

Project SL. No. (2). Study of Business System Environmental Factor of 'Communication' contributing to Uncertainty.

Framework

Emerging global, distributed business structures for competitive advantage and access to bigger markets are formulating business information systems as networked, computerized information systems that see "data" as raw material, "processing" as the system function and "data product" or "information" as processed data used to trigger information use (decision making stage included). Such networked, computerized information system is characterized by (a) computing processes that include microcomputer and telecommunication and (b) pre- and post-processing stage communication channels at various data/information processing nodes, that are people based and include data communication and transaction processing networks with world-wide reach.

Such decentralized structure of IS facilitates organizations and individuals to work with shared data environments and with capture, communication, use and control of growing, complex and diversified volumes of data and information. This brings in the Communication factor where "communication" stands for movement (transfer) of data/information across space and time. At a detailed level, Communication factor operating within and across enterprise is influenced by requirements of: languages, distance, protocols, transmission, receipt, signal to noise ratio, verifiability, medium, confirmation, asynchronous and synchronous communication, acknowledgement, etc (Communication Dimension). And it is this Communication factor that also provides a chance for error introduction in IS leading to inaccurate, inconsistent and unreliable information.

To begin with unlike long distance voice communication and conventional radio broadcast, data communication content and performance are affected by inherent signal interference, usually referred to as communication noise; thereby generating uncertainty in the business information environment and introducing errors in data/information transmitted. Other causes affecting telecommunication and thereby introducing uncertainty in the enterprise information leading to errors in information transmitted, relate to physical structure of telecommunication and to logical aspects of the data communication process itself. Specifically, causes relating to physical structure of telecommunication pertain to factors of electromagnetic signal radiation, circuit switching deficiencies such as cross talk between circuits and the failure of mechanical or electronic components of the switch itself, and any interruption in the electric power supply used by the switching facility.

As regards to causes relating logical aspects of data communication, they include failure of the software used in either data communication network management or in data communication itself, and the size and inherent complexity of the network being used. In this regard, seen particularly from the view point of the logical aspects of the data communication, the Net is a mixed blessing: It's business culture values speed over quality in software development. Further, on the Net, the world is interconnected. Vulnerabilities to software errors thus multiply geometrically; as do the damages and costs. In addition to this, communication channel also suffers from problems of theft of service and circuit tapping, acts of sabotage, incidents of

accidental destruction and of effects of adverse weather and water caused damage; giving rise to uncertainty in information environment and introducing errors in IS.

As regards to communication factor there is yet another aspect, and it concerns human-IS interfaces that exist all through business enterprise system operations including at the decision making stage. Specifically, cognition is communication, determined by the quantitative and qualitative nature of an individual's cognitive status. This communication takes place at the interface of the individual and the physical and social environment. And as amply explained earlier, the very nature of the cognitive process gives rise to inaccurate and imprecise information resulting in uncertainty in information environment of the enterprise.

To elaborate further, cognition can be conceived of as an information processing system consisting of three stages: INPUT (intake of information, including sensory perception),

————→ PROCESSING (integration and storage of information in accessible form, including memory and planning) —————→ OUTPUT (language, expression and action). Although these three stages do succeed each other, there is no simple unilinear sequence. Each stage influences the two others, and feedback loops of information connect all three. There exists an interrelatedness between these stages that results in the whole system becoming affected when any of the stages is damaged. Cognitive process undertakes cognitive functions. Cognitive functions can be defined as all those processes that allow persons to obtain, integrate, and retain information about themselves, other people, and the environment and that enable them to share this information and act on it.

Figure (2.1) illustrates these concepts. As can be seen from the figure, the INPUT stage contains the cognitive function of perception, mediated by the sense organs. The PROCESSING stage contains the cognitive functions of memory, attention and concentration, logical thinking, problem solving, and planning. The OUTPUT stage contains language functions, expression, and action. For the purpose of simplicity, only the most important cognitive functions are mentioned here. In this figure, interrelatedness and interdependence of the cognitive system's three stages is shown by indicating the feedback loops (see dotted lines) that exist between them. The figure also shows that the exchange of information between the individual and the environment (and the later includes both the internal environment of the human body and the external, or social environment) takes place in both the INPUT and the OUTPUT stages.

