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The future of organizational design: A forecasting study

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Abstract

Forecasting (future studies in business) is gaining importance worldwide. As the world becomes increasingly global, technological developments have led to increasing uncertainty day by day. Technology, especially information technology, is changing business and its environment. Managers need to consider future possibilities for making decisions in a competitive environment.

The main purpose of this study is to anticipate the future of organizational design based on expert predictions about changes in the dimensions of organizational design over the next decade. Nowadays, the most important factor to influence organizational design is technology, so this study tries to forecast the future of organizational design and taking the influence of information technology into consideration. The future of organizational design over the next ten decade is analyzed in terms of complexity, centralization and formalization.

In this study, the Delphi method is used to analyze the experts' opinion about the future. When formulating the Delphi statements, preliminary study's results was used and also worked as a team with six academics. The sample of experts used in the study consisted of consultants working for a world-leading technology and management consultancy company operating out of Turkey. This selection was made because it was the neccessary to take the effects of information technology on organization.

As a result, an organization design is forecasted that differs from what is found in studies forecasting that innovation and human resources as a strategic toll will increase in importance. In contrast to what was thought, it is forecasted that in the future organization design will be more centralized with higher degrees of formalization. Furthermore, it is forecast that the use of similar information technology infrastructures (SAP, ORACLE etc.) brings companies many advantages, such as ease of communication, integration etc. and that companies, regardless of sector, are in many ways tending towards isomorphism.

Key words: Organization design, centralization, formalization, horizontal differentiation, vertical differentiation, information technology systems, Delphi method, globalization, forecasting of organization design.

1. Introduction

Competition in the global economy makes forecasting studies a necessity. Globalization, which is defined as the process of political,

economic, socio-cultural, financial, geographical, ecological, and technological integration and union between the countries of the world, forces companies to think strategically and to take action on abstract concepts such as vision, value, etc. (Cooper and Jackson, 1997; Taylor and Flint, 2000; Vilas, 2003). Management in the 21st century has become a management of abstract values and strategic actions based on forecasts about the management of the present and concrete concepts (Friedman, 2002; Lenchter and Boli, 2004). Necessity of making multi-dimensional decisions for the future raises the importance of prediction and forecasting studies for enterprises.

The main reason for globalization spreading so widely, quickly, and intensely is technology, which unites the whole world and aids the quick and continuous flow of products and services, money, knowledge, ideas, people, and culture. It also makes information flow more easily than ever (Stiglitz, 2003; Beck, 2000). Technology, which is the most important factor of production for an organization, continues to change various elements and processes such as inter-employee communication and relations, formalization and decision-making processes, hierarchy and the way of doing business, employee authority and production quality (Costin, 1996; Leinbach and Capineri, 2004). The most important element of competition in the 21st century has become the utilization of information technologies, that facilitates storage, arrangement, and flow of information, which supports people, data, decisions, applications, and consequently all organizational processes and decision-control mechanisms of organization (Burton et al., 2009; Bollingtoft et al., 2009; Hesselbein and Marshall, 2009).

The purpose of this study is to anticipate organizations in the future through expert predictions about the change in the dimensions of the organizational design for the next decade. Nowadays, the most important factor which has an influence on organizational design is technology, so this research tries to forecast the future of the organizational design and the influence of information technology into consideration.

In the literature, the relationship between organization and technology has been examined since the development of the Contingency Approach, and it is accepted that technology is one of the most important elements in establishing organizational structure. However, previous studies have only examined the effect of production technologies on some dimensions of organizational structure in manufacturing enterprises (Daft, 2000; Drucker, 2008; Robbins, 2008; Schermerhorn, 2009). This paper tries to forecast the future of organizational design taking the effects of information technology into consideration for all sectors. The future of organizational design over the next ten decade is analyzed in terms of complexity, centralization, and formalization. The paper also tries to conjecture the purpose behind using

information technologies and to estimate the effects that using these technologies has on organization design.

This paper is divided into five main parts. First, the dynamics of the changing world are analyzed. The economic, political and technological dynamics of the world are detailed and examined in a figure. Second, the change trend in organization design is analyzed. Third, the research methodology -- the Delphi method -- is outlined. The purpose of this study, the research application process and analysis methods of the Delphi method are presented in depth. Fourth, the results of the Delphi study are presented. Fifth, the results are discussed and contributions to the development of theory and to management will be drawn.

2. The Dynamics of the changing world

In 1980s China did not have such a big economy and the Soviet Union had not been yet collapsed. Internet and e-mail were still perceived to be science-fiction. The world economy and consequently the enterprises will face with major changes in the next ten years. Variables that may determine the trends of changes in the world include:

