KADIR HAS UNIVERSITY

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GUIDELINES FOR INFORMATION TECHNOLOGIES CHANGE MANAGEMENT IN TURKEY

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KADIR YAVUZ

Guidelines for Information Technologies Change Management in Turkey

Abstract

Information Technology (IT) has increasing vital importance for organizations and companies which aim to remain competitive in the market. Information Systems (IS) concept is an essential element for companies who build their own IT infrastructure for contributing to organizational processes. Rapid developments in IT revive changes in organizations which use IS intensively. This study investigates how an IT related change may affect organizational processes and how this kind of change should be managed. IT companies having global products, social web platforms and customer-oriented products are most likely nominees which may find this thesis very useful, especially since these products are inclined to change due to variability of customer behaviors, acculturation, trends etc. In Turkey, leading companies give necessary importance to Change Management (CM) principles in the departments or business units created within. CM includes many subjects and management areas due to wide range of topics that it investigates. In general, IT field is rapidly growing due to continuous developments performed in technology departments. Companies in Turkey have to be prepared about controlling and planning prospective changes, just to get the greatest benefits by turning changes into opportunities. This study proposes guidelines to show how to plan, manage, implement and finalize a change process by investigating the change management principles with the light of experiences companies in Turkey have about IT related change projects.

Keywords: Change, CM - Change Management, IT – Information Technology, ITCM – Information Technology Change Management, Organizational Change, Guidelines for ITCM

Türkiye'de Bilgi Teknolojileri Değişim Yönetimi İçin Yönergeler

Özet

Bilgi Teknolojileri (BT), pazarda rekabetçi konumunu korumak isteyen organizasyonlar ve şirketler için giderek artan hayati bir öneme sahiptir. Bilgi sistemleri bir şirket için, kendi bilgi teknolojileri altyapısını oluşturması ve bu yapıyı organizasyonel süreçlerine dahil edebilmesi açısından başlıca önemli elementlerdir. Bilgi Teknolojilerinde yaşanan hızlı gelişmeler, bilgi sistemlerini yoğun olarak kullanan organizasyonlarda değişimi gündeme getirmektedir. Bu çalışma, bilgi teknolojileri ilişkili bir değişikliğin organizasyonel süreci nasıl etkilediği ve bu tarz bir değişimin nasıl yönetilmesi gerektiğini araştırır. Sosyal web platformlarına, müşteri odaklı ürünlere ya da global bir ürüne sahip BT şirketleri bu tez çalışmasını faydalı bulabilecek en olası aday şirketlerdir çünkü bahsedilen tarzdaki ürünler müşteri davranışları, kültürleşme ve trendler gibi faktörler nedeniyle değişime oldukça açıktır. Türkiye'de, lider şirketler bünyelerinde oluşturdukları departmanlar ya da iş birimlerinde Değişim Yönetimine gerektiği önemi vermektedirler. Değişim Yönetimi, araştırma konusu olarak değerlendirdiği başlıklar dolayısıyla birçok konu ve yönetim alanını ihtiva eder. Türkiye'de BT sektörü, teknolojideki sürekli gelişmeler nedeniyle diğer ülkelerde olduğu gibi ülkemizde de hızla büyümektedir. Türkiye'de şirketler muhtemel bir değişim sürecini kontrol etmede ve planlamada değişimi fırsata dönüştürerek en iyi faydayı sağlamak adına hazırlıklı olmadırlar. Bu çalışmada, Türkiye'deki şirketlerin bir değişim sürecini nasıl planlayacakları, yönetecekleri, yürürlüğe sokacakları ve sonuçlandıracakları konusunda, şimdiye kadar tanımlanmış değişim yönetimi prensipleri ve Türkiye'deki bazı şirketlerin tecrübe ettiği gerçek bilgi teknolojileri ilişkili değişim projeleri gözden geçirilerek yönergeler sunulmuştur.

Anahtar Kelimeler: Değişim, DY – Değişim Yönetimi, BT – Bilgi Teknolojileri, BTDY – Bilgi Teknolojileri Değişim Yönetimi, OD – Organizasyonel Değişim, BTDY İçin Yönergeler.

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List of Abbreviations

BT   Bilgi Teknolojileri

CAB   Change Advisory Board

CM   Change Management

CMMI   Capability Maturity Model Integration

COBIT   Control Objectives For Information and Related Technology

CRM   Customer Relationship Management

DSS   Decision Support Systems

ERP   Enterprise Resource Planning

ES   Expert Systems

ESS   Executive Support Systems

GDS   Global Distribution System

HRM   Human Resource Management

IM   Information Management

IS   Information System

IT   Information Technology

ITIL   Information Technology Infrastructure Library

ITM   Information Technology Management

MIS   Management Of Information Systems

MSS   Management Support Systems

OC   Organizational Change

PM   Project Management

SME   Small-Medium Enterprises

UI   User Interface

Chapter 1

Introduction

Information Technology Management (ITM) is becoming increasingly crucial for companies which use Information Technology (IT) in order to achieve many kinds of operations in business processes. Owing to the fact that IT plays a significant role in companies, units or people who manage IT have a pivotal role. Besides the units or people who manage, execute and control the existing technologies, they have some duties and responsibilities such as tracking new developing technologies and including new technology in organizational process if necessary. Units or people having pivotal role are responsible to track market requirements, estimate and plan prospective change action and control it by following pre-defined principles which are tailored for infrastructure of a company or an organization.

Considering any industry in 1990s, it can easily be seen that it is not the same today. The technology, approaches and techniques have been changing day by day. Air transportation, banking, software, communication, manufacturing; every one of these essential industry fields had some serious change as a result of accommodating some factors like quality improvement, emerging technologies, new methods, new arrangements of governments, legal and economic constraints. It is obvious that all business sectors are going to deal with an array of new changes in the coming years.

In any process that business sectors undergo such profound changes, it is definite that every single company operating in those sectors is going to have their own change actions. Companies' only choices are to keep up with the changes. Showing resistance to change or having no ability to manage change processes correctly, increases the chance of experiencing new risks. For example, in today's terms of technological developments, it's not possible to imagine a bank that is not able to respond to its customers about providing mobile solutions as a result of emerging mobile technology. Change will catch an edge of any business one day as technology already did. Companies developing a natural defense mechanism against change are the candidates to lose. On the other hand, companies transforming change to opportunity are candidates to gain value.

1.1 Research Objectives

The goal of this study is to provide guidelines for companies in Turkey about planning, managing and implementing a prospective change project. First of all, previous research and literature about IT, ITM, Change Management (CM) and management techniques and principles belong to other administrative areas of expertise will be examined as theoretical study. Thereafter, change process of a web based product named 'e-Power' and its managing and development team is examined as experiential study. Owing to this examination process, guidelines are explored aiming to help organizations which have similar business area with E-Power in order to determine which steps and actions that they should take in case of an IT related change occurred. E-Power's organizational structure can be defined as product oriented organization so guidelines explored in this study fit to be applied in companies having same organizational structure. Organizations evaluating this study which are structured in different organizational structure should identify their own change actions referencing the guidelines presented in this study aiming to provide improved comprehension about CM for IT by considering their organizational, product and service based requirements within the scope of IT related change that they have faced.

1.2 Thesis Layout

This study is designed as complementary two parts: theoretical study and experiential study.

First part is the theoretical study which examines the literature about the subject and includes two chapters as follow:

- Chapter 2: This chapter introduces a literature review exploring CM and Organizational Change (OC) definitions, principles, models and methodologies.
- Chapter 3: This chapter introduces a literature review for IT and investigates the relationship between CM and ITM. It includes definitions for Information Systems (IS) impacts on OC.

Second part is the experiential study.

- Chapter 4: This chapter includes the experiences of a team having IT change processes within its internal and external operations through the online web product named "e-Power". In the light of previous chapters, the guidelines for managing IT related change in Turkey are very well defined. In this chapter, the reader may easily understand the importance of having a change plan and use defined guidelines to apply into any organization.

Chapter 2

Organizational Change

2.1 Objective of the Chapter

The objective of this chapter is to provide a wide view of OC and underline its definition, approaches and models of CM.

2.2 Change Management

Change Management (CM) is a continuous management process which affects organization's vision, mission and structure in order to achieve business goals within the changing internal and external environment (Moran and Brightman, 2001). CM focuses on mainly three phases: adapting to a change, handling the change and finally executing and managing the change. Organizations need to define their own methodologies in the light of these three main phases before any change actions is required and instituted. In order to adapt to the change, organizations have to be flexible and act quickly when they encounter a problem, in order to have the prospective change in control. During the handling change phase, planning is extremely important so that each planned step needs to be identified proactively. Organizations need to be prepared for any resistance which may occur during a change process. This requires a change management plan for the each stage of the change in order to implement the prospective change effectively.

Earlier approaches and theories for CM suggested that organizations could not be effective and their performance didn't improve during a constant change processes (Rieley and Clarkson, 2001). On the other hand, individuals need to have their routine actions to perform effective change and to improve change performance so that they can maintain and control change requirements and operate necessary actions if needed (Luecke, 2003). However, individuals that are involved in continuous change processes within their organization get starting to distinguish that change is natural and routine reflex (Burnes, 2004; Rieley and Clarkson, 2001). Regarding the internal and external conditions of an organization, it's natural to consider change as a normal process (Leifer, 1989).

In today's environment, change is an adaptive and continuous process. External and internal issues may force change upon organizations. In case of effectively dealing with issues and controlling what happens throughout the change is the heart of CM methodology which helps organization to prepare against planned and unplanned changes. CM methodology also helps organization to diagnose the problems with the change and prevent them just before they become as a crisis. Organizations can build a successful change only if they approach change from correct direction with correct actions. Each organization should have its own change strategy and CM process. It may not be possible to define a change strategy for every company. But they can build their own CM strategy through the rules or programs. Organizations generally use CM programs in four main categories as follow: (Luecke, 2003)

- **Structural Change**; organizations are handled as a whole which include series of small pieces. During this program, top management redesigns the small pieces to increase performance.
- **Cost Reduction;** programs focus on terminating the activities or other methods that no needed in order to reduce operational costs.
- **Change Process;** programs focus on business skills. Typically, it is about making processes faster, cost reduced, more effective and reliable.
- **Cultural Change;** programs focus on general approach to internal processes within an organization and relations between employees and management.

Making changes for IT services are closely related with cost reduction and change process programs. Defining a change need or creating a change project is related with cultural change program because management and employees must involve into a change project together for a successful change.

CM is important to define high level of uncertainty factors like which business step should be changed, why it is needed to be changed, which department will be effected by change and which organization will benefit from that change. Applying and managing CM project according to answers of these questions makes change more predictable and more applicable which could otherwise turn into a nightmare easily. Organizations decide a change according to their organizational culture and opportunities or, restrictions in the industry and apply change management.

