Information Technologies and its Impact on the Organisational Structure

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Abstract: *Neither Information technologies determine organisational structure merely, nor does organisational structure. There is a mutual interaction between there variables. Using information technologies is a must for the organisations in this century. However how information technologies evolved over the time brings a question of what effect can technology bring towards organisations and their structure. This study discusses the conceptual issues that raise the importance of technological tools, views and ways that followed by organisations and changed over the time. It also examines technological, organisational and interactive ties that connect organisational structure and the information technology. It concludes that information technologies have an impact on the organisational structure via centralisation and decentralisation, authority and control, space of control, change in organisational level, departmental structure, decision making process, communication, and organising the work.*

Keywords: Technology, Information Technologies, Organisational Structure

I. INTRODUCTION

It goes without saying that current century underlines how important is the effect of globalisation on a highly competitive business environment. Many discussions are considered under the influence of the booming technological innovations and accordingly growing demand for better organisational structures. Organisations in current world, it is vital to gain the desired information internally and externally and use them in order to maximise efficiency. There is no doubt that a balanced coordination and very open communication channels between the units and groups in the organisations help to stimulate this efficiency. Therefore making use of information and the communication with the IT as a combining tool and sharing its outcomes will set the stage for very productive organisations.

In recent knowledge societies, it is a must to provide transfers for corporate information to create ideal organisational structure. This

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can mainly be provided by moving learning from a narrow perspective to spread and share the information through the organisation. Transferring corporate information can support corporate communication and encourage coordination within the organization.

The objective of the current study is to review the technological, organizational and interactive ties that connect organisational structure and the information technology. Therefore, this study is organized as follows. First, the concepts of information technology and organizational structure will be introduced and discussed. Following this discussion, the impact of information technologies on organizational structure will be articulated in terms of centralisation and decentralisation, authority and control, space of control, change in organisational level, departmental structure, decision making process, communication, and organising the work.

II. INFORMATION TECHNOLOGY AND ORGANISATIONAL STRUCTURE

This section provides information with respect to the information technology, organizational structure, and the interaction between the information technology and organizational structure.

2.1. Information Technology

Information technology includes all the hardware and software that an organization needs to use in order to accomplish its organizational objectives (Laudon and Laudon, 2012: 88). Information technology can also be defined as the products, methods, inventions, and standards that are used for the purpose of producing information (Kroenke, 2012: 18). An organization's information technology resources are divided into two: information technology (IT) infrastructure and human information technology (IT) resources. IT infrastructure includes hardware, software, communication technologies, shared technical platforms, and databases (Bharadwaj, 2000: 172-173; Weill, 1993: 550). Organizations spend approximately 40% of their total capital expenditure on infrastructural technologies (Masli and others, 2008: 3). Human IT resources include expenditures relating to salary and training of IT personnel as well as IT training for end users (Bharadwaj, 2000: 169-196). Human IT resources bring in a unique innovativeness to firms. They can utilize from the opportunities provided by the infrastructural IT resources towards decision making and creating value. Furthermore, proactive utilization of human resources can provide firms competitive advantage by linking the firm's internal processes and structure with continuously changing external environment (Lin, 2007: 96).

2.2. Views on Organisational Structure

Organisations differ from each other in many aspects. According to Crowston and Malone, different organisations can be affected differently by the information technologies. They also point their views on four different areas such as rationalist, information processing, motivational and politics. Rationalist view defends that organisations work by the set out objectives like profit maximization. These organisations more care about fundamental issues like, recruitment, loss of business, management intensity (intensity) levels of hierarchy, centralization, decentralization, differentiation and formalization. Information processing view covers the rationalist view as well as communication models, weak links and social context. Motivational view supports the idea of employees having different objectives than the organisation. However, in this view employees can organise the ways of doing their duties in a parallel way with the objectives of the organisations to make sure of the unity of purpose. On the other side, politic view suggests that organisations may have different group of people who have conflicts and different objectives. This perspectives support that power can be used to combine the objectives together and information technologies may be used by the groups in organisations to empower themselves. The areas this view takes in charge are power, vertical and horizontal organisation (Crowston and Malone, 1994: 250-252).

On the other hand, organizational theorists Burns & Stalker (1994), identify two different organizational structures (organic and mechanistic structures) that are differently influenced by information technologies. These structures are based on different organizational features including the hierarchy, formalization, and efficiency that are key to organizational adaptability. Firms having organic structures, such as firms providing tax and law services, have flat structure and they have relatively less formalized processes.