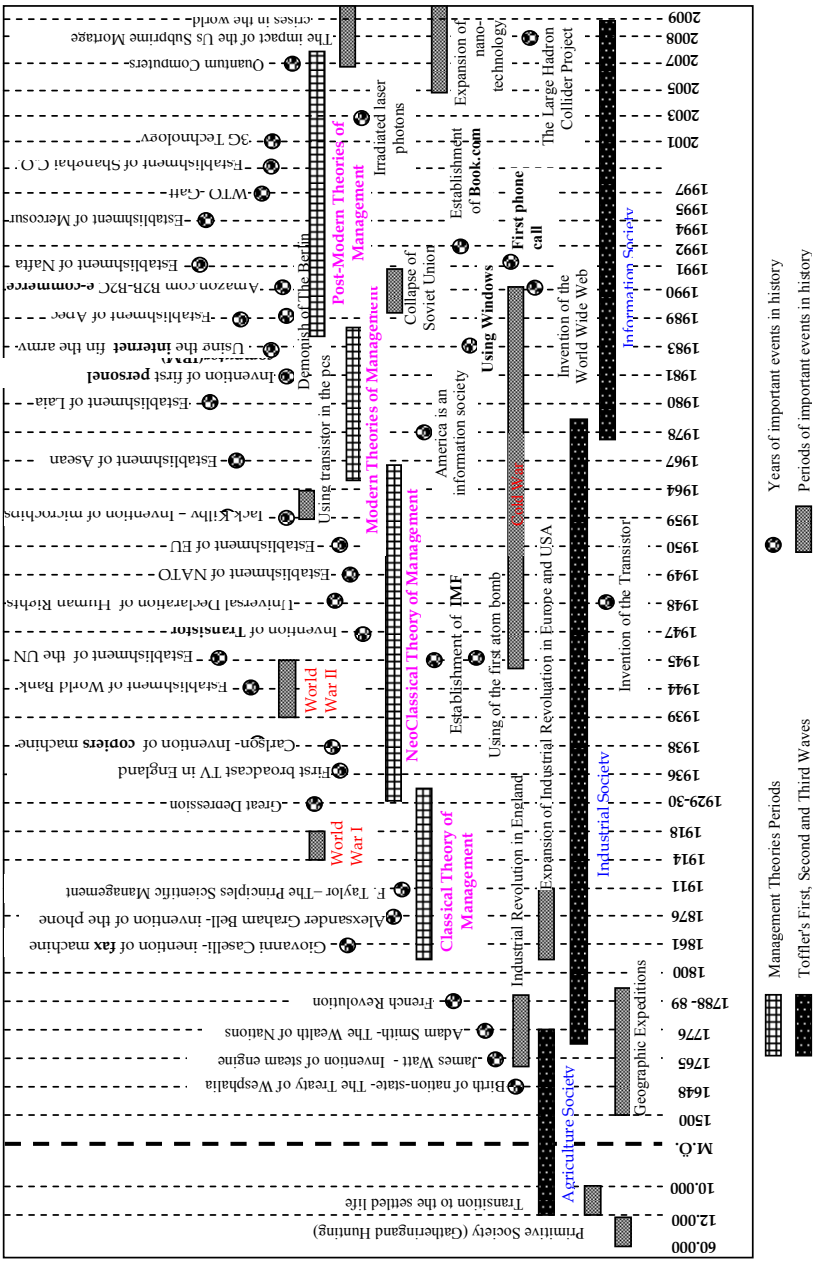
The Economic and Political Effects of Globalization: The establishment of international economic associations such as the EU, Mercosur, ASEAN; the establishment of the World Bank, the IMF; e-business, e-commerce etc. are some of the significant events from the last forty years. Although the dominant world power has not become clear yet, it is widely believed that power distribution will be rearranged in the next ten years (Foresight 2020).

The Socio-Cultural Effects of Globalization: The Universal Declaration of Human Rights, the collapse of the Soviet Union, the fall of the Berlin Wall etc. are some of the significant events from the last forty years. Individualization, cultural harmonization – synchronization (Hamelink, 1993), cultural convergence (Tomlinson, 1991) are new concepts for the millennium.

Technological Development Variables: Quantum computers, the Large Hadron Collider project etc. are some of the significant developments over the last forty years. Networking technologies, information technology and knowledge management, nanotechnology and atomization, transportation technology (Knoke, 1997) are the new concepts.

As Descartes says, “Everything changes and nothing remains still”. If change is inevitable, the only way to survive in this world is to understand which direction change is trending towards. Figure 1 summarizes key social, political, economic, and technological events that continue to have global effects today and periods in the development of organizational theory.

Figure 1
Key Events of The Changing World



In brief, the rate of globalization has been accelerating since the 1970s. Key factors that have contributed to and continue to play their part in the increasing speed of globalization are the spread of multi-national corporations (since the 1970s), the revolution in communications technology (since the 1980s), the end of the Cold War and realignment of power blocs (since the 1990s), and quantum computers, expansion of nanotechnology, irradiated laser photons (since the 2000s).

As we seen in Figure 1, primitive society lasted almost 60,000 years, agriculture society almost 15,000 years, industrial society almost 200 years and the information society, which includes some parts of the world societies, has lasted almost 20 years. Information technology has been the most important factor in shortening the transition time from agricultural society to industrial society and from industrial society to information society.

In addition, the main reason lying behind the recent increasing spread of globalization with its economic, socio-cultural and political aspects is the pace of development of communication, transport and information technologies that interconnect the entire world. In descriptions of the world in the next decade, it is striking how great an effect technology that increases the spread of the globalization has.

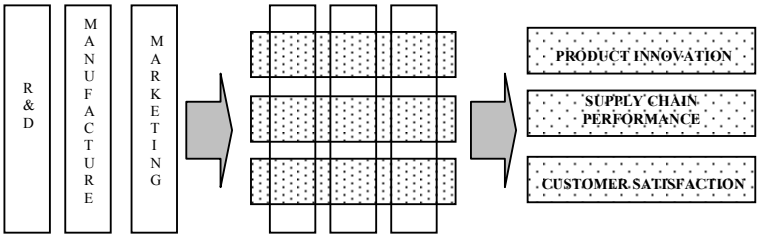
3. The change trend in organizational design

In general terms, the change trend in organizational design can be characterized by a transition from functional to process-based, and from process-based to alliance-based or hollow organizations.

3.1. From functional to process-based organizations

After the industrial revolution, functional- hierarchic structures in organizations started to be defined as horizontal processes. Classic organizational theorists suggested that horizontal communication channels should be as formal as possible. However, the organization structure changed into process-based structures. The change in organizational design from function to process is shown in Figure 2 (Friesen, 2005).