Sometimes applying a change may block ongoing processes of an organization. For example, a software company may focus on developing new user interface (UI) for its main product but support process may halt or get slowed if all resources of the software company focus and join the development of the new UI. Deciding and declaring actions for the change is an important state to be applied but it needs to be considered in planning to manage ongoing processes until the change process is completed and accepted within all business units of an organization.

2.3 Organizational Change Models

2.3.1 Kurt Lewin's Force-Field Theory and Three-Stage Model

According to Lewin, for an effective change implementation, a three-stage process is necessary (Lewin, 1951).

In this model, it's believed that systems within an organization have equilibrium and they are stabilized by equal and opposite forces in a constant state. Lewin identifies these forces as driving and restraining forces which influence the change process. Restraining forces blocks the change with cultural and traditional agreements. They also try to break the pressure such as competitive and innovative pressures that driving forces created. If driving and restraining forces balance each other out, organization will sit in the position of acceptable equilibrium and there would no need for change. If the driving forces are stronger than the restraining forces then the organizational change process may occur.
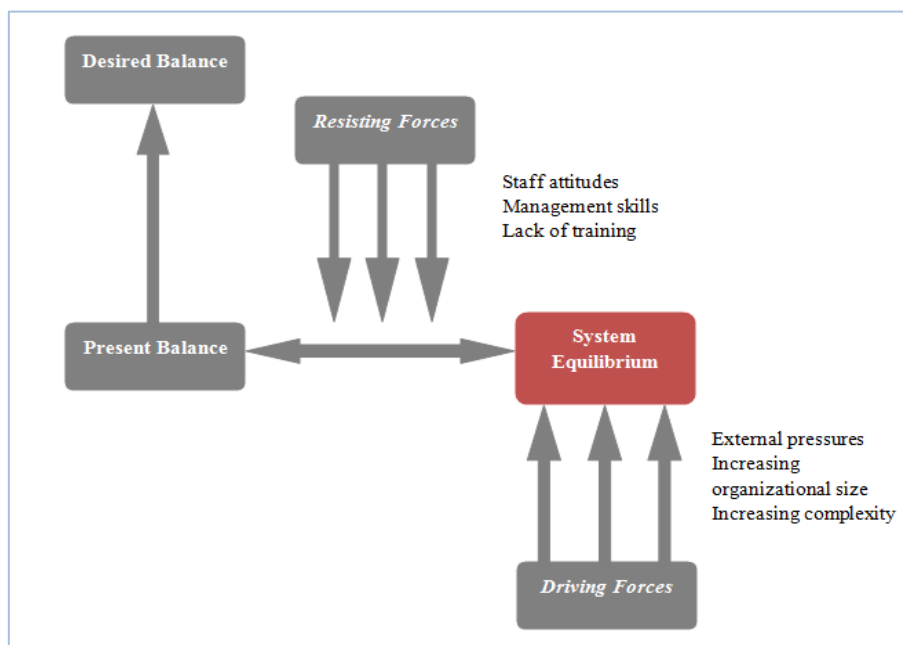
Figure 1 Adopted: Lewin's "Force-Field Model" of OC. Lewin, 1951

"Unfreezing" the existing state is the first step in the change process in this model. Organizations need to be ready for prospective change actions and consider the restraining elements of change in order to identify if the organization really needs that change action. Thus, organization unfreezes the current state and involves investigation of the restraining forces. Unfreezing is necessary to overcome constraints of each individual or group resistance. Unfreezing can be achieved by the usage of following four methods:

1. Absence of confirmation of existing behaviors.
2. Motivate change by creating guilt.
3. Reduce barriers to change by creating safe working environment.
4. Sharing information proactively with the stakeholders and employees for a healthy change

Second step in Lewin's model is the change. In this step, change is required to have to organization move into the intended level. This movement should involve people. Leadership skills are really important in this stage. During change, leaders should be communicating to people, working together with people, encouraging them about benefits of new status.

Lewin's third step in this model is refreezing. If this step is not taken, change will only be short-term and individuals will return to their old lifestyle and norms. The purpose of this stage is to make change permanent. Change should be institutionalized by reinforcing new policies and procedures.
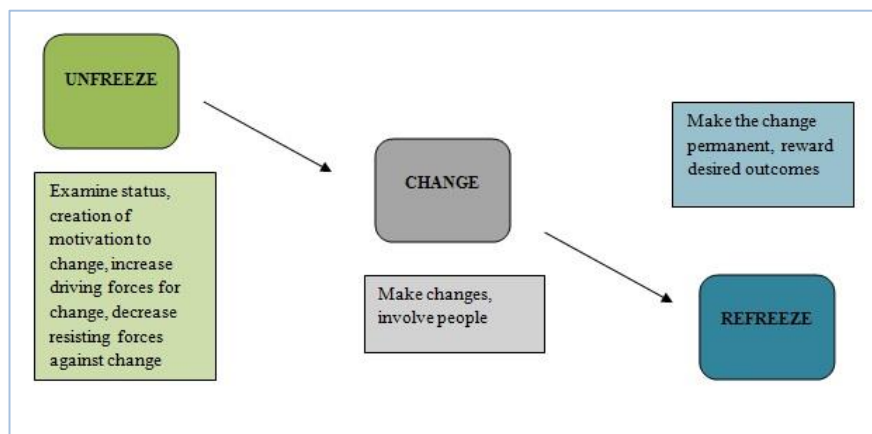
Figure 2 Adopted: Kurt Lewin's "Three-Stage Model". Lewin, 1951

2.3.2 Lippit's Theory of Change

Lippit's theory of change includes seven steps which are extended from Lewin's theory of change. Lippit's theory concentrates on the responsibilities of individuals who execute change process and it states that during the change process, information is used within organization continuously. The steps that create Lippit's theory of change as defined in Table 1.

1. **Diagnose the problem**. Definition of the problem or change need
2. **Assess the motivation and capacity for change.**
3. **Assess the resources and motivation of the change agent.** This includes the change agent's commitment to change, power and stamina.
4. **Choose progressive change objects**. In this step, action plans are developed and strategies are established.
5. **The role of the change agents should be selected and clearly understood by all parties so that expectations are clear.** Examples of roles are: cheerleader, facilitator, and expert.
6. **Maintain the change.** Communication, feedback, and group coordination are essential elements in this stage of the change process.
7. **Gradually terminate from the helping relationship**. The change agent should gradually retreat from their role over time. Thus, change becomes part of the organizational culture.

Table 1 Lippit's seven steps of change theory. Lippit, Watson and Wesley, 1958

Concept of this model points out that if implemented change spreads down to related systems in the organization, it becomes more likely to be a permanent implemented change. Thus, planning change actions as predicting the possibility of neighboring units of the organization may be affected would make acceptance occur in a shorter period.

2.3.3 Edgar Huse's Seven-Stage Model

In this model, a "Seven- Stage" change methodology is proposed by developing the original "Three-Stage" change model of Lewin. Huse determined seven steps and additional two feedback loops staying in the frame of Lewin's model as shown in Figure 3.
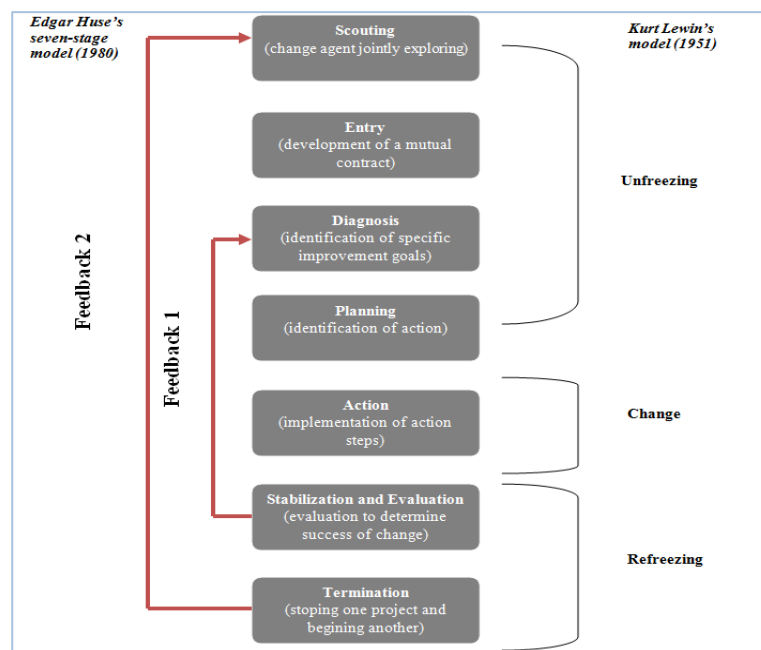
Figure 3 Adopted: Huse's Planned Organizational Change. Huse, 1980

In *scouting* phase, discussions are performed to clarify the need of change between key individuals from the organization and the change team or agent. Change team clearly explores the issues to bring the problems out for the need of attention. In *entry* stage, mutual agreements are involved. *Diagnosis* stage involves determination of specific improvement goals. The consultant diagnoses the underlying organizational problems. *Planning* phase includes a series of intervention techniques and actions are brought together into a timetable or project plan for the change process. *Stabilization* stage is included within the refreezing phase. In this stage, newly added codes, bug fixing, regression implementations and systems takes place as daily routines. *Evaluation* is the stage that aims to identify the need if there is such requirement towards the success of change. In *termination* stage, change becomes completed and ready to use.

The multi-phase is well diagnosed in Huse's model. It reflects the complexity within the organizations and mentions that change plans may be affected by the unpredictable components. Thus, Huse's model differentiates itself from the other planned models.

2.3.4 John Kotter's Eight-Step Model

Kotter's "Eight-Step" model is developed as a result of his experiences as a consultant and very useful and feasible model for the organizations which aim to have change process. In this model, improving communication during the change process being implemented is the mainly focused idea (Kotter, 1996).

1. Create sense of urgency: Analyze the competitive environment by foreseeing future threats and opportunity; and aware and activate theorganizational sources for the urgency of change.
2. Form a powerful coalition: Establish power managerial team for leading change.
3. Create a vision for change: Build clear vision for effective perception of the change ideas among employee.
4. Communicate the vision: The communication is the key part for the successof change, thus build functioning communicative tools to full perception of vision
5. Getting rid of obstacles: Taking care of the resistance factors by empowering the people that can execute your vision
6. Create short-term wins: Plan for short-term success and reward people toincrease motivation
7. Build on change: Consolidation of the change for promoting new products and change
8. Institutionalize new approaches: Make sure that organization will ready for upcoming changes

<p align="center">**Table 2 "Eight-Step" Model. Kotter, 1996**</p>

Kotter (1996) focuses on the importance of creating clear and realistic visions with an appropriate change team.