The communication between people is more lateral, which is in a network structure, and usually verbal, which does not require significant support from information technologies. And also they are effectiveness oriented; that is they serve to the external market. Internal processes are not so complex; that is why efficiency is not important as mechanistic firms. In contrast, mechanistic structure firms, such as GE and Toyota that are large manufacturing firms, have highly hierarchical structure in which written and digitized communication is a necessity. This requires significant support from information technologies. The rules and norms are predetermined, and processes are formalized and standardized. Their internal processes are significantly complex, thus efficiency is a big concern. That is why, it is more likely that information technologies will make a greater impact on mechanistic structure firms, since the processes and structure is more suitable for the deployment and utilization of information technology resources.

2.3. Interaction Between Information Technology and Organisational Structure

According to Marcus and Robey, there is technological, organisational and interactive necessity between information technologies and organisational structure (Crowston and Malone, 1994: 253-255). Technological necessity argues that technology itself have some certain impact on the organisational structure. A study done by Woodward on this shows that business formal structure take its shape by the production technology they use in the organisation. At this stage organisational change can be triggered by the technology. Secondly, organisational necessity looks at the change from an adverse perspective. This view argues that managers can implement the change including technology in an organisation in order to fulfil the needs of the organisation. The last necessity on this view shows that interaction between what technologies allow and what managers and organisation try to achieve is complexity (Woodward, 1980). Crowston and Malone agree to this view and support that the needs of the organisation and the current technology can bring the organisational change (Crowston and Malone, 1994: 253-255).

Laudon & Laudon (2012) argues that all organizations have a structure or shape, while the type of information technologies utilized in an organization generally reflects the structure of the organization. For example, a hospital, which is the basic example of the professional bureaucracy structure, is dominated by department heads with weak centralized authority. It is therefore possible for a hospital to deploy and utilize a parallel patient record system operated by the administration, doctors, and other health-care professionals including nurses and social workers. Another example would be the small-sized entrepreneurial structure firms that usually have simple organizational structures and are managed by entrepreneurs serving as the owner and chief executive officer. Such small firms typically have weakly designed systems and the value and usefulness of these systems to the organization quickly decreases. On the other hand, it is less likely to find a single integrated information technology infrastructure in large firms having divisionalized bureaucracy structure. These firms have many locations, so each location has its own set of information systems and technology infrastructure (Laudon & Laudon, 2012: 88).

III. IMPACT ON ORGANISATIONAL STRUCTURE

Main discussions come under the structure of the organisations talks about the technology being determinative factor to form businesses as centralistic. On the other side, deep research on these areas show that technology has an impact on authority and control mechanism, number of organisational level, and the number of department within the organisation (Bensghir, 1996: 243).

3.1. Centralisation and Decentralisation

Today's knowledge society cannot allow organising workload in Weberian or Taylorist way. This is because of the nature of information or service oriented workload which does not work in the same way as standard of production of goods. Technology provides flexibility to the organisations and this allows them choose in between centralised or decentralised activity. On the other side of the technology, organisational culture and environmental factors affect forming hierarchy in the organisation. If the technology used in the organisation promotes flexibility, creativity and participation, then the structure of that company becomes more decentralised. According to Lan Barbour, computers in the past created head offices to control the organisation from one point, however especially

after the 1980s booming technology allowed Laptops and Tablets in the business life and this can lessen the workload of head offices as the management can be done by small and many work station (Barbour, 1997: 169).

3.2. Authority and Control

Henri Fayol defined authority is to right to give orders and expect obedience. Classical management view support the centralisation of the authority to ensure coordination between small jobs (Etzioni, 2005: 43-67). Horizontal or vertical authority in the company shows how the control mechanism work either centralised or decentralised. With the emergence of computer in the business life, control and the power of authority was expected to be centralised. Nevertheless, recent developments in the information technologies allow both centralised and decentralised authority and control mechanisms (Bensghir, 1996: 249).

3.3. Space of Control

By the new economies forming everyday in the world business environment, space of control has been observed to be narrowed. Space of control as a term refers to the number of human resources who report to the line manager or senior management team. By the new technologies businesses start using every day, it is believed that less workforce needed in organisations. However, Whisler draws a different perspective than this natural outcome of the technology. According to him, it is important to have a look at the degree of centralisation of control by the computerisation. His argument support that information technologies bring out centralisation of control and it cause the narrowance of the space of control in the short term operational level and in the long term in managerial level (Whisler and others, 1967: 46).