Figure 2
From Function to Process

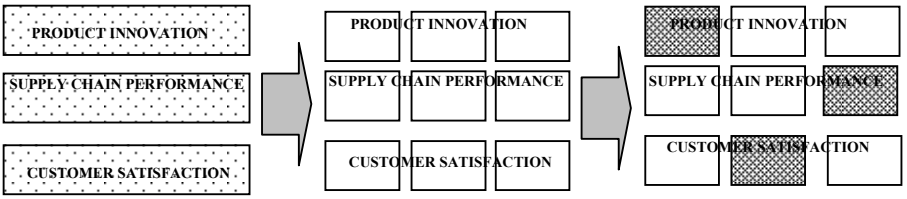


In this transition period, work becomes a multi-dimensional responsibility instead of being a simple responsibility. Work is passed to process teams without functional-based segmentation, from high hierarchical and narrow control span to horizontal communication and wide control span. Centralized decision-making power has given way to decision making by process teams. Team dynamics and communication have become more important than rules in the formalization level.

3.2. From process-based to alliance-based or hollow organization

Depending on its own value chain, an organization can hand over operations that do not require direct control and that do not create a different value; to their business associates. Nowadays, information networks allowing fast and cheap communication with business associates can be created over the internet. Work is segmented according to process, and given to business associates to maximize economic value; thus, alliance-based structures are formed. From process-based to alliance-based organizational design is shown in Figure 3 (Friesen, 2005).

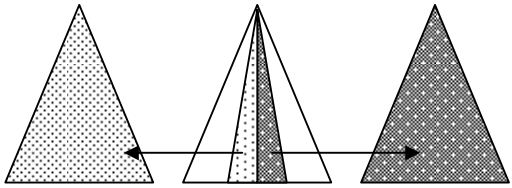
Figure 3
From Process-Based to Alliance Based or Hollow Organization



Undoubtedly a major trend in organizational design is the outsourcing of some business units to external partners. Due to this, organizations have turned into hollow organizations. A hollow organization has outsourcing modules and internal processes support the organizational mission.

The structural characteristics of a hollow organization can be explained as follows; first of all, core and non-core business processes need to be identified. The core competency of an organization should be of critical importance for organizational performance and it should provide, or have to potential to provide competitive advantage. In addition, it should have characteristics that allow for future development and improvement. Business processes that do not add value should be outsourced. Hollow organizations are as shown in Figure 4 (Anand, 2007).

Figure 4
Hollow Organization's Structure



In addition to the aforementioned structural alterations, the development and intense use of information technology have created some specific organization structures. *Networks and virtual organizations* developed by wide internet use have found a wide range of applications. Successful organizations of the future will have structures formed by the intense use of computer and communication technologies (Jarvenpaa and Ives, 1994). Moreover, virtual organizations are a global organizational structure that creates high-value through its intense technology (Nikolenko and Kleiner, 1996).

Flat structured *lattice organizations,* in which communication and team work are well developed and support innovation, are one of the structures in which people can make use of their creativity and accordingly provide their organization with a competitive advantage (Hamel, 2007, www.gore.com). The key characteristics of W.L. Gore's lattice structure are: *i.*lines of communication are direct --from person to person-- with no intermediaries, *ii.*there is no fixed or assigned authority, *iii.*there are sponsors, -- not bosses (which means that there is a workplace without bosses)--, *iv.*objectives are set by the same people who are charged with making them happen, *v.*tasks and functions are organized through a system of commitments. The Gore Corporation's more than 5,000 employees are known as "associates", and there is no hierarchical structure. There isn't even a corporate policy manual. Associates are evaluated each year and rewarded through incentives such as profit sharing and stock options. They are a part of one big team known as a "lattice organization", Cross-functional and cross-level sub-teams are constantly being formed and dissolved by Gore associates as necessary, to carry out specific tasks and projects. For associates who are up to the challenge of an ever-changing organization, the lattice organization offers an energizing environment (Nelson, 1999; Hamel, 2007).

Chaordic organizations formed by the development of chaos and complexity theories are self-improving and self-organizing structures resembling a neural network instead of a hierarchical structure. Chaordic organizations have the capability to keep pace with the technological developments and globalization to the highest level (Hock, 1999a, 1999b).

Chaordic organizations comprise a series of separate parts that work together as a whole. Rather than strict hierarchy between parts, each part is

as important as the other. Just as in a biological organism, each separate part is vital in the overall healthy functioning of the system (Harman, 1995).

According to Hock, the organizations of the future—chaordic organizations—will embody community, based on shared purpose calling to the higher aspirations of people. As applied to business, this can be thought of as "an organization that harmoniously blends characteristics of competition and cooperation; or from the perspective of education, an organization that seamlessly blends theoretical and experiential learning" (Hock, 1999a, 1999b). The organization has common yet diverse goals, and finds strength precisely within this diversity. It is adaptable and mobile, able to change within a constantly fluctuating world, and finds strength in the very fact that a continuous and level plane cannot collapse (Harman, 1995).

4. Methodology

The purpose of this study is to forecast the state of organizations operating in the global economy over the next decade. The future of organizational design is taken into consideration in terms of complexity, centralization and formalization. In addition, the effects of technology on organization design over the next decade are analyzed.

Predicting results that have a high probability of occurring is a part of future studies, and so that these predictions may be correct, those making the forecasts have to be experts in their field. Expert opinion is often necessary when forecasting because there is a lack of material appropriate for statistical methods. One forecasting technique that makes use of expert opinion is Delphi. As outlined below, the Delphi method has some advantages, so it is fairly suitable for the research. The Delphi method of forecasting, developed in the 1950s at the Rand Corporation during the height of the Cold War, uses independent surveying of a group of experts. It was designed for use on complex or ambiguous problems that exceed the capabilities of a single person (Goldfisher, 1993; Linstone and Turoff, 2002).

One of the advantages of the Delphi Technique is that is a tool which can be used to reach consensus amongst a group of people who are experts in their area (Rowe and Wright, 2001). The Delphi technique is a widely used and accepted method for gathering data from respondents within their domain of expertise. The technique is designed as a group communication process which aims to achieve a convergence of opinion on a specific real-world issue (Hsu and Sanford, 2007). The Delphi method is based on the principle that forecasts from a structured group of individuals are more accurate than those from unstructured groups (Rowe and Wright, 2001).

