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Toward Synthesis And Practical Guidelines

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ABSTRACT

This thesis is a doorway towards understanding the similarities and the differences between the human brain and the organizations. I chose to use the human brain in attempting to improve the organizational structure, because the brain is the only complex and the at the same time efficient vehicle known. It is responsible for various functions essential to human life – from breathing to making complex decisions. Through the exploration of the human brain's structure as well its functions; one may realize what it takes to establish a successful organization. I try to emphasize the importance of a given entity's structure, that is, structure is the first and foremost step guiding any entity towards triumph, whether it is the human brain or an organization. This thesis attempts to present a new method through which today's organizations may be viewed. Namely, comparing and contrasting organizations to the human brain, provides one with a better understanding of how to improve the structure of organizations to ensure effective and efficient decision making by management. In turn, this will result in successful organizations with satisfied stakeholders and the elimination of self-serving management.

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Chapter 1 – Introduction and Rationale

One might agree that one of the most complex and at the same time fascinating structures are the human brain and an organization. Both consist of structures and units responsible for their effective performance. It is interesting to compare and contrast them in order to see the differences not easily detected unless they are carefully observed and analyzed. There are numerous works of literature dedicated to describing and explaining the human brain and organizations in general, but there is dearth of research indicating the link between the two.

In order to better understand how to improve organizational structure and therefore improve the efficiency of its functions, one must compare and contrast organizations to the human brain. At first, it sounds rather strange, but after careful examination and proof, one will understand that the organizations are more similar to the brain than initially thought and those similarities may be used by today's executives to develop a winning strategy towards achieving their goals, which can be accomplished by becoming more "brain-like".

One should consider several research questions, such as:

- How similar and different are the human brain and the organizations?

- What does it take to be an exceptional leader and therefore direct a successful organization?

- Should organizations become more brain-like in order to ensure their effectiveness as well as efficiency? If yes, why and how?

Chapter 2 – Literature Review

It has been demonstrated numerous times that structure can determine whether or not an entity will succeed or fail. Structure determines how well-managed are the units of an entity and whether or not there is enough communication between the units to ensure success. Namely, any successful entity must have specific units responsible for certain tasks, such units must be correctly grouped together, and they must be able to freely communicate with one another. This, in turn, will enable management to make proper decisions and ensure successful achievement of goals.

This thesis presents two structures: a business structure and the human brain. One might agree that without proper organization, these two structures will not be able to function successfully and efficiently. Businesses are able to thrive in a changing environment, because managers are able to change the organizational structure as needed. Similarly, throughout the years, as the human beings evolved physically, the structure of the brain went through major changes as well, thus, facilitating the adaptation process in the environment. Although the brain is not equipped with the flexibility of a business, for example, "restructuring" – being able to alter the organizational structure, it is powerful enough to control various critical processes per second without our awareness.

The purpose of this chapter is therefore twofold, to discuss major literature streams of particular relevance to the research questions described in Chapter 1. First, I will present four different conceptualizations of organizational structure that can be used to facilitate reconciliation with those of the brain. Second, I will examine corresponding features of the brain which in turn can be related back to organizational structure. Finally, I will review existing work that has directly considered this nexus.

Organizational Structure

There are four perspectives of an organization's structure which I contend are useful in bridging the gap in understanding organizational structure and improvement via analyzing the human brain's structure. They are: Information Processing Perspective, Design Perspective, Social Network Perspective, and Contingency Perspective.

Information Processing Perspective:

In order to acquaint one with the concept of what an organization is, one must understand that there are three assumptions made regarding organizations. According to the *Information Processing Perspective*, the three working assumptions are: 1. "Organizations are open social systems which must cope with environmental and organizationally based uncertainty; 2. Organizational structure must perform the major functions of facilitating the collection of information from external areas as well as permitting effective processing of information within and between subunits which makeup the organization; 3. The basic unit of analysis will be the subunit; the basic structural problem is to design subunits and relations between subunits capable of dealing with information processing requirements faced during task execution" (Tushman and Nadler 615). When interpreting whether or not an organizational structure is effective, one must first depict the entity in terms of these three assumptions and whether or not they are adequately implemented and addressed.