In this model, defining rational and measurable goals and creating realistic vision is important. For a successful change, communication factor has the vital importance. Communication is the basic and powerful factor to prevent resistance to change (Kotter, 1996).

2.3.5 Luecke's Seven-Stage Model

In 1990s, Michael Beer and his colleagues Russell Eisenstat and Bert Spector defined several steps that managers at business units could create real change. Richard Luecke (2003) added two steps additional to Michael Beer's model which is taken from Management Development Center of General Electric as third step (Schaffer and Thomson, 1992).

1. Definition of Business Problems

According to Beer and his colleagues, defining business problem clearly is the beginning state of an effective change process. Despite of the problem or change need defined clearly, if decision-makers or managers are not convinced to requirement of change, they will not take the risk of leaving current state (Luecke, 2003)

2. Create a Joint Vision In Order to Organize

The people executing change must define a common and clear vision for the desired state. And they should frankly implement this vision to others to show benefits of change. The most of the employees can be supporter of change as a result of an effective vision. John Kotter (1996) sequences six properties for an effective vision:

1. Define a reasonable state.
2. Feel compulsory to achieve that state.
3. Aim rational goals.
4. Concentrate.
5. Be flexible.
6. Provide communication with each level.

Managers or employees must transform the vision into tangible goals like reducing costs %20 or increasing servers' backup capacity %40.

3. Identify the Leadership

Presence of a visible leader who owns and leads change initiative is mandatory. Beer, Eisenstat and Spector say that there are three common properties for a successful change leader:

1. Change leaders believe that creating a revival is a critic point to gain competition ability.

2. They formulate this belief as a reliable vision. Unless employees believe that they will not have better, they won't face with bother of change.
3. These leaders have required organizational skill and ability of managing human relations to give life to their vision.

4. Concentrate on Results Rather Than Activities

Companies that are making project to accomplish change may have managerial attentions to activities instead of results. Whereas research of Schaffer and Thomson shows that these activities seem like physical elements that managers are holding and operating which may sound good but contribution to performance will be reflected in the result is not enough. They advise short-term measurable goals for performance improvement. For instance, organization may select a pilot business unit to implement the first module of their new Customer Relationship Management (CRM) software.

5. Plan a Self-Spreading Change

If change begins from small units, probability of success would be higher. When change accomplished in a small unit, this success can be observed by other units and change initiative spreads spontaneously. If designed change has the features below, organizations may expect success (Rogers 1983)

1. **Relative advantage.** Carrying a clear superriority to existing one
2. **Compatibility with existing values and practices.** Being agree with depth values, experiences and requirements of people
3. **Simplicity and ease of use.** Change should come from understadable reasons and should be easy to adopt. Innovatios that simpler to understand are adopted more rapidly than innovations that require the adopter to develop new skills and understandings.
4. **Trialibility.** Innovation that is triable to represents less uncertainty to the individual who is considering it.
5. **Observable results.** It is useful for individuals to see the results of innovation.

Table 3 Designed change features. Everett, 1983

6. Institutionalize Success through Policies, Systems and Structures

It requires taking risk and effort of people to change within an organization. Because of that, after a successful change, companies should prepare policies, build new information systems and build new reporting relations to save this successful recovery. Institutionalizing success makes the change permanent.

7. Monitor Strategies during Change Process

Change actions practically never go as planned. Many difficulties can figure out in this process. Companies should watch external and internal environment and should be prepared to bring themselves adapted to situation (Luecke, 2003).

2.3.6 Colin Carnall's Change Management Model

Carnall's CM model is an alternative model that emphasizes the effects of managerial skills on change process regarding the success rate of the change implementation. This model focuses on level of managerial skills in managing transition, organizational culture and politics. According to Carnall, managerial skills are the essential factor for efficient CM process (Carnall, 1990).
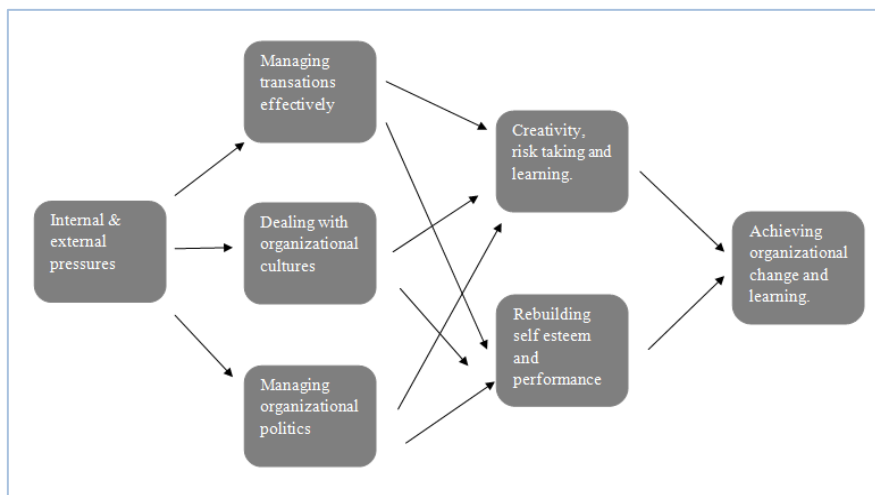
Figure 4 Adopted: Carnall's Change Management Model. Carnall, 1990

Organizations decide to have necessary change action due to effective internal and external pressures. Therefore, organizations take risk and plan to have a desired level in order to reach business goals. When a change process accomplished, organization may have motivation for the next prospective change process (Carnall, 1990).

2.3.7 "Congruence Model" by Nadler and Tushman

This model focuses on understanding the elements which have impacts within successful life cycle change process. It investigates systems and sub-systems within an organization having interactions and dependencies.
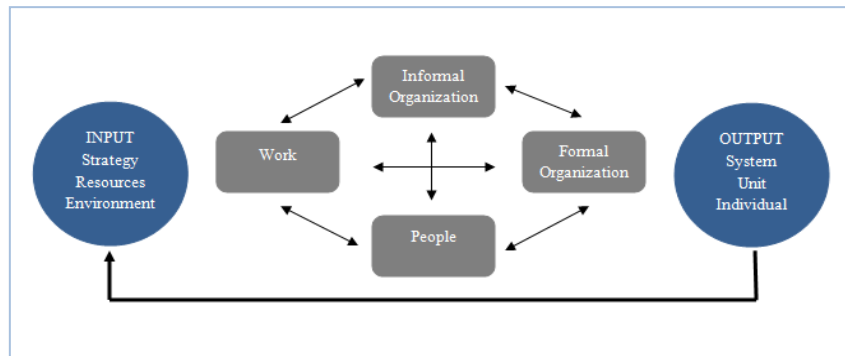
Figure 5 Adopted: Congruence Model. Nadler and Tushman, 1980

Sub-systems which have interaction in this model create organizational integrity through the transformation process. Therefore, developed integrity generates characteristic of the organization because each sub-system has unique feature. In case of a prospective change, organization may deal with the change process in a positive way through the comprised characteristic. Sub-systems are described in the following table:

Sub-System	Interaction
The work	Daily activities of individuals and characteristics of the work: the knowledge or skills it demands, the rewards it offers, and the stress or uncertainty it involves.
The people	Backgrounds, capabilities, skills and expectation of people.
The formal organization	Written rules of the organizational structures, policies and systems organized informally
The informal organization	Unwritten rules of the organization: Emerging structures, systems and norms among the interaction of individuals throughout the time.

Table 4 Interactions among sub-systems within an organization. Nadler and Tushman, 1980

The congruence model does not suggest to copy competitor's change strategy or structure. This model focuses on "fit" concept which defends that every company or organization has its own business dynamics, characteristics and interactions between each set of organizational elements –work, people, formal and informal organization- should fit to organization's business strategy, structure and culture and is more important than the elements themselves.

FIT	THE ISSUES
Individual-Formal Organization	To what extent individual needs are met by the organizational arrangements; to what extent individuals hold clear or distorted perceptions of organizational structures; to what extent individual and organizational goals converge.
Individual-Work	To what extent the needs of individuals are met by the work; to what extent individuals have skills and abilities to meet work demands.
Individual-Informal Organization	To what extent individual needs are met by the informal organization; to what extent the informal Organization makes use of individuals' resources with informal goals.
Work-Formal Organization	Whether the organizational arrangements are adequate to meet the demands of the work; whether organizational arrangements tend to motivate behavioral consistent with work demands.
Work-Informal Organization	Whether the informal organization structure facilitates work performance; whether it hinders or promotes meeting the demands of the work.
Formal &Informal Organization	Whether the goals, rewards and structures of the informal are consistent with those of the formal organization.

Table 5 Determining Degree of Fit. karlin.sdsmt.edu, 2012

2.3.8 Prochaska and DiClemente's Change Theory

Individuals pass through a series of stages during a change process being implemented (Prochaska and DiClemente, 1986). In this change theory, following stages are identified: Precontemplation, contemplation, preparation, action, and maintenance. In *Precontemplation* step, individuals refuse to join any activities related to change process and it's highly possible that this behavior of them is normal. **Contemplation** phase figures out when they understand the change need and the problem that creates change. In this stage, individuals are still not ready to commit change process but they think that they will be. In *Preparation* stage, individuals are ready to change their behaviors and plans. Individuals should be encouraged with small initial steps for change. In the *Action* stage, individuals begin to engage with change processes. As the last phase of this theory, in *Maintenance* phase, organization performs evaluation of implemented change process and tries to establish the change to organization's values.
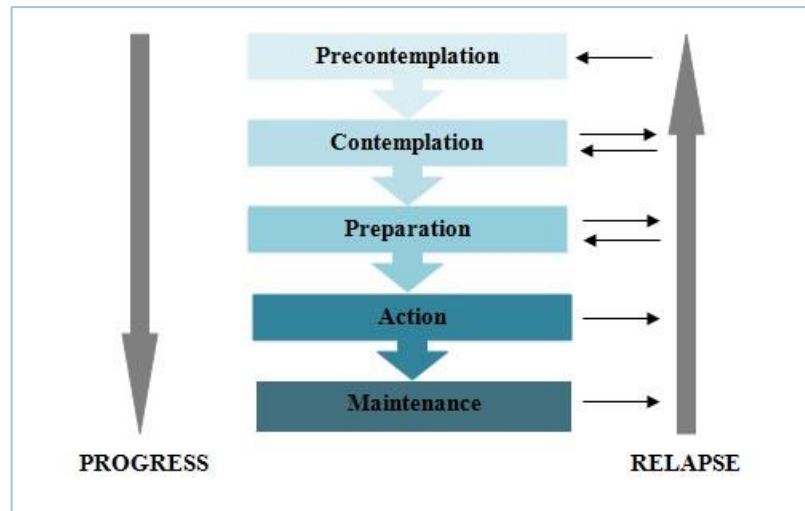
Figure 6 Adopted: Change Model of Prochaska and DiClemente. Prochaska and DiClemente, 1986

Individuals have capability of leaving at any stage during the change process. Since this model takes the behavioral relapses into account, individual may return to the previous behavior. Therefore, individual returns to contemplation stage and gets prepared for the action. This model is important to achieve change process in the individual basis that may impact entire organization. If all individuals learn how to act with the issues that they experienced during the change process instead of circling around it, organization may directly focus on the main change idea instead of considering individual effects.