Another advantage of the Delphi technique is that it is "a method for structuring a group communication process, so it does not entail face to face dialogue" (Linstone and Turoff, 2002). The other advantage of Delphi is that it can be to conducted without bringing the respondents together physically,

especially over a wide geographical area. Thus, there can be a broader selection of experts.

This research tries to form an "agreed vision for the future" (Saritas and Oner, 2004) and to make sense of a consensus (Hsu and Sanford, 2007). When individuals identified as experts reach a consensus, more effective results can be obtained since there are many factors affecting organizational design for the future (Porter, 1991). Since these reasons make the Delphi method particularly suitable for this research, it has been used.

Questionnaires were sent out and answered anonymously and individually by each member of the group. The answers were summarized and sent back to the group members along with the next questionnaire. After each round, a facilitator provides an anonymous summary of the experts' forecasts from the previous round, as well as the reasons they gave for their judgments. Thus, experts are encouraged to revise their earlier answers in light of the replies of other members of the panel (Porter, 1991). This process is repeated until a group consensus is reached or the results have stabilized. This usually only take two iterations, but can sometimes takes as many as six rounds (Linstone and Turoff, 2002). In this research, two iterations was enough. Finally, the process is ended and the mean or median scores of the final rounds determine the results (Rowe and Wright, 2001).

Although this study used the Delphi technique, a number of improvements and updates were made due to the nature and purpose of this study. The Delphi research process is difficult to conduct, therefore the research process was improved. The Delphi research process is shown in Figure 5.

4.1. Preliminary study

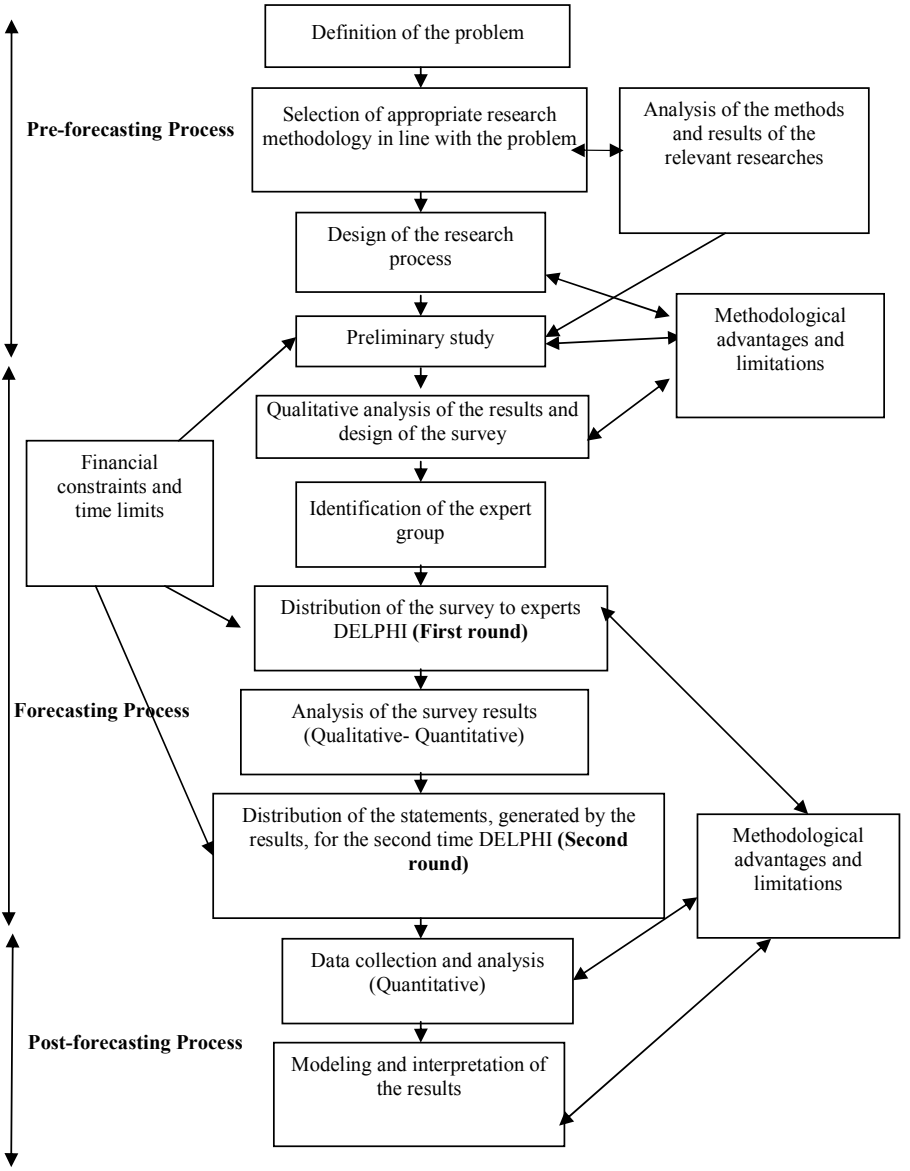
The preliminary study was designed to increase the scientific validity of the statements forming the basis of the Delphi survey. In the preliminary study, the experts' opinions about future alterations in organizational design and about concepts that create or trigger change were collected and analyzed.

The purpose of this preliminary study was to help prepare the statements forming the basis of the Delphi survey by providing preliminary data with the help of expert academicians and managers of global organizations and thus increasing the reliability of the results.

At this stage, an in-depth interview consisting of semi-structured and open-ended questions was used to collect data. The interviews were recorded and transcribed. Content analysis was used to assess the interviews.