It is imperative for any organization to be an open social system, since in order to be successful, the firm must be able to effectively intake new information from the outside as well as inside environments and address any changes that must take place accordingly. In addition, an organization must be well structured to allow proper communication between its units and

subunits. This in turn would enable it to effectively process the information as a whole, as well as take necessary steps to distribute it accordingly between the units so that those units will implement new guidelines and take required actions as needed based on the processed information. Furthermore, an organization must be comprised of units and subunits. This would permit the entity to differentiate itself by achieving economies of scale, specialization, and, therefore, improving the efficiency of the firm. Furthermore, the units must have varying degrees of independence as well as interdependence in order to ensure the health of the organization and creative functioning.

Social Network Perspective:

According to the *Social Network Perspective*, organizations consist of social units with relatively stable patterns of relationships over time (Tichy, Tushman, Fombrun 509). Namely, an organization is viewed as a system of objects joined together through direct and indirect relationships of its units and subunits. The stable patterns of relationships between those units assist management in evaluating their performance and making changes accordingly.   This feature of organizations enables one to analyze and ensure that each unit fulfills its responsibility by contributing to the overall success of the organization as well as assess the need of restructuring.

Design Perspective:

In order to create a successful organizational arrangement in a business, there are a number of challenges to overcome. Namely, one must be able "to choose the right extent of vertical and horizontal differentiation; to strike an appropriate balance between differentiation

and integration and use appropriate integrating mechanisms; to strike an appropriate balance between the centralization and decentralization of decision-making authority; strike an appropriate balance between standardization and mutual adjustment by using the right amounts of formalization and socialization" (Jones 124).

When management determines the organizational structure, they must take into consideration two different types of differentiation, that is, vertical and horizontal differentiation. Vertical differentiation is referred to its hierarchy of authority, namely, how reporting relationships are structured between the management and the organization's employees. Horizontal differentiation describes actions taken by management to group organizational tasks into roles and subunits (Jones 102). While vertical differentiation enables the organization to establish a line of authority to enhance effective management, horizontal differentiation allows the organization to function more efficiently by creating roles and subunits, each having a certain function and task to complete. In an organization the extent of differentiation is determined by the complexity of the structure itself. More complex structures require greater differentiation in order to be more efficient, specifically; there is a positive relationship between the complexity of a structure and the total differentiation needed.

Although differentiation is a means of dividing an organization into groups for more effective management, integration is a way of facilitating communication and coordination between the groups created due to differentiation. Despite the fact that each group performs only the task it can perform the best for efficiency purposes, integration is essential in uniting all of the groups so that they will still work for the common goal of the organization for effectiveness purposes. It is vital to find the correct balance between differentiation and integration in order to

be an effective leader, the more differentiated an organization; the more integration is needed to ensure effective coordination of activities.

One might agree that it is important for management to be able to determine the right balance between centralization and decentralization. Centralization is needed when the environment is more stable and top level managers are able to make important decisions concerning the organization overall. On the other hand, decentralization is desirable when there is uncertainty about the organization's environment and top management must focus on the company's long term goals and set up winning strategies, while they can delegate every day decision making to lower level management.

Moreover, it is critical for management to ensure that the organizational culture is healthy by striking the right balance between standardization and mutual adjustment through formalization and socialization. Formalization is referred to the use of written rules and procedures to standardize operations. On the other hand, socialization is referred to the process by which organizational members learn the norms of an organization and internalize the unwritten rules of conduct. Both formalization and socialization enable employees better understand the culture of the organization. This, in turn facilitates the processes of standardizing employee behavior to ensure the ongoing success and at the same time encouraging mutual adjustment, namely, allowing employees to look for better and more creative ways of achieving organizational goals.

Contingency Perspective:

Studies by Tom Burns and G. M. Stalker indicate that an organization needs different types of structure depending on the present situation. Namely, the two types are Mechanistic

structure and Organic structure. Specifically, the studies indicate that organizations with Organic structure perform better in an unstable environment, that is, having a complex structure, high differentiation, high integration, mutual adjustment, and most importantly decentralized decision making (Jones 121), enables them function more freely and exchange ideas more productively. On the other hand, a Mechanistic structure utilizes simple structure, low differentiation, low integration, standardization, and centralized decision making which is usually necessary during certain times to maintain an entity's well-being.