3.4. Change in Organisational Level

By the great use of production and information technologies even enterprise systems, many changes in the structure of organisation became important. One of them could be the less need of human workforce because of the machines which can help doing things at a low cost and less time efficiently. Today's enterprises based on knowledge and value information as it is the only and unique source to the company. Wriston believes that need for more organisational level has been decreased due to less processing information from one level to the other level in knowledge based organisations. New economic system creates its own hierarchic businesses which dependence is the participation, horizontal movements in a highly competitive business environment. In organisations now, knowledge, freedom, creativity are more supported instead of traditional hierarchic structure (Wriston, 1994: 19).

3.5. Department Structure

Creating information and processing this information moves horizontally in the organisation level nowadays. The effect of change in economical variables and globalisation makes today's enterprises more empowered by the information technologies; therefore they do not look for moving production processes from one unit to another unit. Management stages are disappeared due to reengineering processes and new management styles. Even leadership can start at a traditional way and end up in different person because of the nature of the job given. As a result, information technologies promote reunion of the departments or dividing these departments via its functions or creating new departments (Bensghir, 1996: 251).

3.6. Process of Decision Making

Decision making is the focus of the organisational action as a managerial and organisational process. In an highly competitive business world, it is vital that the data collection, evaluation, identification of alternative strategies and final decision must be done effectively and timely. Decision-making is a way of processing information. Managers process the information, decide and then make sure that the decision is fully understood and applied by the workers. Decision Support Systems, Expert Systems, Executive Support Systems and many more affected directly decision-making process in a positive way. Laudon et al discusses that number of decision taken is risen, time of planning is lessen, decision making can come out of being personal, change in the nature of administrative work becomes positive (Laudon and Laudon, 1994: 566).

3.7. Communication Process

Communication process shapes all managerial sub-systems of the organization (planning, organizing, implementing, coordinating, monitoring). As in all areas of information technology in organizations has changed the concept of communication and continues to change rapidly. According to Alsene, workers in this information age can work without being isolated from each other, they have greater connection than before, and they also can be free and mobile which bring out many benefits to the organisations. New communication technologies allow dialogs and exchange in knowledge concurrently. Email, telephone dismissed the usage of paper and slow communication in businesses (Alsene, 1994: 657). Huseman and Miles also suggest that the technology especially in information have a great impact on the communication of businesses either internally or externally (Huseman and Miles, 1988: 181-203).

3.8. Organising the Work

Traditional management approaches, particularly Weber's bureaucracy approach works to standardize as much as possible and to ensure coordination between standardized work is based on the centralization of authority. Henry Ford brings the term of mass production to business life by following the roots of Taylorism. Mass production brings the routine into workers life because of doing the same job all the time fast and efficiently. Karl Marx on the other side describes the organisation of the work as "Masses of labourers crowded into the factory, are organized like soldiers. They are placed under the command of a perfect hierarchy of officers and sergeants" (Marx and Engels, 1969: 98-137). However, today, all business functions like production, marketing, accounting, finance, management, R & D, procurement, human resources, etc are performed by using information technology. This new style brings the flexibility as people can work from home or they can work independently, personal or as a group. According to Hammer and Champy, work processes needed this change to be simplified and organised better (Hammer and Champy, 1996: 46-57).

IV. CONCLUSION

This study has discussed the significance of information technologies from the perspective of organizational structures. It should be recognized that all organizations throughout the world have been structured and shaped in a certain way. With the emergence and widespread utilization of information and communication technologies in organizations leads to a need in changing and improving the organizational structures. It is possible to articulate that the structures of today's contemporary organizations are determined and shaped based on the information technologies and systems they deploy and use. Therefore, understanding the role of information technologies in the structures of the organizations has utmost importance.

Modern business environment has thought the world brand-new techniques to cope with the challenging and competitive market place. Changes happened in many different areas of business, however, most importantly, technology has driven all the aspects of management and organisational structure. Technology had its major transformation in the last couple of decades and this transformation is not only in technology, but in economic, social, cultural, political and geopolitical areas. Globalisation through rapid changing technology, businesses started to cope up with the changes and eventually the structure of the firms became more active and flexible.

First development we could feel in the business world must be the communication. Today, it is the easiest thing to communicate from one side of the world to the other side. Even the techniques of communication has been developed rapidly and now in a very advanced level. Additionally, organising the work in businesses has many different ways, departments and their functions may have changed and maybe lessen over the time. Technology definitely affected the need for human being in organisations. There are less need to the workers because of this rapid changing information technologies. This study also shows that structure of the organisations changed from centralised to the decentralised. Even authority and control left its place to the more flexible base which allow leader to move

from one to another depending on the job and responsibilities. Due to these increasing changing in information technologies as well as e-businesses and e-trades have changed the organisational structure.

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