Within the financial and time constraints, in-depth interviews were conducted with two academicians with fields of study related to organizational theory and six senior managers of global enterprises with an interest in organizational theory. They were chosen using a random sampling method. In addition to this, documentary evidence from the

Figure 5
The Delphi Research Process



managers relating to their future plans for their businesses was examined as a secondary data source. The interviews were conducted with eight people until interview assessment results repeat themselves. As a result of the encoding content analysis used to assess the interviews, it was found that the two most encoded terms in the preliminary study, "*technology*" and "*information and communication technologies*" were used 289 times and 192 times. In this context, out of all the factors accelerating globalization in the 21st century, information and communication technologies are the most important factors.

Besides, the results of the content analysis of the preliminary study highlight the fact that many global enterprises use infrastructure systems such as SAP or Oracle both for gaining a competitive advantage and for speeding up communication and integration processes; similar systems have an effect on organizations and organizational structures.

4.2. Identification of the group of experts (study sample)

The group of experts should consist of experienced people who have knowledge and practical experience in the subject of this study. One of the criterions in selecting the Delphi's experts was heuristic (Goldfisher, 1993). In order to remove industrial paradigm (or perspective) from the predicted organizational design of the future and not to focus on industrial dynamics, the group of experts was made up of employees of global information and communication technology consulting firms.

In 2008, the list of the top 100 hardware, software and service provider companies in the world was drawn up on the basis of more than 240 benchmark studies conducted by the Aberdeen Group and answers from 90% of the Fortune 500 firms and 75 % of the Global 500 firms. The most important criteria in selecting the firms that appear on the list are the total cost of ownership (43%), product functionality (42%), vendor stability (24%), special market knowledge and experience (24%), domain or industry expertise (22%), and reputation (21%). The Aberdeen Group, which prepared the list, is the leading research company to focus on the global technology-based value chain, and has been the market leader in collecting scientific and measurable data from companies since it start operations in 1988 (www.aberdeen.com).

Technology vendors (Microsoft, Oracle, SAP, etc.) and technology providers (HP, Dell, Cisco, etc.), that are in the list of the top 50 technology consulting firms in the world, are not included in the sample, because employees who work for hardware producers or for companies that market and produce their own software systems may not be able to separate sectoral biases from predictions.

The sample for the forecast study consisted of IT consultants of the world leading technology and management consultancy company, which operates out of Turkey.

The survey forms created were e-mailed to the group of experts who e-mailed their answers back. The first round of the Delphi, the survey was sent to 138 experts and was answered by 56 of them, so the return rate was 40% (n=56). After the first round, there was no need to intervene in open-ended questions, so survey's questions, nor were there any added statements, was not altered. In the second round of Delphi, survey was sent to experts and the return rate is 100% (n=56).

The demographic questions related to the experts' sex, age, level of expertise in the subject (expert/ non-expert), educational level (graduate/postgraduate/PhD) and length of time working in the information and communication sector.

Of the study participants (experts) 64% were male and 36% were female. All participants were from the 31-40 age group and were experts in the subject. 39% of the experts had a bachelor's degree, 47% a master's degree, and 14% a PhD. The experts had a mean of 22.5 years experience in the information and communication sector. The median was 19 years and the mode was 15 years.

4.3. Delphi first round

In a Delphi study, the development and administration of the survey are interconnected. The first survey could take several forms, but would most likely be one or two open-ended questions related to a broad issue. The second survey is developed by the researcher based on the information collected during the first round. Being certain that steps are taken to eliminate the chance of research bias is important throughout the Delphi process (Ludwig, 1997). In this study, future statements were formulated based on the information collected during the preliminary study and the first round. In addition, the statements were formulated with the help of six academics.

As a result of the preliminary study, the survey statements were formulated regarding organizational design, the effects of technology and the use of information technology-based- infrastructure. The Delphi survey was designed by a team of 6 academics. The group was comprised of three assistant professors, two professors, and one research assistant. The survey was brain stormed and contained thirteen questions and eighty-one statements complying with the purpose of the study. A six-point scale where 1 was "absolutely disagree/not important at all" and 6 was "absolutely agree/very important" was used to remove the possibility of median answers.

4.4. Validity and reliability of the scale

Afterwards, the Delphi Survey, formed to test the validity of the statements and prevent differentiation in meanings, was administered to ten middle and senior managers of global firms in face-to-face interviews for

experimental purposes, like a pilot study. The validity of the survey was tested, and misunderstood, false or incomplete statements were detected and corrected to try to minimize the error rate, so content validity of the scale was provided by experts.

For the reliability of the survey, the Cronbach's alpha score was calculated for each dimension (or question) of the survey. The Cronbach's alpha score obtained was minimum 0.70, which indicates that the scale is reliable.

4.5. Delphi second round

In the second round of Delphi, responses were received from 56 people all of whom participated in the first round. The responses rate for the second round was 100%. After four months, the arithmetic mean, the median, and the standard deviation obtained from the first round Delphi were re-sent to the experts, and they were asked if they wanted to revise or change their answers In the second round none of the experts changed their answers, so the process was completed in two iterations.

Future statements took on their final form at the end of the Delphi second round, this makes it possible for experts to confirm their common ideas (Goldfisher, 1993). There were eighty-one future statements.

An example of the future statements about departmentalization is "*Departmentalization in companies will be based on regions/functions/processes/customers/products more than one factor*". In the first round space was left for the experts to add their ideas. For example, "*Departmentalization in companies will be based on..... *". However, no statements were added after the first round.

An example of the future statements about the specialization is *"Employees will need to have expertise in one subject area/more than one subject area/employees will need to have a little information about every subject"*.

In addition, as a result of the preliminary study, questions were added about the aim and effect of using the similar information technology infrastructure, such as "The aim of using the same information technology infrastructure is to gain a competitive advantage/to integrate with business partners/to enable rapid decisions making/to keep up with competitors/to gain cost leadership/integrate with shareholders all over the world".

4.6. Statistical analysis of the delphi survey

The Statistical Package for Social Sciences (SPSS) 11 for Windows was used for statistical analysis of the data collected from the Delphi survey questionnaire. Descriptive statistics was used to analyze the central tendencies of the data and are discussed under the value of mean, median and mode.