TABLE 2-1:

Major Conceptualizations of Organizational Structure

Perspectives	Description
A. Information Processing	1. Organizations are open social systems 2. Proper collection and analysis of information 3. Design units and subunits
B. Social Network	1. Organizations consist of social units 2. These units display stable patterns of relationships
C. Design	1. Differentiation vs. Integration 2. Centralization vs. Decentralization 3. Standardization vs. Mutual Adjustment
D. Contingency	1. Mechanistic Structure vs. Organic Structure 2. Fit with Environment

The Human Brain

The human brain is the most fascinating and probably the most complex structure in the known universe.   About 100,000 years ago, today's human brain has formed weighing approximately 3 pounds and consisting of millions of neurons. The human brain can be divided into roughly three separate parts:

1. <u>Brain Stem</u> – relay station connecting much of the body (via the spinal cord) to the cerebrum. It is considered to be a "primitive" structure of the brain. Together with the Thalamus, the Brain Stem controls wakefulness, attentiveness, and sleep pattern. The Brain Stem consists of the Midbrain which is responsible for ocular motion, Pons are responsible for eye and facial movements, facial sensation, hearing, and balance, and Medulla Oblongata is responsible for breathing, blood pressure, heart rhythms, and swallowing.

2. <u>Midbrain</u> – this structure is part of the limbic system which lies above the brain stem and under the cortex and consists of the Thalamus which is the relay station for pain sensations and alertness, Hypothalamus which is responsible for controlling the Pituitary Gland and thus hormone secretion, eating behavior, sexual behavior, sleeping and body temperature, Hippocampus is responsible for memory formation, Amygdala is responsible for emotional or affective behaviors and feelings (e.g. fear, anger).

3. <u>Forebrain</u> – consists of the Cerebrum: Frontal Lobe: the primary motor cortex of the frontal lobe controls movement of the body parts, the prefrontal cortex plays an important part in memory, concentration, temper, intelligence, and personality, the premotor cortex guides the eye and head movements and sense of orientation, Broca's area is important in language production, Occipital Lobe contains the visual cortex, which aids in the

recognition of visual objects, Temporal Lobes: contains the auditory cortex that receives

signals from the ear, Wernicke's area is important for language and speech, Parietal

Lobes coordinates signals received from other brain regions to interpret sensory signals