2.4 Approaches to Change

2.4.1 Top Down and Bottom Up

Traditionally, change is defended to happen from top to down level of organization. Resource of this situation is top management can access the information much easier and have foresight of company's situation in the future by using this information. As a result, change is declared and planned by the top level of management and expected from down level of management to comply with it and enforcement it. A new approach gained importance in response to the criticism of this planned model (Burnes 1996). According to this newly developing model, change should happen from down level to top level of organization. The main factor defending this model down level of organization is much more involved within organizational processes. Being involved within organizational processes and tasks is important to know about what level of resistance that organization will meet during the change and what kind of difficulties that company will face with new business processes after change. Therefore, being

closer to down level of organization before or during the change, prospective problems can be solved at the beginning considering human factor of change.

Dawson (1994) and Wilson (1992) challenged the compatibility of the planned model in an organizational environment that is progressively dynamic and unclear. Putting each change scenario of an organization which can meet often into practice as planning by top level of management will fail mostly because of nature and dynamism of change. But determining some variables for example culture, political or legal factors, economic restrictions etc. unsuccessfully of a change beginning from the down level and spreading to the top level of organization may end change with failure. This is a disadvantage of down level that seeing and understanding change as just a process.

Five interrelated activities are defined to overcome this complexity within strategic and operational change (Pettigrew and Whipp, 1991)

- Evaluation of organizational environment,
- Leading change process,
- Organizational compliance,
- Attaching strategic and operational change,
- Development of human resources

If organizations undertake the above activities they can handle uncertainty against a prospective change action. They act as a whole by emerging information processes with its environment. Therefore, they become as an open-learning system and always prepared for the incoming change opportunities (Pettigrew and Whipp, 1991).

2.4.2 Mixed Planned/Emergent

Organizations can determine their change management strategies considering circumstances which suddenly come up and they can develop a change management plan to apply in a specified time. Perspective of thinking a change process involving the development of identifying organization's current state, targeting a desired state and moving organization to the desired future state may be useful for organizations (Nadler 1998). Organization's skill is the determining factor for starting and focusing change in a strategic way (Pettigrew 1991). Effective organizations are the ones that properly position themselves within their environment (Nadler 1998). But it is up to leadership to decide that change is going to happen according to a planned strategy or emergent situation. Effective and authoritative leadership may bring up an urgent and inevitable change (Champagne 2002). Some qualities that effective leadership may have listed below:

- Leaders have to be entrepreneurial, visionary, strategists, daring and even prepared for crisis and opportunity.
- They have to be forward-looking, and they must program and plan change with care and attention.
- They have to be charismatic, astute psychologists who can overcome the resistance of their troops.
- They have to be human, participatory and empowering.
- They have to prefer flexible structures that can easily accommodate contingencies.
- Lastly, they have to be skilled negotiators who can build winning coalitions.

Table 6 Effective leadership qualities. Champagne, 2002

2.4.3 Economic and Organizational Competence Approach

According to economic approach, change aims economically improvement by considering sponsor's profit. Purpose of this approach is ensuring improvement in cash flow and increased value of shares. Organization takes actions like rewarding performance, staff reduction, real property disposal, reorganizing business units etc. This approach is generally triggered by a financial crisis. In this approach, all business agreements are suspended during the change effort. Generally research and development and planning departments which put intangible value to organization are in danger.

In economic approach change is certainly directed from the top to the down level of organization. Top level of management and top level of business units that responsible for execution of change direct this process. After change is applied, departments or units that are not affected tangibly lost their organizational culture value. Companies applying change management with only defending this approach seem successful in the short term but in the long term failure will be inevitable. Economic approach generally focuses improving shareholder returns. The change actions that could be processed with economic approach may improve organization's returns but the real problem would always be continues. As the short-term organizational returns have achieved, the real change need will be appeared again. Top management needs to apply economic approach only to evaluate real change need after organizations gets economically recovered.

According to organizational competence approach, change aims to develop organizational culture which supports learning and high performance working staff. In this approach, employees are expected to commit themselves to change and improvement. Change comes true with high level of employee attendance and a more horizontal organizational structure. There should be strong connection and communication between organization and its members.

Organizational competence approach is strongly opposite to the economic approach. Human which is one of the main elements of effective change is not unconsidered. For example when

Hewlett-Packard (HP) entered to a financial crisis at the beginning of 1980s, they didn't put the employees in the front of the door to make a cost reduction, instead of this, they provided to organization's operation units and employees greater autonomy by reducing bureaucracy. This behavior was dealing HP's organizational culture, tradition of keeping human existence above all other things.

But even in the case of using organizational competence approach in its purest form and only, the fact of failure should be considered. Ignoring the economic situation and being loyal to organizational culture than needed and not to make necessary things to prevent failure may endanger the existence of the organization. Beer and Nohria touch on the issue of using these two approaches – economic and organizational competence – together could give more successful results. According to their theory, using these two approaches together makes relatively increased productivity. The organizations adopted with using these two approaches together are close to gain competitive advantage. Another advantage of using them together that employees stop feeling fear of losing their job during organizational restructuring (Beer and Nohria, 2000).

2.4.4 Change Typologies

Change may be different according to business sector that organization is in. Companies would like to be at the top using new technic in their business to gain competitive power. A law which will come up can change whole business processes of company and whole organization structure can be redesigned as a result of this. Change types are as follow (Ackerman, 1997):

- **Developmental.** Organization plans and creates improvement for the already implemented business processes. According to this improvement, business processes, methods and performance standards will be changed and this would be considered developmental change. In this kind of change, it can be planned or emergent. People factor is important in this kind of change, because of the acceptance of changes. Also change should be managed and determined well according to organization's need and it should be suitable for organizational culture or people don't accept it and resistance begin.
- **Transitional.** It is more unexpected change type than developmental change. It replaces current processes or application with the ones that totally new to the organization. The consequence of this change type is generally obscure so it causes unstable working environment for the individuals. Employees may feel the fear of losing their job due to unknown results of transitional change process. The people

managing change may involve employees with education sessions on the upcoming processes or application so that they could become engaged in the change.

- **Transformational.** In this stage, both developmental and transitional processes may be required.

Chapter 3

Change Management and Information Technology

3.1 Objective of the Chapter

In this chapter, it's aimed to determine relationship and interaction between IT and CM. This chapter underlines the importance of information usage in organizations and emphasizes the IT elements supports and forces for a change.

3.2 What is Information?

Change is an on-going concept and occurs in any wise. The important thing is to keep up with change and manage it. Referring which reason do decision making organs decide in an organization that when and how the change occurs? Do the companies have to keep up with every changes of external world's consistently changing environment? In fact, must not to look to incident in terms of change management. Companies should be able to interact with the external world constantly to go to change and first of all they must be developed survival reflexes for it. Hinder the normal business process to track external developments will admittedly cause negative consequences. Eventually, purpose of the change management is to increase the company level to targeted level. The companies must keep under control the stability of existing level while going in change and it's only possible with information.

Unstructured, unprocessed inputs constitute data. Analyzing of this data for a particular purpose, grouping, classification, comparing, regulating, gain meaning and when necessary putting into usage called information. In fact this definition contains the corporate information definition. But when mentioning the corporate information, in addition to these, we can mention productive information; in other words, simply in computers, folders, e-mails, employees experiences and opinions about their jobs, sector, product, technology and organization information which are important for companies to produce high valuable products and services, to reap profit and value.

While traditional economics are featuring nature, labor, capital and entrepreneur as of basic production factors, today information became the important one. Today information is basis

decisive factor to provide competition advantage. According to Drucker, meaning of the information concept began to change in 250 years, this case changed society and economics. Nowadays, it seems significant single source (Drucker, 1994). Drucker expresses the state of the world after 1980 and superiority of information in economics as "information capitalism" (Drucker, 1994).

When looked to information's historical evolution, it seems a bureaucratic need and a force to sustain the organizations. Today, the force focuses on to use information rather than to have it (Toffler, 1992). Toffler specifies that change is very rapid, people's knowledge is insufficient and old bases collapsed. Therefore, organizations and economies shouldn't just gather data, meantime should reconfigure the information. For this, information symbols which used its communication, production and distribution need to be reorganized (Toffler 1996). Therefore, organizations must have an effective information management process.

Information is a complex concept including very wide range meanings according to content and perspective which worked on. Information is all of learning, researching and fact, knowledge and understanding which obtained observation. About information was made different definitions due to the multi-dimensional. From time to time, data and information concepts which have closer meaning are used interchangeably. The point is accepted by everyone that information is combination of organized in a number of ideas, rules, procedures and data. In this sense, the information is defined as processed depending on a certain structure, meaningful for users, made sense for current and future decisions, perceived or real value of data (Çoban 1997). According to another definition, information is defined considering its features as follows; "it's a flexible composition which constituted a frame to gather and evaluate the experiences and knowledge in a particular order" (Davenport and Prusak, 2001). Information is emerging in brains that know and put into practice. In organizations, usually not only in documents or cupboards, shows it in routine workouts, processes, applications and norms. According to definition of Davenport and Prusak, information is a data which processed. (Davenport and Prusak, 2001)

The information is data which gained meaningful and useful content and forwarded to a receiver for utilizing in decisions. But the thing to notice here, the information is not meaningful singly and is one of the raw materials of organizational life. In organization, the basis information provides the division of labor and coordination. Especially, in large systems, it's not possible to ensure coordination without information and communication systems

3.2.1 Information in Today's Organization

Information provides great contribution which improves the organizational productivity and individuals' performance. Organization uses information to deliver products and services to increase the profitability by utilizing it. In the individual level, it's used to provide employees more qualified information to support their decisions.

The importance of information to organizational performance has been recognized by the IT Governance Institute, which has developed with its member organizations COBIT (Control Objectives for Information and related Technology), a framework intended to assist organizations in managing their information resources. In COBIT 4.1 (COBIT, 2008), the reasons for the importance of managing information are stated as follows:

Information has a significant impact within the organizations. Managerial individuals need to be convinced about IT is being executed and operated successfully. They particularly try to understand that if the organization is effectively managing information in fact for the following organizational basics:

- Is organization close to achieve its goals?
- Is organization responsive to learn and adapt?
- Is organization managing risks that it experienced in the most rational way?
- Is organization ready to take actions for the recognized opportunities?