The standard deviation was also provided to give more confidence in the findings. A standard deviation of less than 1.50 was used as a criterion for a high level of consensus among respondents. Using a standard deviation of less than 1.50 is considered to be a conservative criterion reflecting a high degree of consensus (Gao et al., 2008). A six point scale was used, so the statements have both four or above mean and less than 1.50 standard deviation rates were accepted. The mean, median, and standard deviation for the future statements are as in Table 1:

Table 1
Summary Of The Mean, Median, and Standard Deviation Ranks Of The Deplhi Survey Statements

No	*Within the next 10 years,*	Mean	Median	Standard Deviation
F1	Employees will have to be **an expert in one area of subject.**	4,46	5	1,49
M4	**The division of labour between employees** will **increase.**	4,18	4	1,35
E2	Employees will be doing little parts of the work but they have to know the whole work.	3,96	4	1,49
D6	Departmentalication in companies will be based on **more than one subject.**	5	6	1,37
D3	Departmantalization in companies will be based on-**processes.**	4,96	5	1,09
D2	Departmantalization in companies will be based on **functions.**	4,32	4	0,76
M9	**The number of employees** needed by companies will **increase.**	4,57	5	1,36
M6	**The level of managers' control** on employees will **increase.**	4,16	4	1,06
M6	Employees will **have more** to say in decision-making process.	4,16	4	1,06
M3	**The authority and responsibility that employees are given to** will **increase.**	4,14	4,5	1,47
M13	Education quantity about methods of doing works in companies will **increase.**	5,04	5	0,95
M11	Obligation of implication of job descriptions will **increase.**	4,68	5	0,81
M12	The written procedures in companies will **increase.**	4,2	4	1,27
M8	**The written rules** in companies will **increase.**	4	4	1,27

The mean, median, and standard deviation for the future statements about the effects of information and communication on organizations are summarized in Table 2.

The study tried to identify whether there was any relationship between the independent variables, i.e. the socio-demographics data, and the expert' responses to the Delphi survey questionnaire. Therefore, the independent samples t-test, ANOVA and correlation analyses were used. The independent samples t-test is used to compare the means of two independent samples, so it was used in this study to compare sex, which has a nominal scale with the survey responses. The ANOVA test is used to compare the scores of a continuous variable for two or more groups, so it was used in this study to compare the responses with the years of experience. Correlation

Table 2
Summary Of The Mean, Median, and Standard Deviation Ranks Of The Deplhi Survey Statements-Part2

No	*Within the next 10 years,*	Mean	Median	Standard Deviation
N1	**The strategic importance** of using information and communication technologies will **increase.**	5,61	6	0,56
N5	The use of information and communication technologies will **increase the focus of the companies on theirs core competencies.**	5	5	1,32
K3	The aim of using the same information technology infrastructure is **needing of making decisons rapidly**.	4,93	5	1,14
K7	The aim of using the same information technology infrastructure is **integration with shareholder all over the world.**	4,9	5,5	1,38
K2	The aim of using the same information technology infrastructure is **integration with business partner.**	4,86	5	1,42
K1	The aim of using the same information technology infrastructure is **getting competitive advantages.**	4,75	5	1,37
K5	The aim of using the same information technology infrastructure is **moving flexible.**	4,61	5	1,33
L2	The use of the same information and communication technologies is to make **methods of data reporting** similar to each other.	4,57	5	1,16
L8	The use of the same information and communication technologies is to make **business processes** similar to each other.	4,54	5	1,36
L1	The use of the same information and communication technologies is to make **methods of doing work** similar to each other.	4,21	4	1,19
L7	The use of the same information and communication technologies is to make **processes of making decision** similar to each other.	4,21	4	1,33

analysis is used to determine the strength and direction of the relationship, if any, between two continuous variables where both variables are at least ordinal scales, so it was used in this study to determine the relationship between experts's years old and their responses.

The differences between the two independent variables of sex (male/female - a nominal scale) and the survey results are significant for some future statements. The results of the independent samples t-test are presented in Table 3.

The results show statistically significant differences between some levels of education and the participants' responses. The results of the ANOVA are presented in Table 4.

Table 3
Summary of the t-test results

No	Future Statements	Gender	Mean	Standart Deviation	t	p
F1	Employees will need to have ***expertise in one subject area.***	Female	5,1	0,96	0,002	0,01
		Male	4,1	1,78		
D3	Departmantalization in companies will be based on-**processes.**	Female	5,5	0,51	3,572	0,007
		Male	4,67	1,22		
N1	The **strategic importance** of using information and communication technologies will increase.	Female	5,8	0,41	0,001	0,033
		Male	5,5	0,6		
L8	The use of the same information and communication technologies is to **make business processes similar** to each other.	Female	5,1	1,33	0,714	0,019
		Male	4,22	1,28		

Table 4
Summary of the ANOVA results

No	Future Statements	Education Degree		Mean Difference	F	p
K7	The aim of using the same information technology infrastructure is **integration with shareholder all over the world.**	Bachelor	Master	1,39	8,913	0
		PhD	Master	1,35		

The correlation coefficient between length of experience (ordinal scale) and the survey responses (ordinal scale) was not statistically significant.

5. Findings

The final formulation of the future statements at the end of the Delphi second round was analyzed. The arithmetic mean, the median, and the standard deviation of the all the future statements were calculated. As a result of the Delphi second round, statements about organizational design can be grouped and summarized under the following heading:

5.1. Changes in horizontal differentiation over the next ten years

The experts predicted that in the next ten years employees should know one subject very well and that they should increase their expertise in that subject. Therefore, division of labor, made in accordance with the employees' area of expertise, will create more value. However, this will not alienate employees from their jobs when they are working as a part of a team. While they are working on one part of a job, they will also know the whole. Besides, it will necessary to communicate quickly, to adapt to change quickly, and to have more capabilities for using information technologies effectively, so employees will need training to improve their competencies in these areas.