(http://w3.aces.uiuc.edu/AnSci/BSE/Human_CNS_structure_function.htm).
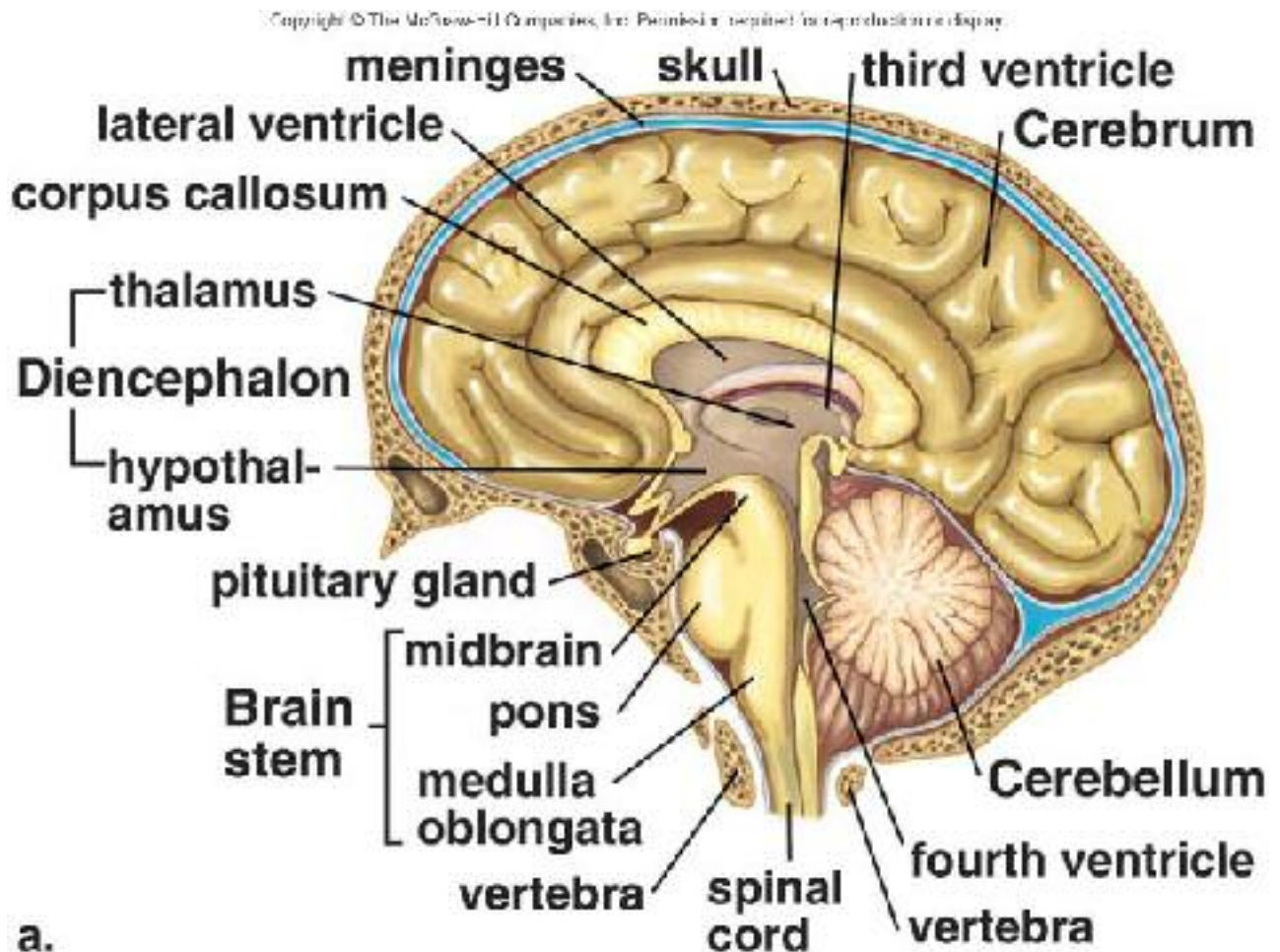

Figure 2.1

Nexus of Organizations' Structure and the Human Brain

The preceding discussion suggests several areas of potential overlap between the understanding of organizational structure and the human brain. Notwithstanding, an examination of multiple databases in the Organizational, Psychological, etc. literatures failed to uncover any studies that directly considered and linked the human brain AND organizations, namely describing the similarities and differences between them, drawing conclusions about the subject matter, and making recommendations as to how an organization may improve and progress more successfully. Therefore, it is imperative to establish the beginning of the research of such a topic, in order for one to become a better leader and drive organizations towards continued success. In an attempt to partly address this gap, the following sections will provide an understanding about how to improve organizational structure utilizing the human brain as a model. Namely, I will demonstrate the similarities and the differences between the human brain and the organizations, present real-world examples, and explain how an organization can become more "brain-like", that is, adopt brain-like functions and avoid brain illnesses.

Chapter 3 – Model and Hypotheses

This chapter will present the similarities and differences apparent between organizations and the human brain. The discussion will include a combination of various organizational structures' perspectives as well as the structure of the human brain. Although the organizational and human brain structures are physically different, theoretically they are very similar, since they work towards achieving goals successfully, whether it is for the organizational or human well-being.

Similarities between Organizations' and the Human Brain

One might agree that the human brain is very similar to organizations. For example, the human brain is an open social system; it requires proper collection and analysis of information; and it is comprised of units and subunits that perform unique functions. Furthermore, the human brain consists of units with stable patterns of relationships which enable it to function properly and efficiently. Additionally, the human brain is a well-balanced structure in terms of differentiation and integration; centralization and decentralization; standardization and mutual adjustment.

Organizations and the human brain can be classified as similar structures, because both can be analyzed in terms of the *Information – Processing Perspective of Organizational Structure*. Namely, organizations and the human brain must be open social systems, that is, both must scan their environment and be prepared to respond to any significant changes accordingly. This in turn would enable them to be better equipped with necessary information for survival. Additionally, both must properly collect and store vital information following the examination

process of the environments. Moreover, both structures must be divided into units and subunits so that task allocation will take place and specialization will be achieved, thus ensuring efficiency. In organizations, various departments are developed to monitor the changing environment, while in the human brain, the spinal cord acts as the link that brings in new and important information to the brain.