3.2.2 Using Information to Support Business Processes

Since the operation units and top management within the organizations have started using information extensively, information became vital for the all business processes. Cost reduction is the main driver for organizations to feel the need of information. They also use information to gain enhanced communication with customers, staff and suppliers.

As the economic developments increased in Turkey, organizations invest in IS and they have increasing benefits of competition, growth and power of training which IS provide. Small and Medium Enterprises (SMEs) which have increasing investments in Turkey evaluate IT investments as a must to become strong positioning the market and to increase profitability. Organizations may have additional reasons to invest in IS as follow:

- Reduce cost,
- Provide communication with internal and external environment,
- Keep up with the progress,
- Analyze customer requirements and demands,
- Create internal competitive stress,
- Rebuild business processes,
- Share knowledge etc.

Organizational performance may be improved by analyzing implemented processes and making optimizations on them to achieve more effective outcomes. Organizational business process is a series of tasks performed by the individuals or systems to achieve business goal (Davenport and Short, 1990). Thus, having some optimizations for the already defined and implemented business process may be changed in order to aim more effective outcome and achieve the organizational goals. In that case, there may be even a removal on the defined business processes if it's identified as unnecessary.
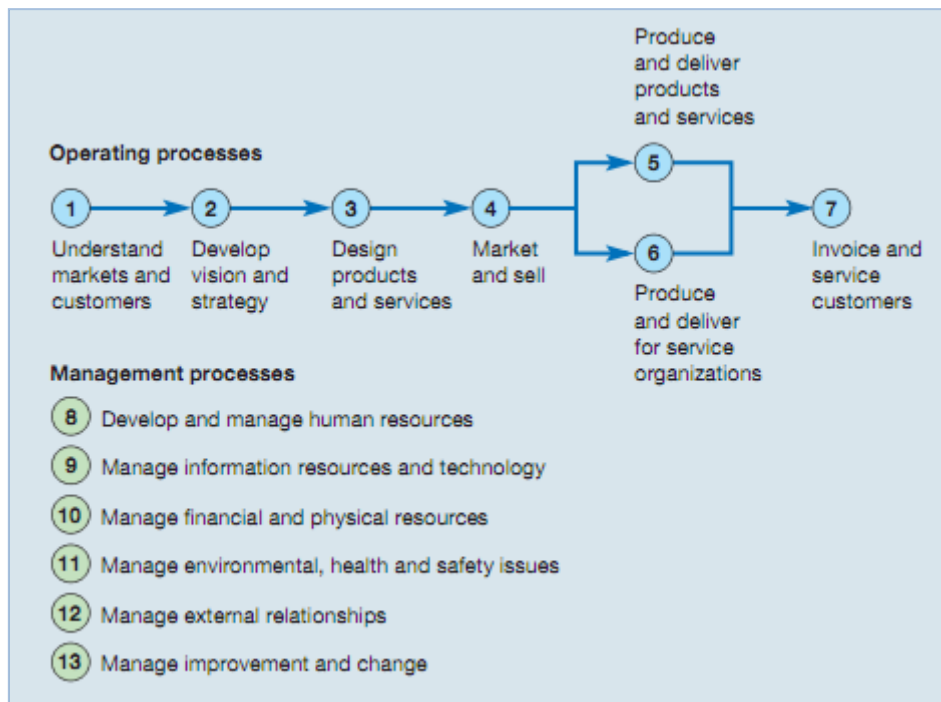
Figure 7 Generic Organizational Operating and Management Processes. Davenport and Short, 1990

Business processes are basically split into two sections as shown in Figure 7. Operations and management processes perform the basic functions of the organization. Organizations generally have interaction with external environment in their operational processes. Organizational strategy has to be defined accordingly by understanding the market and customer needs and behavior. Products or services get the finalized state through the defined strategy and reach customers with selling channels. In managerial process, organization provides control and management for a number of areas like financial and physical resources, human resources, information and technology resources, security and environmental impacts and relationship with external world. As managerial process continues, organization becomes vulnerable to change due to finalized product and organizational vision improvements.

Following types of information groupings are defined by The Hawley Committee which was created to provide organizations effective understanding and usage of their information entities (The Hawley Committee, 1995):

- Market and customer information
- Product information
- Specialist knowledge
- Business process information
- Management information and plans
- Human resource information
- Supplier information
- Accountable information

The information groups listed above are the evident that information enables organizations to sense, research, monitor and control, exchange information and communicate. Information provides organizations awareness about the external environment so that they may reflect the latest developments accordingly through their strategies. Therefore, organization may research markets and understand customer trends to meet new demands. It requires regular monitoring and controlling activities which may turn into daily activities to improve the efficiency. Thus, organizations may have partners for some of their daily activities or critical operations by exchanging information. Moreover, organizations need to keep communication strong about brands, products and services both internally and externally.

3.2.3 Information Management Resources

Information Management (IM) is a set of management procedures to increase the organizational performance by using information as a key resource. Information has the key importance for the organizations to gain values. Managing information is a significant challenge for organizations. Effective IM is depending on effective management of different types of resources within an organization. These are information, people and technology.

The key organizational issues related to Information Management (IM) are stated by Elizabeth Orna (1999) as follow:

- How organization operates collecting, processing and storing information
- Which unit's responsibility of information resources
- How organization manages information processing flow within the organizational units.
- How IT supports organizational units using information
- Which information contributes for organizational value

3.2.4 Information Resources

Data is unprocessed objective facts that may be produced as a result of transactional events. Information is produced from data by adding value, categorizing and calculating.

Information is the revised data within a considerable context. It is commonly used for decision making.

Knowledge is the information that gained meaning and value with the expert skills and experience.

Business information may be divided into different groupings like customer, marketing and financial information. Following information types may be internal and external in order to support business processes in different levels:

- Structured information. It's processed information that can be presented in reports, tables and graphs which are meaningful to the top level of management.
- Unstructured information. It's unprocessed information but ready to have it structured according to organization's need
- Formal information. It's shared information with organizational units in writing.
- Informal information. It's shared information with organizational units

3.2.5 Technology Resources

Software is a computer program which has a huge usage area within computer systems. It can be designed to have programmed functionality.

System software is main software which provides delivering computing services for a range of applications.

Systems software controls and operates the resources within computer environment and provides applications to have functionality in user side. As an example, Microsoft Excel is a software application that you can enter calculations or formulas by using it but Microsoft Windows is system software that interprets the movements of the mouse and keyboard from signals sent by the hardware.

The hardware components are the communication and software elements create technology infrastructure of an organization and aim to store, use and transfer the information.

Hardware is a physical device used for information processing and storage.

Communications Networks are communications media and communications processors used for transfer of data between systems.

3.2.6 People Resources

Human resources involved in IM include internal staff and staff at other organizations such as customers, suppliers, distributors, government and the media.

In this stage, information that provided to organization may be about frequency of customers prefer organization's products or services, return profit that organization gets as result of a product campaign created on a website and measuring distributor activities. This can be also internal like considering the frequency that employees' interesting organization's internal portal website.

3.3 Management Information Systems

IS is the combination of hardware and software elements which are ready to be managed by educational individuals to create, filter and distribute data in order to use organization's internal and external operations (Jessup and Valacich, 2008).

Regarding the definition above, there are three elements to build an IS in an organization: Information, Hardware and Software Elements and Educated Individuals. These elements built within an organization works interacted with each other during the organizational processes. Therefore, managing an IS means to have knowledge and ability to manage organizational operations beside capability of IT processes.

Information is interpreted data used in decision making. Information may be tangible or intangible and provides reducing uncertainty about incoming events and future state (Lucas, 1978). MIS is a set of user integrated system which provides information to support important business processes and operations within an organization. MIS includes computers, written procedures, models for planning and control and decision making and utilize them to build servant system for an organization (Davis and Olson, 1984).The system directly effects managerial functions of a company and also effective in other business areas like planning, implementing, monitoring and controlling.

MIS has been described as a pyramidal structure in shown below with four levels of information resources.
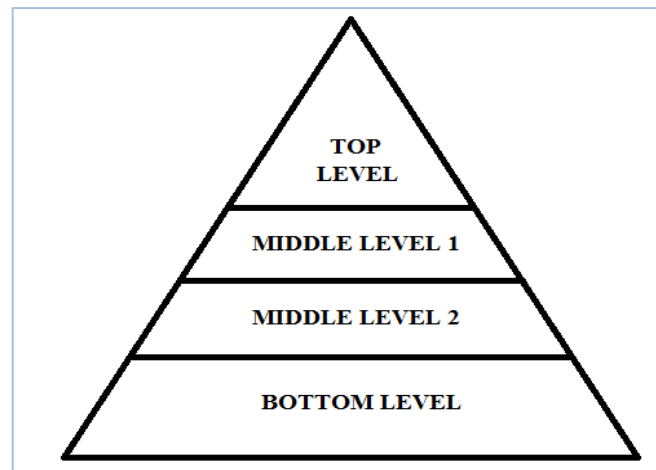
Figure 8 Adopted: MIS as A Pyramidal Structure. www.fao.org, 2012

Organizational structure directly affects information levels. Long term strategic planning and policy making is formed within the highest level of management and supported by the top

level information resources. Tactical planning and decision making which aims short term management control is supported by the second level information resources just under the top level. Daily operations and control mechanisms are supported by the third level of information resources. Finally, transaction processing actions are supported by the bottom level of information resources. Since taking strategic decisions and aiming long term goals are particularly depended upon the hierarchical levels within the organization, the requirements of information may vary accordingly as it is illustrated in Figure 8. As being a support system, MIS uses some elements to improve support functionality.

- Organization's vision
- Organizational structure and behavior
- Leadership concept

Implications about different concepts of organizational structure in case of designing IS has been analyzed by Davis and Olson (1984).

Concept	Conclusion
Hierarchy	Formal control for information is required at higher levels in the organization.
Specialization	IS applications are needed to be possible for specializing regarding organization's requirements.
Formalization	Formalization in the organization becomes increased with the common usage of IS.
Centralization	IS is available to be centralized in case of adopting any level of organization.
Modification of essential model	Essential organizational processes may be modified according to organization's need.
Organization's IS Model	IS reduce information processing and communication within organizational mechanisms but may be considered as an alternative to operate lateral organizational activities.
Organizational culture	IS may be affected by the organizational culture.
Organizational power	IS assets may be designed to improve organizational power.
Organizational growth	IS that are developed and maintained regarding organizational requirements may provide growth at different stages of organization.
Goal displacement	Organizational goals may be displaced during the analysis phase of IS development.
Organizational learning	Since IS is open to change due to organization's requirements, organizational learning gains importance to keep individuals and other related mechanisms updated.
Project based organizational change	Analyzing and planning organizational change phases with a project based IS processes
Stable System	Provides control over every step of information system changes
Organizational change that developed by systems	Identifying and monitoring change variables, relationships within organizational change are considerable in case of analyzing returns for a prospective change environment
Socio-technical organizational systems	Analyzing the change requirements and identifying desired design when socio-technical environment involved.

