cognitive map

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Cognitive maps can be defined as mental images and concepts that are built to visualize and assimilate information. They are also referred to as mental maps, mind maps, schemata, and frames of reference. They act as tools for strategists to move beyond the constraints of short-term memory and to process information spanning long periods of time.

The mind creates spatial concepts in order to make sense of incoming information. The process organizes complex information into manageable portions. It simplifies knowledge, increases memory, and improves cognition where cognition is understood to be the mental act or process by which knowledge is acquired, including perception, intuition, and reasoning.

The advantage of cognitive mapping as a fundamental mental process is that it acts as a coping mechanism under conditions of uncertainty. It is also essential in environments where strategic decisions are made in rapidly shifting economic environments. For example, a manager's perception of an organization may be visualized in terms of division leaders, regional locations, product departments, or their relative power levels within the hierarchy. The four distinct elements provide an anchor around which the understanding of the mental map of the organizational structure revolves.

Visualization, the act of organizing information in visual spaces, is applied to both spatial and nonspatial tasks. The cognition of product design would involve spatial processing. The method is applied equally effectively for nonvisual tasks, such as memorizing lists, code, names, and other textual information.

Memorizing speeches, for example, often requires cognitive mapping of the subject. One of the earliest recorded forms of cognitive mapping was used by the Roman philosopher and orator Cicero, who used mnemonics to bind his speeches around vivid mental images. The "method of loci" or mental anchoring is traceable to students of rhetoric in antiquity. More recent feats of memory involve a mnemonic technique called the memory palace, where the learner visualizes an object representing the different words in a long list, in prememorized locations, visualized in rooms or boxes. The learner perceives the memorized locations and walks through them mentally, detecting the objects located there during the memorization phase.

Perception of the Strategic Environment

Strategists may review their business environment by creating cognitive maps, which act as tools to process knowledge. These mind maps are frameworks that are shaped mainly from personal experience. They tend to influence the method employed by executives to transform data into information and to make strategic inferences.

Executives develop cognitive maps of their commercial environment through observing and interacting with others within the industry, through industry publications, training, seminars, and conferences. The collection of information about the industry, through work experience and deliberate research, results in a mental model of the industry's structure and an understanding of what it takes to succeed in this environment.

Executives may follow a grounded theory approach with no preconceived hypothesis, whereby an understanding of a business issue or phenomenon is based on information rather than preestablished hypothesis. With this method, strategists allow data to shape their mental processes and develop their existing perspectives. This mode of processing tends to be less common and less natural. It requires executives to ignore intuition, which was formed by earlier cognitive mapping.

Cognitive Mapping through System 1 and System 2 Thinking

Cognitive science applies cognitive task analysis (CTA) to comprehend the underlying processes of cognitive maps in strategic management and to provide an understanding of how mental skills and strategies work. CTA provides information to understand the thought processes of managerial strategists who want to apply lessons learned from efficient models of decision-making and to avoid decision errors.

Wiley Encyclopedia of Management, edited by Professor Sir Cary L Cooper.

Two types of mental processes are employed to build cognitive maps. System 1 thinking is rapid, intuitive, instinctive, and automatic. System 2 thinking is slow, conscious, analytical, and deliberate.

Traditionally, the field of psychology that deals with cognitive mapping considered the brain as logical, premeditated, and calculated, as characterized by System 2 thinking. It has focused on observing complex intelligent behavior, which manifests itself in strategic behavior. Cognitive science applies this approach to understand managerial psychology, to comprehend managers' intentions, to construct mental models of how they process strategic knowledge and to build a description of how managers think in business environments.

The faster, intuitive System 1 thinking provides an alternative understanding of how cognitive maps are constructed by individuals, groups, and industries. It is applied automatically by the human mind in time-pressured scenarios and situations when information is limited. Most complex markets, industries, and economies are characterized by bounded rationality or bounded access to perfect information. Intuition allows an executive to rapidly access information, knowledge, and memories and to link atypical events with possible causes, stored in the brain through experience, preprogrammed instinct, or training. Intuitive decision-making, although complex, is fast, automatic, and incisive. It scans a wide breadth of data without going into depth and detail. Personal experiences and judgmental anchors provide a rationale for intuitive decisions.

When strategists develop cognitive maps, they are often bounded by System 1 thinking. At other times, System 2 thinking may become activated and conscious thinking intervenes. There are interesting overlaps and interactions between rational incremental thinking and iterative intuitive thinking. The process gives rise to agreement and disagreement that is often the basis of negotiating cognitive maps developed by groups of industry participants or "cognitive communities."

Cognitive Communities

Research on cognitive communities shows that there is a difference between what has traditionally been defined as an objective environment and how top management perceives the world around it.

Top management takes decisions based on the cognitive maps it has constructed for its industry, which in turn has direct effects on strategy reformulation and subsequent industry structure. Strategic decisions are based on intuitive and cognitive constructs of the managers' cognitive community.

A cognitive community could, therefore, extend the boundaries of individual rationality by pooling existing information and cognitions. Active interactions, mutual influence, evidence of collective efforts, and information sharing widen the boundaries of perception and improve the chances of more factual cognitive maps.

Strategists and managers share their perspectives on the industry. The decision makers' cognitive maps and strategic outlook provide the foundations for a common frame of mind that would influence how an industry evolves and develops. The mental models of managers in individual firms help to sustain the traditional competitive structure of this industry. The sharing of these mental maps makes up the norms or the formula for doing business. Shared beliefs establish the identity of individual firms and help to create a stable transactional network in which the actions of rivals can be interpreted.

In cognitive communities, top management has some external reference points, guidelines, and anchors that influence its decision-making. The reference points change because sense making is a continuous process that evolves with its environment.

Cognitive maps do not always reflect reality and are influenced by bias or lack of information. The existence and persistence of mental maps might lead individuals to ignore contradictory data. They may not reflect evidence from a changing world. Cognitive structures are also based on incomplete knowledge and even the simplest inferences are frequently biased. Individual and collective cognitive maps within an industry can be indifferent to significant economic indicators and market signals during a time when an industry is changing. Cognitive inertia, unless reexamined by regular reviews of incoming information that refresh the strategists' understanding of the business

environment, can lead to the decline of the business.

See also *benchmarking*; *PEST analysis*; *psychological foundations of strategic management*; *strategic decision making*; *strategic drift*; *SWOT analysis*

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