Hypothesis 1a: Organizations and Brains are mechanisms for information-processing.

Organizations and the human brain are comprised of units with stable patterns of relationships. This enables the structures to achieve cohesiveness as well as realization of expectations, namely expect stability of actions taken by such units when the need arises. This contributes to the overall success of the organization and the brain. One example demonstrating the importance of such a relationship would be the proper communication skills developed and used in organizations, while in the human brain this function is performed by neurons. According to Joseph Ledoux's *The Synaptic Self,* neurons found in the human brain are connected through synapses which enable the communication process between any two and more neurons. Consequently, transfer of information takes place in the human brain through the efficient performance of neurons.

Hypothesis 1b: Organizations and Brains are networks.

Organizations and the human brain consist of varying degrees of differentiation and integration. It is necessary, because although each unit's task is different and vital, the units must also be integrated to achieve cohesiveness and therefore act on the organizations' and the brain's behalf. Differentiation is achieved in organizations via dividing tasks into departments,

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while in the brain, it is apparent via various brain structures. Integration is achieved through sharing the common vision of an organization and acting towards achieving organizational betterment. The human brain reaches integration by making sure each brain structure accomplishes its own task successfully and communicates the results to other parts, thus achieving the well-being of the individual.

Hypothesis 1c: Organizations and Brains are designed with varying degrees of differentiation and integration, centralization, and formalization.

Both organizations and the human brain display mechanistic and organic characteristics depending on the situation and the problems that must be addressed.   Mechanistic characteristics are present when the environment is more stable and each unit carries out the specific task assigned. This feature ensures uniform completion of the task. On the other hand, they both exhibit organic characteristics when they operate in an unstable environment. In the following scenario, they delegate important tasks to specific units in order to achieve overall success.

Hypothesis 1d: Organizations and Brains have both mechanistic and organic characteristics.

Differences between Organizations' Structure and the Human Brain

Although the human brain has many similarities when compared to an organization, it also has a few differences. One might agree that the human brain cannot be very flexible but it is able to become an organic or a mechanistic structure according to the environmental changes that surround the human brain effectively. On the other hand, organizations may become too flexible, which results in losing organizational focus. Therefore, they must be able to allocate correct levels of independence to various units and subunits when necessary. Furthermore, in order for organizations to become more brain-like, that is, efficient and effective in accomplishing various goals, important and visible differences between the organizations and the human brain must be eliminated. These major differences may partly explain why many organizations cannot survive in a volatile and globalized business environment, as well as how huge companies such as Enron develop brain-like diseases, fail, and cease to exist.

Hypothesis 2a: Organizations tend to be more flexible whereas Brains tend to be more rigid.

Organizations have taller hierarchical structure, whereas the human brain has a flatter structure. The taller the hierarchical structure, the more difficult it is for upper management to ensure that implementation of various ideas and decisions will be carried out since the structure creates communication problems between upper management and lower level employees, thus hindering focus and goal achievement. On the other hand, when one closely examines the human brain structure, one can conclude that it is flatter, which in turn illustrates each structure's equal supremacy and facilitates goal achievement and success.

Hypothesis 2b: Organizations have taller hierarchical structure whereas Brains have flatter structure.

There is internal competition taking place within organizations, namely due to employees competing for their positions. This in turn impedes employee performance and focus towards achieving the organizational goals. On the other hand, there is more collaboration involved between each structure in the human brain. Also, it is easy to realize that the human brain appreciates the importance of every structure and each structure performs its task without competing with the other structures, since in the human brain no one structure can be replaced with another one.

Hypothesis 2c: Organizations have more internal competition whereas Brains have team cohesiveness.