Table 7 Organizational structural implications for IS. Davis and Olson, 1984

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3.4 How MIS Can Support Organizational Change

MIS deals with providing information for decision-making process, managing IT in the organizations and integrating IT strategies with organizational change efforts (Bensghir, 2002). IS contributes organization at every level of business processes. As demonstrated in Figure 9, requirements collected from suppliers and customers; feedbacks returned from organization's stakeholders and intelligences achieved from competitors are collected in order to proceed with organization's control units. All of the information delivered to control units are analyzed and planned as change requests within change plans. Defined change actions are handled within organizational processes and outputs are achieved at the end of the organizational processes. Outputs are delivered to organization's control units with their performance metrics. Organization's control unit makes analysis on the outputs to see if they meet organizational target. If outputs don't suit with organizational target, control unit will create new change action that can engage with organizational target.
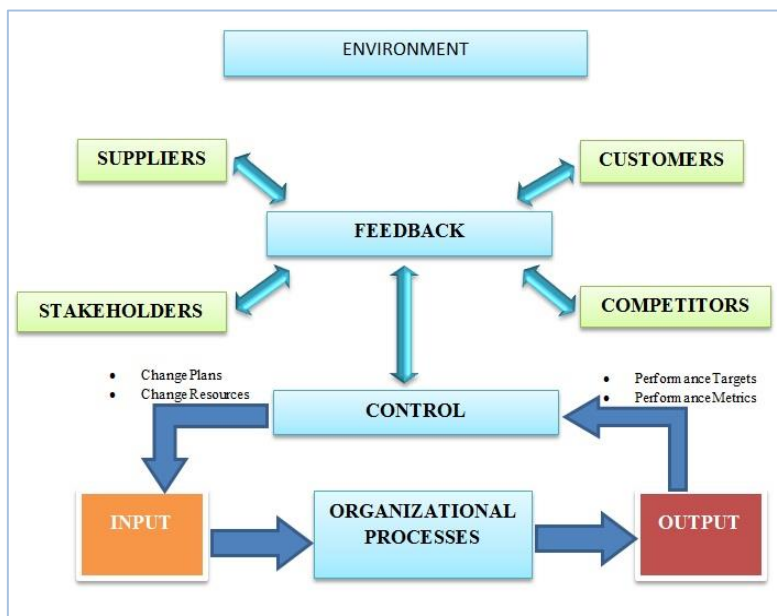
Figure 9 Demonstration of an Organizational Environment

IS may support organizational change with following 3 elements:

- Enterprise Resource Planning (ERP) Applications
- Knowledge Management Software
- Data Mining

ERP (Enterprise Resource Planning) is an integrated computer-based system used to manage internal and external resources including tangible assets, financial resources, materials, and human resources as shown in Figure 10.

Figure 10 Business Applications Delivered by an ERP System. www.ou.edu, 2013

ERP systems include Human Resources Management, Financials, Supply Chain Management, Customer Relationship Management and other management modules supporting decision-making. These modules integrated to one application which provides analysis, design and manage possibilities with its external and internal relations for the organization. ERP system gives organization advantage about easy understanding if they need a change about process steps, to control their targets and to get suppliers' and customers' requirements easily. Also organizations can evaluate their change needs module by module.

Knowledge means understanding the significance of the information. Knowledge can be tacit or explicit, individual or collective. **Knowledge Management** provides meaningful and observable and manageable information by identifying, creating, processing and distributing the lower level information to achieve a series of organizational purposes.
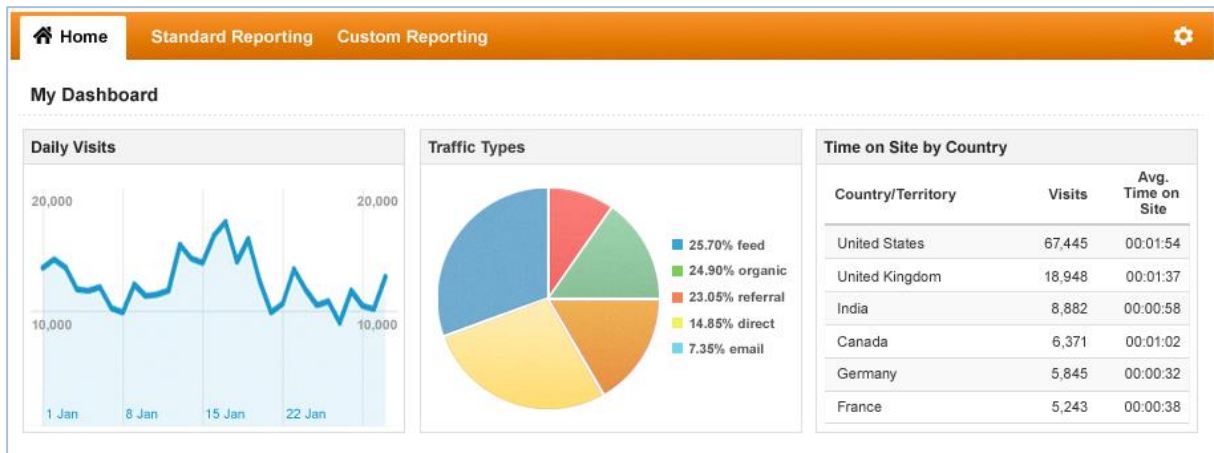
Figure 11 A view from Google Analytics. www.google.com, 2013

Google Analytics is very useful software to understand your web site, e-business availability and popularity of your web site and also is a good example about knowledge management. Google Analytics may provide answers of below questions which users may achieve evaluation points as follow:

- How many users visiting organization's website?
- How user can reach organization selling platform?
- Which pages the users like most?
- Is there increase in identified time intervals?

Users may have all answers of the questions mentioned above through a small script configured by Google and it is very easy to implement. Users may have necessary change actions with the acquired knowledge.

Data Mining provides processing the data. It explores the data and apply patterns that previously defined by the organization in order to have range of purposes like fraud detection, marketing.

Following four tasks are generally included within data mining:

1. **Classification**: It's the task that creates predefined groups to divide data into.
2. **Clustering**: It's the process similar to classification task but here groups are not predefined. In this task, meaningful groupings will be done by the algorithm.
3. **Regression**: This task includes attempts to find a method which forms the data with the minimum error.
4. **Rule learning:** This process aims to find out the relationship between variable items.

MIS has an important role about helping information management to have effective decision making processes. Individuals who have responsibilities in driving organization to the higher

levels in the market perceive information as the key force to achieve important goals. They see information as the key factor in decision making due to its help for marketing and change opportunities. What makes MIS so vital for the top management for the decision making process is providing how to get, use and store data as identifying a systematical mechanism. This mechanism eliminates redundancies in the data and produce key information after having organizationally defined processes.

3.5 IT Contributions to the Organization

Today, managers look IS in a different way. It happened after that they realized how positive of emergent IS for their organizations. Many years, IS was seen as support elements in organizations. But today, having factors that creating value for organizations like competitive advantage can only occur if organizations use information systems. Managers who have decision-taking authority understand the importance of taking high level efficiency from information systems. With information as a strategic power, they gave importance using computers, data processing and management information systems as important tools producing and directing information. But still the reasons for the inactivity of these systems are the following:

- Solutions provided by information are commonly expensive and time-consuming
- Applying information systems are always risky.
- Information systems inevitably bring change to the agenda. But organizations avoid changing most of the time

In order to show how information systems support to the organizations, value chain concept which is developed by Porter and Millar can be used. Their concept splits organizational functions according to the value functions. These functions are basic and supportive functions. Basic functions basically inbound logistics, operations, outbound logistics, service, technology, firm infrastructure (Porter and Millar, 1985).

The value chain concept mentioned above is a model that purposes to create value and competitive advantage by aiming to analyze following specific activities:

- **Inbound Logistics:** It's the activity that aims to inbound transportation activities by receiving, storing and scheduling and backlog control.
- **Operation:** It's the activity which provides to process inbound items by maintaining, packaging, testing and controlling quality.
- **Outbound Logistics:** It's the activity that purposes to finish the product and includes the delivering activities like warehousing, transformation.
- **Service:** It's the activity that provides marketing, pricing and promotions activities for the finished product.

- **Technology: It's the activity that aims to develop to support the value chain activities** and includes research and developmental tasks and procedures.
- **Organization Infrastructure: It's the activity that aims to** have action items and responsibility for planning, marketing and financial management.

IT influences every stage of value chain that figured at Porter's value chain. It changes business making replaced on this value chain and connection between chains. IT also affects scope of competition and structure of finished goods or services.
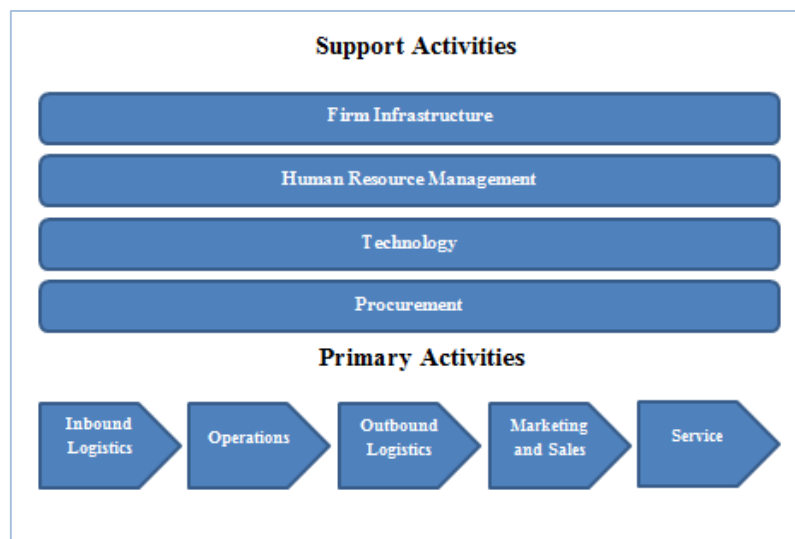

Figure 12 Adopted: Schematic View of Porter's Value Chain. Porter and Millar, 1985

IT influences organizations' primary and supportive units by the ways shown in Figure 13. Information technologies create competitive advantage by providing contributions to every factor of value chain and empowering coordination between customer and organization. IT and with the facilities it offers change the structure of competition by providing competitive advantage, new business opportunities and changing the industrial structure.