Over the next ten years it is forecasted that departmentalization will not be just based on a single issue; however, the primary basis will be

processes followed by functional basis. This prediction is similar to the organizational design changes that are moving from functional-orientation to a process-orientation.

5.2. Changes in vertical differentiation over the next ten years

In the next 10 years it is forecasted that the number of employees and the number of management levels are going to decrease, and that the chain of command and the span of control will narrow. In this sense, it is expected that the organizational structure will become more organic and flexible while enabling tighter control of all information and communication technology employee activities. Therefore, while an expert workforce is employed as teams in a flexible organizational structure, wide and effective use of information and communication technology systems can be more tightly controlled.

5.3. Changes in centralization over the next ten years

In the next ten years it is forecasted that employees will play more of a part in decision making; they will be empowered; their authority and responsibilities will increase. However, this authority and responsibility in their areas of expertise will be clearly defined and the level of control will increase. Intensive use of information and communication technologies will increase integration while allowing for the tight control of remote units, which should strengthen centralized structures. Since the number of employees will decrease, their authority will depending on their area of expertise; however, they will be under stricter control in a centralized structure.

5.4. Changes in formalization over the next ten years

It is expected that there will be downward pressure on formalization as employees' authority and responsibilities increase; conversely, the growing dominance of centralized structures is also expected to exert an upwards pressure on the level of formalization. The greater authority and responsibility afforded to employees will, however, be counterbalanced by an increase in written rules and procedure. Rules, about employee integration with partners and business units around the world; will be in written form. In addition, there will be training about how to do business. It is thought that technological infrastructure systems will increase the level of the formalization for integration between businesses and their shareholders across the world and for quick and effective information-communication flow.

5.5. Use of similar information technology

The wide use of information technology systems like SAP, Oracle etc. has a continuing influence on all aspects of organizational structure. Information technology is used so that organizations can make quick

decisions, can integrate quickly with the world and with their business partners, can act flexibility and quickly, and can thus gain a competitive advantage. It is also forecasted that these objectives will continue to be valid. When we examine the factors similar to the use of information and communication technologies in organizational design, it is forecasted that

- Methods of data reporting,
- Business processes,
- The way of doing business,
- Processes of decision making,
- Employee competences, and
- Written rules and procedures shall continue to resemble each other.

The changes that organizational design undergoes due to information technology systems according to factors such as type of organization, size of organization, the product/service produced, the number employees, etc. In order to facilitate integration, information technology systems make business processes, the way of doing business, reporting methods, and written rules in businesses in the same network (business partners) similar. In this context, it is not incorrect to say that the use of similar information and communication technologies has an influence not only on the process and way of doing business, but also on organizational design; in fact it creates a cultural leveling.

6. Conclusion

In the next ten years it is forecasted that the division of labor among employees specialized in one subject will increase and that work thus divided will be done by qualified employees working collaboratively as a team. Employees will not only know the part of the job that they are working; instead, they will know that the part of the job that they are working on is part of a whole, and hence the risk of alienation will be reduced. In this way, division of labor will allow to work in a more harmonious and efficient way.

According to the findings concerning departmentalization, which like division of labor is another aspect of horizontal differentiation, it is forecasted that departmentalization will be motivated by more than one factor, but especially by processes in the next ten years.

It is forecasted that while employees will be able to intervene more actively in decision making, the level of control will increase. Information and communication technologies enable all the information, reporting. This means that organizations will be more centralized in the next ten years.

It is forecasted that there will be an increase in the necessity to comply with job descriptions, the number of training about how to do business, and written rules and procedure. Therefore, the level of formalization will

increase in the organizations. It is thought that the reason of increasing level of formalization in organizations will increase so that organizations can integrate with their shareholders around the world and that information and communication flows can become quicker and more efficient. There will be an increase in the way of doing business, reporting, rules and procedures to enable holistic assessment and to integrate with other businesses that they have worked with or with other units that they have global operations with.

In the next ten years, there will not be any radical changes in organizational structures. Instead, organizations will have more control and will be more centralized and formalized. One reason is that organizations will not be able to make any radical changes in their production processes. Although the structure predicted by forecasting studies is similar to the mechanical organizational structure of the classical organization period, it is incorrect to say that they are the same. Today's production technologies do not cause radical changes in production. Information and communication technologies that affect operations within the organization create opportunities that form organizational structures and provide a competitive advantage. They make global companies try to provide effectiveness and efficiency with lower costs and increased global competition. This can be interpreted as increasing control and having more centralized and formalized structures in order to costs and gain a modular future by ensuring effective integration that shares one production system. Global companies benefit from information and communication technologies in that they create integration that allows them to operate with other units around the world -as each other's suppliers of each other-.

In addition, information and communication technology infrastructures, used to integrate global businesses with the world and to gain pace, make companies from different industries similar. Systems like SAP, Oracle etc. segment businesses according to process and in turn create similar business processes, similar ways of doing businesses and similar decision making processes. Thus, employees increasingly have similar competences to each other. Moreover, the way organizations do business is clearly identified as is their employees' authority and responsibilities, and how they fulfill their responsibilities. The number of written rules and procedures that determine methods of doing business and reporting has increased as has formalization. As a result, control will increase and businesses will be similar regardless of the industry; there will be highly centralized structures which makes decisions quickly, can be integrated with the world, and have sub-units in different countries.

It is forecasted that even companies that are not in the same industry will have similar ways of doing business, need similar organizational structures, and be global organizations resembling each other. So isomorphism, which affects global companies using information and communication technologies, tends towards global isomorphism.

It is incorrect to say that all global businesses are isomorphic. However, it will not be incorrect to state that global businesses using similar information and communications infrastructures are exposed to global isomorphism. It can be interpreted as isomorphism of a global information and communication infrastructure in terms of formalization and centralization of the organizational design.