TABLE 3-1:

Similarities and Differences between Organizational and Brain Structure

Hypothesized Similarities	Description
	1. Organizations and Brains are mechanisms for information-processing
	2. Organizations and Brains are networks
	3. Organizations and Brains are designed with varying degrees of differentiation and integration, centralization and formalization
	4. Organizations and Brains have both mechanistic and organic characteristics
Differences	1. Organizations tend to be more flexible whereas Brains tend to be more rigid
	2. Organizations have taller hierarchical structure whereas Brains have flatter structure
	3. Organizations have more internal competition whereas Brains have team cohesiveness

Chapter 4 – Case Studies

One might agree that organizations are not able to function as effectively as the human brain as evidenced by various problems. For example, several industries have been scrutinized: investments, pharmaceuticals, pension plan funding, prescription drug advertising, etc. for various reasons that hinder the economic well-being of the nation. As a result, there have been numerous regulations requiring corporations to disclose financial as well as other relevant information properly in an attempt to secure the financial health of the country. I would like to present two cases of corporations, Microsoft and Enron, demonstrating the similarities and the differences between those two organizations and the human brain as well as illustrating that similarities to the human brain lead to growth while differences lead to decline.

Microsoft

Microsoft is the world's largest software company, with global annual sales in the tens of billions of dollars and more than 55,000 thousand employees in 85 countries and regions. "Micro-soft" (short for microcomputer software) was founded in Albuquerque, New Mexico in 1975 by Bill Gates and Paul Allen. Now the company's headquarters are in Redmond, Washington, USA. Microsoft develops, manufactures, licenses, and supports a wide range of software products for computing devices. Its most popular products are the Microsoft Windows operating system and the Microsoft Office suite of productivity software (http://en.wikipedia.org/wiki/Microsoft).

Microsoft exemplifies a company that has brain-like characteristics. Namely, it is an efficient information processor, since it is open to examine its environment, analyze gathered information effectively, consider and implement any necessary changes accordingly. Moreover,

Microsoft is able to successfully divide the corporation into units and subunits that specialize in their tasks, therefore, achieving competence. Also, the company is able to foster prompt communication between the units and provide feedback accordingly. Furthermore, Microsoft is designed to include differentiation, that is, the corporation is divided into departments, and it is also designed to include integration, namely, to facilitate coordination between those departments. The above described features illustrate the similarities between a corporation and the human brain, confirming that the more "brain-like" characteristics an organization exhibits, the more successful an organization can become.

Enron

Enron was one of the world's leading electricity, natural gas and communications companies. It was based in Houston, Texas that employed around 21,000 people by mid-2001, before it went bankrupt. The company, with revenues of $101 billion in 2000, marketed electricity and natural gas, delivered physical commodities and financial and risk management services to customers around the world, and developed an intelligent network platform to facilitate online business. Questionable accounting techniques allowed it to be listed as the seventh largest company in the United States, and it was expected to dominate the trading it had virtually invented in communications, power, and weather derivatives. Instead, it became the largest corporate failure in history, and became emblematic of institutionalized and well-planned corporate fraud. Its European operations filed for bankruptcy on November 30, 2001, and it sought Chapter 11 protection in the U.S. on December 2 (http://en.wikipedia.org/wiki/Enron).

Enron failed to achieve continuous success since it was not able to adopt several "brain-like" characteristics. For example, it had a higher hierarchical structure which hindered effective

communication across the organization. As a result, the vision of the organization was not transferred and understood across all of the departments of the company. Furthermore, Enron exhibited internal competition, where higher level management was concerned about its own well-being and failed to address "company-wide" problems. This, in turn, resulted in the collapse of the company since the top management and lower level employees had lost the focus towards achieving the organizational goals.

TABLE 4-1:

Application of Hypotheses to Microsoft and Enron

Hypothesis	Microsoft	Enron
1. Organizations and Brains are mechanisms for information-processing	✓	✗
2. Organizations and Brains are networks	✓	✗
3. Organizations and Brains are designed with varying degrees of differentiation and integration, centralization and formalization	✓	✗
4. Organizations and Brains have both mechanistic and organic characteristics	✓	✗
1. Organizations are flexible whereas Brains are rigid	✓	✓
2. Organizations have taller hierarchical structure whereas Brains have flatter structure	✗	✓
3. Organizations have internal competition whereas Brains have team cohesiveness	✗	✓

Key: ✓   - present

         ✗   - absent

Chapter 5 – Leadership Implications and Recommendations

How an organization can become more "brain-like"

A: Leveraging Brain-Like Advantages

In order for organizations to function more efficiently and effectively, therefore, achieving the goals, they must become more "brain-like". This can be accomplished by improving the similarities that they have with the human brain, such as information-processing; networks structure; differentiation and integration, etc. and eliminating the apparent differences between the organizations and the human brain, namely, organizations must be able to adopt the correct level of flexibility, flatter hierarchical structure, and eliminate internal competition between the employees.