Primary and supportive activities defined by Porter and Millar, are supported elements by IT through sort of systems and automations. Decision Support Systems (DSS) and ERP automations support organization within the decision taking and strategy defining level. Personnel planning automations are important for Human Resource Management (HRM). IT systems or automations supporting organization in HRM and firm infrastructure are relational with top level management and provide organization important planning options. Automations and web products created by IT departments provide organizations with online marketing and online sales operations. Systems related with warehousing, manufacturing and remote customer service are supported by IT within organization's primary activities.
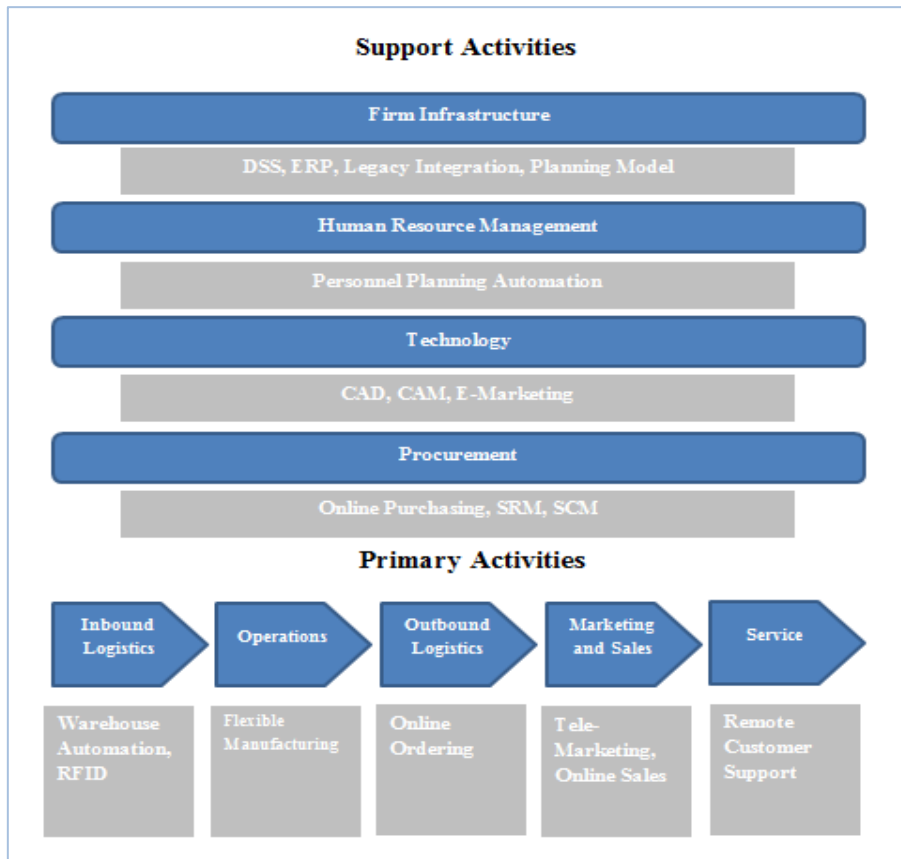
Figure 13 Adopted: ITS Contributions to the Value Chain. Porter and Millar, 1985

3.5.1 Change in the Industrial Structure

Five competitive powers determine profitability of an industry. These are respectively power of sellers, power of supplier organizations, power of customers, power of competitors and power of products that can be substitute. IT affecting these five powers may change the structure of industry and play role in strengthening the power of competitors (Porter and Millar, 1985).

IT may reduce the power of supplier organizations supporting the information systems that presents the possibility of controlling the organizations that providing input themselves. This advantage is provided by IT with supporting information systems that remove the uncertainties. At the same time, IT blocks new competitors entering to the high level of information technology supported organizations included industry because of infrastructure costs are very high.

3.5.2 Competitive Advantage

IT provides organizations a competitive advantage in two ways. The first of these; to provide low-costs leadership and the second is to enable the diversification of products. These two ways can change the scope of their own organizations competition (Schulte's and Sumner, 1989). For example an online booking company can increase the number of customers with starting to reservation via mobile devices. Or an organization in the manufacturing sector can provide savings what can reach up to %50 in labor costs by using automatic cut off system with IT.

Organizations can make it unique using IT to produce designs of goods and services. It can be provided by adding superior features to goods and amending after-sales support services. Thus, they acquire competitive edge. For example company of Volvo, which to develop program of ON-CALL, acquire competitive edge; because they can provide to service by immediate needs during to travel (Schulte's and Sumner, 1989).

3.5.3 New Business Opportunities

Regarding the developments in IT, they are not only removing available opportunities of jobs but also creating new job opportunities. For example; with the developing systems of ATM and Internet Banking, people can do, without banker, lots of banking transactions such as money order, EFT, opening an account and check out, investment operations, as soon as possible and safely.

The big organizations commonly using information technologies and having point of sale systems can take corrective actions by identifying effects on sales of advertising and promotion activities using customer database information systems which they already have and reviewing current market strategies. With this advantage, it becomes easier for them to create new business opportunities.

3.6 Management Support Systems

Management Support Systems (MSS), information technologies supported systems that start from data collecting, data storing and data processing systems which belongs to operational level systems of an organizations and expends to strategic level systems which provide manager to take strategic decisions (Turban, 1990). These systems are decision support systems, data processing systems, expert systems and executive support systems that developed to provide different functions according to different management levels.

3.6.1 Data Processing Systems

It is called "data processing" or "information processing". But data and information are different concepts. Information is finished data. Otherwise data processing means producing information from raw data. Data and information processing pass through similar stages. These are respectively recording, classification and sort, calculation, summarizing and reporting:

- **Recording** stage; includes obtaining data from the sources internal or external to the organization and keeping them at magnetic environment.
- **Classification**, separation data which is available to processing stage, according to their scope, usage places, types, section or other criteria
- **Sort**, includes getting ready systematic lists from classified data according to some identified criteria. Classification and sort stages that complete each other
- **Calculation,** to achieve results by applying mathematical or logical calculations on data.
- **Summarizing** stage, includes transform data into useful format
- **Reporting** stage, includes reaching data to other sections of organization which needed

3.6.2 Management Information Systems

Managers in big organizations take advantage of using information sources to gain competitive advantage. Today, information is the most important strategic weapon. Management Information System (MIS) is an important and effective tool to produce and manage this source.

MIS is a collection of functions and systems about managing, using and processing of information as an organizational resource. It is a business system providing information about organization and its environment for past, today and for the future. It gets all information together which are necessary for managerial decisions. It provides necessary information for strategically planning, control and taking managerial decisions.

Organizations try to execute functions in coordination for a desired goal. These functions are production, marketing, financial and human resources functions. IT and IS to be developed for every one of these functions contribute that making these functions available for organizations' goals.

3.6.2.1 Financial Information System

Organizations financial functions purpose monitoring and analyzing organization's financial state through preparing reports and managing accounting systems. Basically in financial management, these functions are included: budget preparation, credit management, cash flow management, rational assessment of investment options, calculation of insurance premiums and management, Calculation of payments and taxes.

Computers and IS were introduced firstly in accounting systems as a managerial field. With starting usage of information systems in this field, information technologies find common usage area by providing routine accounting record and calculation processes in a short time and effective period.

Financial IS and as integrated sub-systems within provides organizations below advantages:

- Organizations have full knowledge about its customers' account status with sub-system about receivables management so they can avoid risky loan.
- Receivables to be done with automation, organization's office automation can be fulfilled with right information.
- Within the sub-system called order management, organization can take stock decisions without error.
- By executing financial functions with financial information system, organization gains competitive advantage.
- Databases created by executing financial information systems service strategic level of organization for taking tactical or planning decisions.

3.6.2.2 Marketing Information System

Marketing is a function that provides information effecting production and financial decisions in organizations producing goods and service. Basic function of marketing is taking care of customer wishes about organization's goods or service.

With a Marketing Information Systems, processes executed in this function may be designed operational, tactical or strategically according to general properties of processes. In operational level marketing information system includes sale, stock and distribution sub-systems. IS developed in tactical level provides comparison information and uses information that taken from systems developed in operational level. In tactical level marketing information system includes advertising and promotion sub-systems In strategic level of marketing information systems include estimated sales of information systems, product planning and development systems. Estimated sales of information systems provide sales director or managers organization level, industry level or product level information and

analyze support. Product planning and development systems provide designing a product based on consumer preferences.

3.6.2.3 Production Information System

Organizations produce goods by shaping raw materials that they purchased through machine and labor. IS for production oriented organizations generally provide support to all managers.

Production information systems provide support for planning production systems, executing, monitoring and controlling. Data structure in these systems are different that the others. Inputs that used in production information systems can be measured by some physical dimension like temperature, pressure. Production information systems provide organization information about current state of production and analysis that could support to managers about selection of production area.

3.6.2.4 Human Resources Information System

It's a critical success factor that managing the organization's human resources. In human resource management function these processes are included: employment of employees, evaluating current of future personnel, business analysis and development, training employees, producing reports, identifying organization human resource need in short term and long term. Human Resources Information Systems that designed to execute all above process provide huge support managers in very effective manpower managing, planning, applying and controlling.

3.6.3 Decision Support Systems

Computer systems mostly support solutions for problems with structural nature. Otherwise managers are responsible for solving problems by their jurisdiction and intuition. Decision Support Systems (DSS) combine specialties of managers and computers. According to Morton, DSS is an interactive computer system that helps decision maker to solve the problem by using data model (Keen And Morton, 1978). Alter emphasizes the importance of DSS about increasing personal and organizational effectiveness more than data processing productivity (Alter, 1980). Basic difference between management information system and decision support system, DSS can make detailed analysis.

Alter defines decision support systems under 6 groupings (Alter, 1976):

1. Systems to access to information
2. Systems to perform analysis

3. Standard systems in order to prepare reports
4. Systems to estimate alternative decisions prepared with What – if analysis
5. Systems estimating the best alternative decision
6. Systems take decisions on behalf of manager.

First three items listed above are related with DSSs that provide decision taking by querying database and getting periodical reports. The others are systems that provide decision taking by using mathematical models. Decision support systems developed based on what – if analysis helps understanding problems before they occur. Systems estimating the best alternative decision provide the most effective decision support. Systems take decisions on behalf of manager give decision according to the rules programmed itself.