In addition, another result is the fact that horizontal organizations will be present with zero hierarchy, organizations that think and learn will gain importance, humans, who are the sole producers of information, and the human brain will gain importance, and concepts like quantum leadership and creativity will stand out.

Using similar technology makes organizational structures similar and creates a contrast with concepts such as creativity of human resources, work environment supporting creativity, improving business processes, and thinking and learning organizations. Using the creativity of human resources as a competitive advantage contradicts with the fact that the control on employees and written rules and predetermined reporting methods will increase.

Furthermore, it is thought that artificial intelligence will be used to prevent human resources working on unskilled jobs, so organizations whose only basic competence is innovation will gain importance. However, it is also forecasted in the next ten years that organizations will become more centralized, and have more control over their employees who will work according to determined processes and procedures. Information and communication technologies create the global possibility of change in pace, integration and production processes. They also have started to create similar company structures in a standardized, global world. Global businesses have started to create global organizational design for technology, which has a global character.

Operating in knowledge-based societies, global companies' opinions of human resources have changed and they seem to have more normative structures characterized by increased control based on information and communication technologies. But it is also seen that this structure of global product/service companies is more flexible, gives a greater competitive advantage and allows decisions to be made more quickly than the headquarters.

7. Discussion

The relationship between information technologies and organizational change has been examined over the past forty years by many organizational theorists, especially theorists interested in the Contingency Approach. Past researchers have examined the fact that information technology utilization in organizations has an effect on job design, job complexity and commitment (Kelkar, 2006); makes jobs more structured, resolves time and space

limitations (Pinsonneault and Kramer, 1997); decreases the number of managers, increases rightsizing and downsizing (Bidgoli, 1999); reduces the auditing area by decreasing the number of employees (Pinsonneault and Kramer, 1993); makes communication with external units easier (Batra, 2006). Nevertheless, since the Contingency Approach, reliable generalizations and proper modeling cannot be made about the relation between technology and organizational structure (Stevenson, 2006). One of the reasons for this is that organizational theory is interdisciplinary and consists of different academic units in which there are specific concepts and methods, such as management, sociology, and computer sciences. Another reason is that concepts such as individual, group, organization, and society are used interdependently and measured accordingly as units and levels of analysis (Myers, 1996).

As explained above, none of the past studies has considered all dimensions of organizational design. This study has shown the future of organizational design in all its aspects.

Although the relationship between organization and technology has been analyzed in the literature since Contingency theory, there has been no future research about the effects of information technology on future organization design for all sectors. The dimensions of these effects are the aims and results of the using the same IT infrastructure such as Oracle, SAP etc.

Some future research has forecast that the organization of the future must focus on and inspire its employees to gain a strategic advantage (Hesselbein and Marshall, 2009), to be creative (Amabile and Khaire 2009), and also that its managers must foster creativity in the organization. Nevertheless, the experts forecast that organizations of the future will be more formal and have more central management in the next ten years. The reason for this is that they use the same information technology infrastructure for integration with their shareholders or partners all over the world. In addition, using the same IT infrastructure also makes business processes, methods of data reporting and working similar to each others in all sectors. Althuogh the information infrastructre was especially design for the each organization, it's making the standardization on some subjects. It is predicted that this nascent standardization will secure a competitive advantage by integrating management with the world, but in contrast to what all other future studies have suggested, that it will deter employees from creating a de-centralized work environment based not on hierarchy and formality, but on self-control.)

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Özet

Geleceğin örgüt tasarımı: Bir öngörü çalışması

Teknolojik gelişmelerin hızıyla orantılı şekilde günden güne küreselleşen dünyada, işletme alanında öngörü (gelecek tahmin) çalışmaları önem kazanmıştır. Özellikle bilgi ve iletişim teknolojileri, işletmeleri ve faaliyette bulundukları çevreyi hızla değiştirmektedir. Bu nedenle yöneticiler de, hızla değişen rekabet ortamında kararlarını gelecek ihtimallerini de göz önünde bulundurarak verme ihtiyacı hissetmektedir.

Çalışmanın temel amacı geleceğin örgütlerini tanımlayabilmektir. Başka deyişle amaç, gelecek 10 yılda örgüt tasarımı boyutlarındaki değişimleri uzmanların fikirleri doğrultusunda tahmin edebilmektir. Günümüzde örgüt tasarımını etkileyen en önemli unsur teknolojidir. Bu nedenle çalışmada da teknolojinin geleceğin örgüt tasarımındaki etkisi göz önüne alınmıştır. Gelecek 10 yılda geleceğin örgütleri ise karmaşıklık, merkeziyetçilik ve formalizasyon boyutlarıyla ele alınmıştır.

Çalışmada uzman görüşleri temel alınarak yapılan gelecek tahmin yöntemlerinden biri olan delfi metodu kullanılmıştır. Delfi ifadeleri öncalışma verilerine dayanarak ve altı akademisyenden oluşan bir ekip yardımıyla oluşturulmuştur. Delfi uzmanları bilgi teknolojilerinin etkisini göz önünde alabilmek için, Türkiye'de de faaliyet gösteren Dünya lideri bir teknoloji ve yönetim danışmanlığı firması çalışanlarından seçilmiştir.

Sonuç olarak, stratejik bir araç olarak insan kaynağının artan önemine ters düşen sonuçlar elde edilmiştir. Beklenenin aksine geleceğin örgütlerinin daha merkezi ve formalizasyon düzeylerinin yüksek olacağı öngörülmüştür. Ayrıca işletmeye hızlı iletişim ve entegrasyon gibi avantajlar sağlayan benzer bilgi ve iletişim teknolojilerinin (SAP, Oracle vb.) kullanımının; işletmelerde, sektörden bağımsız şekilde, küresel boyutta bir benzeşme (izomorfizm) yaratma eğiliminde olduğu öngörülmüştür.