B: Limiting Brain-Like Dysfunctions

Flatter organizations emphasize greater autonomy on the employees' parts and their direct involvement in business decision making. In an ever-changing business environment, organizations will benefit even more if upper management adopts a flatter structure, thus decentralizing the decision making power and letting all employees voice their opinion and equally contribute towards the organizational well-being and be recognized for their achievements. If an organization cannot adopt a flatter hierarchical structure (due to type of business, organization size, employees' need for consistency and some decision making authority on upper management's part, etc.), it must implement a system of checks and balances to ensure that self-serving managers do not exist and accountability is distributed more evenly across organizational departments.

An ineffective organization may develop "brain-like" dysfunctions, such as Alzheimer's, Amnesia, Schizophrenia, and Depression.

Organizational Alzheimer's – A progressive form of presenile dementia that is similar to senile dementia except that it usually starts in the 40s or 50s; first symptoms are impaired memory which is followed by impaired thought and speech and finally complete helplessness. If an organization develops such an illness, it will lose its edge and competitiveness. An organization can remedy such an illness by being more flexible and encouraging creativity.

Organizational Amnesia – Partial or total loss of memory, usually resulting from shock, psychological disturbance, brain injury, or illness. An Organizational Amnesia can be described as losing its focus and ignoring the organizational goals. Therefore, top management must make sure that effective communication takes place among its units, as well as stress the importance of the goals and bring the employees together through various company-wide events.

Organizational Schizophrenia – Any of a group of psychotic disorders usually characterized by withdrawal from reality, illogical patterns of thinking, delusions, and hallucinations, and accompanied in varying degrees by other emotional, behavioral, or intellectual disturbances. Schizophrenia is associated with dopamine imbalances in the brain and defects of the frontal lobe and is caused by genetic, other biological, and psychosocial factors. An organization may develop Schizophrenia, if it is too flexible and organic, thus forgetting about the major projects that must be accomplished in order to ensure the success of the organization. The management therefore, must prioritize the tasks and put emphasis only at those projects and accomplish one at a time when possible.

Organizational Depression – A psychiatric disorder characterized by an inability to concentrate, insomnia, loss of appetite, anhedonia, feelings of extreme sadness, guilt,

helplessness and hopelessness, and thoughts of death. Organizational Depression may come about when employees lose their motivation, resulting in a decrease of the firm's potential overall. It must be a priority of the management of the organization to ensure that all employees are satisfied and try to give them autonomy to improve creativity and desire to achieve goals.

Chapter 6 – Conclusion

The following thesis was the first attempt to demonstrate a new approach of analyzing whether or not an organization is successful or not. Specifically, the human brain serves as the model an organization is compared to. If the given organization is successful, it must have similar characteristics as the human brain. One can are always in should make certain that those similarities in place and try to improve any other processes to become more "brain-like". On the other hand, if the given organization is not successful, it is lacking the most important characteristics of the human brain, such as being an open social system; proper collection and analysis of information; correct balance of differentiation and integration, centralization and decentralization; having units responsible for specific tasks; as well as effective communication between those units. In the following scenario, an organization will not be able to achieve its goals and eventually will develop brain-like diseases and fail.

Throughout the process of researching and writing the thesis, I have gained an immense amount of valuable information about how the human brain and organizations function. In addition, I have realized the importance of structure, that is, structure ensures an entity's success or failure as evidenced by the human brain, which showcases success. Therefore, more and more organizations must become more "brain-like", that is, be able to adopt the correct type of structure. There is lack of information available to us about the link between the human brain and the organizations; therefore, my thesis is the first attempt to portray a connection between the two and help organizations function more efficiently and effectively. I encourage future research on the following subject in order to better understand and thus make effective suggestions on how to improve organizational competence.

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