The three stages of the cognitive system interact as follows: The INPUT is determined by the INTEGRITY of the incoming information. Thus this stage depends on the status of the sense organs, the sensory perception, which permits the person to become aware of the available information; that is, the incoming information must be received. Without adequate attention and concentration, however, the incoming information may not be noticed. Further, the information must be recognized. Attention and concentration are cognitive functions belonging to the PROCESSING stage, as is memory, a cognitive function (influenced by previous experience and education) that makes recognition

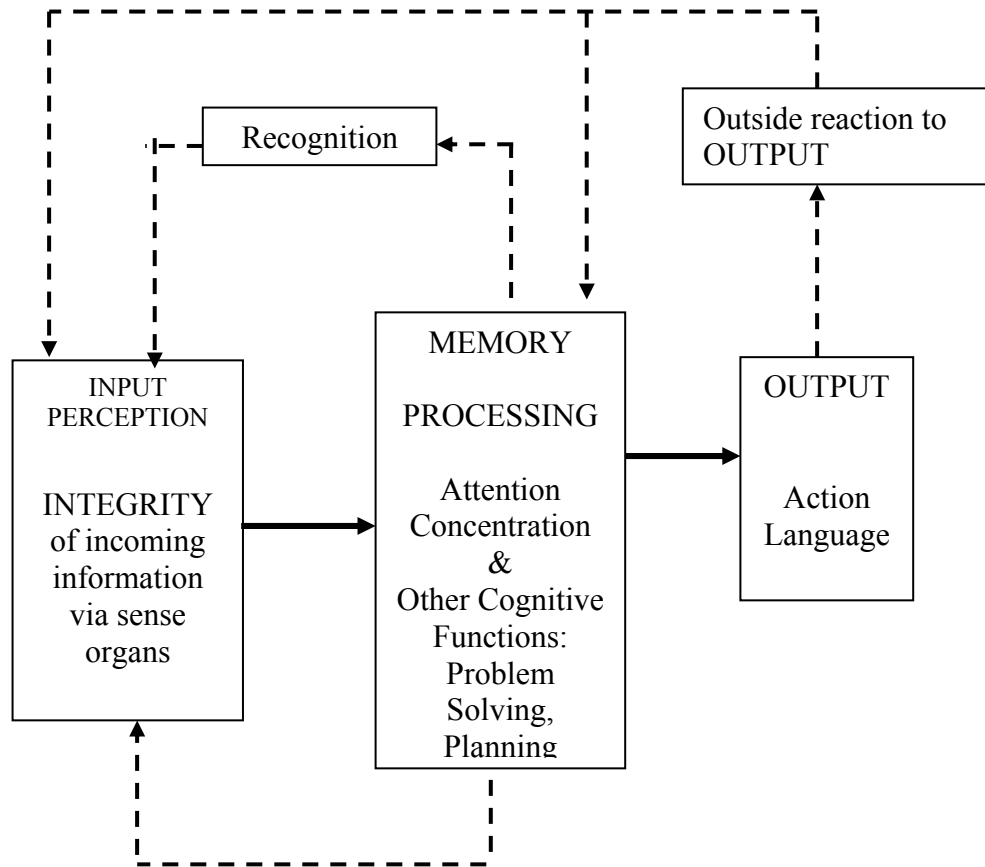


Figure (2.1) : Systems view of three stages of Cognitive process and functions

possible. Recognition is needed in order to make sense of the incoming information. However, during this interpretation of incoming information, misconceptions can occur.

Specifically, the process of making sense of what is being observed is often ruled by the partly unconscious search for patterns and the tendency to favor the obvious and the familiar. On this basis, a person forms a set of premises that lead to further interpretations, and that will become the starting point of the analytical, step-by-step process of problem solving that follows. De Bono calls this the “vertical thinking process” acknowledges its essential, analytical nature. However, he warns that the results can only be as good as the premises from which this process derives. In view of this, he advocates a retraining of the thought processes, especially perception, in “lateral thinking”.

In lateral thinking, alternative ways of looking at available information are systematically tried out, and the more obvious and the familiar explanations for what is being observed are routinely questioned or challenged. This way premises themselves are being questioned, unproductive routines can be discarded, and creative approaches to the problems at hand might suggest themselves. Addressing problems as an interdisciplinary team should encourage lateral thinking, because each participating discipline has a chance to challenge the thinking patterns of the other disciplines.

The PROCESSING stage influences not only the INPUT stage but also the OUTPUT stage. Its planning and problem solving components lead to action, and language – generating functions make verbal communication possible. Thus, the individual can interact with the external environment. The OUTPUT stage itself feeds back information to both the PROCESSING stage and the INPUT stage as follows: The response from the outside world to the INTEGRITY of a person's OUTPUT (i.e. OUTPUT INTEGRITY) reflects the ways in which this person is being perceived by others. Such person will notice and interpret this reaction, which may then determine how future contact with the external environment will be handled. For instance, people may avoid as too burdensome the output information decision suggested in the form of action. A very sensitive person notices this avoidance and may interpret it as his or her information decision being judged as unworthy of implementation. The person may therefore withdraw from future communication for any action.

It is possibilities as these which can influence the integrity of future cognitive processing, as also the possibilities of poor input integrity due to incorrect sensing of incoming information and poor processing integrity due to errors in interpretation of information, that then render data/information cognitively processed inaccurate, inconsistent and unreliable. In the face of Communication factor, for the reasons given above, business information environment is characterized by uncertainty thereby giving rise to errors in business process IS as it processes inaccurate, inconsistent and unreliable information.

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