in the oil market. OPEC itself was a symbol of great importance to the managers at Shell, as its policies had direct and sometimes drastic implications for the company.

Effective scenarios are focused and analytically detailed for relevance to the business. In addition, they must resonate with managers and executives. Assumptions are often unconscious understandings of the world and in its effort to uncover and challenge these assumptions, scenario planning may drive changes in the culture of the organization.

Many scenario planning practitioners will call scenario planning more of an art than a science and perhaps by this statement they are referring to some kind of unwritten and unexplored aspect of good scenarios that appeal to some unconscious aspect of managers' minds. However, currently this is all speculation. An area for fruitful and interesting—albeit complex and difficult—research from the post-modern view of culture in organizations is gaining attention, although methods for harnessing and exploring this view go against its very nature.

7. Summary

From the preceding discussion of culture and mental models, one can see the relationship between the shared mental models of the organization and the culture of the organization. Therefore, it seems logical that affecting change in the shared mental models of the organization will affect change in the culture.

The advantage of scenario planning is its ability to facilitate cultural adaptation and change in organizations by facilitating change in the shared mental models of the organization. Scenario planning facilitates self-analysis and challenges an organization's shared assumptions, beliefs, and values. We believe it is advantageous for members of an organization to engage tools that foster reflection, challenge to the status quo, and adaptation. For organizations to grow and remain vital in their environments, members must anticipate changing conditions and effectively adapt from within.

It is vital that organizations perceive their cultures as an important factor moderating their ability to adapt and succeed. Any tools that foster consideration of the influence of organizational culture on the ability to adapt to changing conditions are valuable to the ongoing vitality of the organization. Thus, the culmination of the argument presented in this article is that scenario planning is a tool for affecting change in organizational culture by way of facilitating the reconstruction of shared mental models that govern the reasoning and actions of the organization.

8. Research suggestions

Attempts have been made to raise the level of awareness of the underlying assumptions operating in organizations for the purpose of analysis and change. Typically these efforts focus on only half of the process we have discussed above—either they focus on the surfacing assumptions or developing alternative courses of action. We propose combining these two in an attempt to systematically analyze the mental models operating in the organization and systematically develop alternatives to those models. One possibility is explained below.

Carley and Palmquist [37] offered a computer-driven method for extracting, representing, and analyzing mental models based on four core components, namely, (1) concepts (2) relationships, (3) statements and (4) maps. In this view, mental models are networks of concepts and the relationships between them. The method presented by Carley and Palmquist requires texts as its primary form of data for analysis; thus, interviews must be transcribed into textual format.

Terminology: Presented here are some terms utilized by Carley and Palmquist in their four-step method of mental model extraction:

1. Concepts—"Concepts are nothing more than symbols which have meanings dependent on their use, i.e., their relationship to other symbols" [37] (p. 607).
2. Relationships—Relationships tie two concepts together. "The relationship can have directionality, strength, sign and meaning" [37] (p. 607).
3. Statements—Statements simply involve two concepts and the relationship between them. "if it rains then the sun will not shine" is an example offered by Carley and Palmquist [37] (p. 608).
4. Maps—Simply stated: "a map is a network formed from statements" [37] (p. 608).

The four-step process of mental model extraction: The four steps proposed by Carley and Palmquist [37] are as follows: (1) identify the set of concepts that will be used in coding the texts (2) define the relationships that exist between and among the concepts (3) use a computer assisted approach for coding the texts as statements using concepts and relationships and (4) construct the resultant map graphically and analyze it statistically. Essentially, the computer software asks the researcher to define the concepts, relationships, and to form statements. The software analyzes the texts according to the specifications set by defining the concepts, relationships, and statements. The software then compiles a graphic interrelationship map and also has the capacity to output specific statistics about the data.

The method of extracting mental models offered by Carley and Palmquist [37] is a highly quantitative approach that uses computer driven analysis of transcribed interviews and texts to provide a general map of the mental models in use according to specifications set by the researcher. While this approach has been successful in some situations, it overlooks the critical step of developing alternative models (scenarios) that effectively challenge the status quo. A more narrative approach to revealing, analyzing, challenging, and reconstructing mental models is suggested through the use of scenarios and scenario planning.

A very basic study might use one of several culture surveys, pre- and post-scenario planning to determine if there are culture changes that could be attributed to the scenario planning intervention. A study such as this used in conjunction with a pre- and post-assessment of mental models might provide enough evidence to warrant more focused and more complex forms of inquiry.

9. Conclusions and implications

This article has attempted to conceptually explain how scenario planning might be used as an aid for culture change in organizations. Based on an argument that organizational culture can be thought of as the collective contributions of individual mental models, this article has further explored some dominant views of culture and considered the role of scenario planning and the individual mental model according to each of those views. While no definitive conclusions can be drawn at this point, it seems that the conceptual linkage of using the notion of individual mental models to describe and explain organizational culture may have merit.

The proposed research studies would contribute to a better understanding of the validity of this view and may aid in the overall understanding of organizational culture itself. Considering the benefit of such an understanding, this research seems worthwhile and potentially quite fruitful. Further, with the use and popularity of scenario planning on the rise, if this approach were found valid and reliable, the abilities of managers to have a more direct input into the culture of their organizations could be greatly improved.

Finally, further understanding of the importance of deeply-held beliefs and assumptions that govern organizational reasoning and activity is necessary to achieving more successful change initiatives. Recognizing the power of underlying assumptions and systematically challenging these assumptions is critical to foster an adaptive, vital organization. Of the tools available for surfacing and challenging assumptions, it seems that scenario planning offers a highly feasible and effective process for organizational renewal.

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