3.6.4 Executive Support Systems

Executive Support Systems (ESS) are very comprehensive systems that provide communication and analysis for managers to resolve their information needs and support decision process (Turban, 1990). ESS includes office support services, improvement planning and control processes and development predictive models to achieve three managerial goals (Rockart and De Long, 1988).

Office Support Services, provide increasing effectiveness for routine processes at organization by taking information technology advantages.

Improvement, planning and control processes, provide increased productivity for Planning and control process by restructuring them. Managers who use ESS for this purpose indicate that system force themselves to make new arrangements about these subjects (Rockart and De Long, 1988): While indicating information needs, taking into account what important for organization is, thinking for the future instead of past while arranging management, planning and control processes, make dynamic reporting processes, expanding functional coordination, activating organizations data management.

Development predictive models: Predictive model presents manager a conceptual frame from his or her mental activities.

ESS gives manager these advantages:

- Easy access external data source
- Getting together data in one place
- Presenting data with decreased complexity
- Building models and making analysis

3.6.5 Expert Systems

Expert Systems (ES) are computer systems that help directors about problem solving and taking effective decision. An expert system is a computer based System which can answer asked question, request explanations, give suggestions and help taking effective decisions. ES is a system that uses related expertise which transferred to a computer of some expert people (Turban, 1990). ES may be in use financial and strategically operations of organizations

Expert systems provide these opportunities (Turban, 1990)

- Increased productivity and goods
- Better quality
- Decreased waiting time
- Achieving expertise information
- Decreased dependence to mission-critical personnel
- Flexibility on production and services
- Achieving ability to solve complex problems

3.7 IT Management Frameworks

3.7.1 IT Infrastructure Library (ITIL)

ITIL is most widely accepted public framework providing best practices in the IT Service Management (ITSM). ITIL covers a set of experiences to provide organizations align their businesses with their own needs and demands. ITIL, through its process approach, enables perfect communication between suppliers, customers, IT units and users. The benefits that gained by the organization deploying ITIL processes are as follow:

- Successful communication between IT units and customers or users.
- Increased business revenue with the advanced service availability
- Increase savings with advanced resource management and reduced rework.
- Successful in defining business goals with advanced decision making processes.

ITIL's last version is version 3, known as ITIL v3, includes five interrelated phases as focusing service processes: Service Strategy, Service Design, Service Transition, Service Operation and Continual Service Improvement. ITIL focuses on ITSM with those five core service related elements and create IT management standards for the organizations.

Organization adapts ITIL needs to define purposes and service concepts for each service section.

In Service Strategy phase, organizations need to define their business requirements and make definitions and analysis to understand what need to improve service quality and business processes. In this phase, it's important for the organizations to achieve strong understanding of customer demands. However, the service provider needs to identify the strategy concepts as defined in ITIL as four basis of strategy: Perspective, position, plan and pattern. Organizations should determine their vision and direction in order to create clear perspective and road map for a successful service. Organizations as a service provider should understand their position to begin and execute for planned action that achieved according to their vision and perspective. Organizations should create patterns to institutionalize the distinctive processes over time.

In Service Design phase, organization as a service provider should design the service within the framework that created in strategy phase. Processes, documentation and requirements are the design elements in this phase and those elements should be created clearly in order to achieve the current and prospective business goals. There are four key figures for effective use of service design: People, products, processes and partners. Individuals with skills involved within the IT services take place in the definition of people key figure. In products key figure, there are managements systems and products used within the delivery of IT services. Processes key figure includes activities which provide IT services. Suppliers, producers and third level partners create partners key figure to assist and support executing IT services.

In Service Transition phase, service provider identifies the requirements and processes to delivery services to have them take place in the operational environment. Service Transition phase enables the outcome of the Service Design phase and delivers in to operational business.

In Service Operation phase, service provider plans and operates the delivered service with minimum failure to ensure that service needs to live to achieve goods and outcomes in return.

3.7.2 Control Objectives or Information and related Technology (COBIT)

COBIT framework helps IT professionals while delivering IT services to achieve business goals. It is developed by Information Systems Audit & Control Association (ISACA) and IT Governance Institute (ITGI) in 1996. It includes best experiences for IT management and provide organizations standardizations to increase their IT service quality and management capabilities. The latest framework is version 5, known as COBIT v5; create value for enterprises with guiding best practices within service management. COBIT as a framework may be applied in all size of organizations and provides following benefits:

- Process and monitor high-importance information to provide successful decision making.
- Provide effective use of IT to achieve business goals.
- Optimize IT process and minimize IT related risk.
- Provide compliance with policies, law and other external constraints.

3.7.3 Capability Maturity Model Integration (CMMI)

CMMI was developed by Software Engineering Institute of Carnegie Mellon University in 1989. CMMI is a framework model that defines key elements of a software development process. It draws a much disciplined road-map from the process that is not mature to the process that is mature. CMMI is a tool that evaluates how mature of a software development process is in an organization and compares with other organizations having same business processes. It is an effective process improvement approach aims to have organizations increased performance with their organizational operations. CMMI approach is generally used in IT field as a reference model. There are several levels that companies seek to have software development projects nowadays:

In CMMI Level 1, software development process is being performed with random steps which cause chaotic environment. In this level, success of a development process is connected with personal skills and there is no plan for a crisis state. Capabilities of software project are not predictable.

In CMMI Level 2, there are defined check points will be handled by project management and project is proceeding suitable with project plans that are previously documented. In this level, a project management system is considerably implemented and this system effectively manages the software development process.

In CMMI Level 3, processes are now well defined and understood. All processes in a software development are defined and explained through standards, policies, tools and methods.

In CMMI Level 4, there are sub processes which examine that current development process is stable and successful. In this level, software development process is predictable that factors could affect process may prevent prospectively or necessary implementations are required.

In CMMI Level 5, feedbacks and control items are evaluated to optimize implemented software development process.

3.8 Interdependence between Organizations and Information Systems

Information systems support organizational processes at every level and every business processes of organization. Information systems wrap organizations such as the spider using

information technologies. Figure 14 shown below demonstrates the interdependence between organizations and information systems:
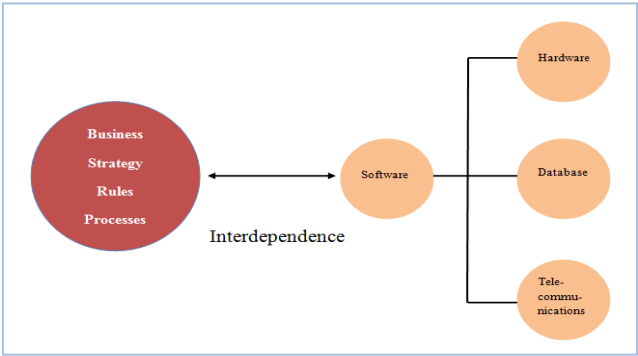

Figure 14 Demonstration of Interdependence between Organizations and Information Systems

Organization reaches IS with using software empowered by hardware, database systems and telecommunication technologies. Business rules, strategies and process use software to get information stored in database systems, to communicate effectively and cheaper and to finish works quickly and effectively.

Chapter 4

Guidelines for Managing IT Related Change in Turkey

4.1 Objective of the Chapter

Objective of the chapter is to identify guidelines in the light of theoretical study of previous chapters and exemplify them through the web based software product named 'e-Power'.

4.2 Research Idea

As an experience to refer thesis idea, an example change process is investigated during thesis research which is about a product named 'e-Power' and its development team having a change process in organizational and technological basis. When it is considered that a local software product became a global product, required change actions are generated in order to have increased quality and keep the product living in fast growing and dynamic environment. E-Power's development and managing team had the required change actions and applied within organizational and technological dynamics of current development and organizational processes. I, as a researcher of this study, had the partial access within change actions and found strong observation chance to reflect change actions and their effects within

development team as also being a team member. In this manner, as having the opportunity to participate a change action which is being implemented through e-Power, all my observations and findings are generated via the literature review belong to IT management models and organizational change models.

4.2.1 Introducing e-Power

Amadeus is a leading travel and tourism company providing high-tech solutions to travel providers, travel agencies and end-users. Amadeus e-Power Project is a web based solution for travel agencies that aim to sell online tickets. It also provides getting online flight ticket, hotel and car reservation for the end-users by querying flight tariff, available rooms and rental car services and making online reservations within the scope of agency's business policies and designs or the selection criteria of end-users regarding the information provided by Amadeus Global Distribution System (GDS).

E-Power is web-based software which has been developed in Turkey. First, e-Power was evaluated as a regional product by Amadeus and it was only available for Middle East and Eastern Europe countries. In time, e-Power got increasingly importance among all other Amadeus products and turned into a central product. Thereby, e-Power started to get investment to be involved bigger markets like Europe, Asia and North America etc. Becoming an increasingly important product and aiming to be involved in larger markets made e-Power open an indispensable change. The main elements that drag e-Power itself and its managing and developing team into change are as follow:

- New customers with new requests
- Need of human resource
- Professionally organized team
- Performance and Quality Assurance
- Following technological developments

When e-Power got into the new markets, naturally it gained more customers with new marketing and development ideas offering to make some change operations in User Interface (UI) and code behind. By aiming to give life that change operations, new change requests have been defined for the product. In order to perform change operations for a product, management and development team needs to be re-organized to increase team performance and reliability. Thus, in terms of the main elements dragging e-Power and its team into change, e-Power had IT related change effecting organizational structure and forcing into the change. Below guidelines shown as subheading are defined by explaining the main elements for e-Power listed above.

4.3 Research Strategy and Design

While research is being performed, there are three types of strategies which the researchers may adopt in their research.

- Quantitative Research
- Qualitative Research
- Action Research

Quantitative and qualitative research strategies are the most utilized ones among those three research strategies. These research strategies may be more illustrative for a specific subject. However, action research strategy is most helpful strategy to find out specific solutions particularly in management related subject. My choice was to design my study as action research because the researcher and the client may collaborate in a solution of diagnosed problem (Bryman, 2004). It concerns practical involvement of a researcher with the solutions which are being developed in an organization. The observations of the researcher should be evaluated with the following recurring phases (Susman and Evered, 1978):

- Phase 1: Diagnosing the action
- Phase 2: Planning the action
- Phase 3: Action taking
- Phase 4: Evaluating
- Phase 5: Learning and specifying

There are five types of research designs which are experiential, cross-sectional, longitudinal, case study and comparative design (Bryman, 2004). I, as the researcher, focused primarily on the case study of e-Power by reviewing and observing its change process experiences as applying action research principles. The main concept of using a case study is to evaluate a compact investigation of a case and finally to bind a theoretical analysis (Bryman, 2004). Thus, the observations and findings are evaluated in the lights of change and IT management frameworks and models in order to generate guidelines which are proposed as a result of this study.

4.4 Research Method

Research method is defined as a practice of collecting data (Bryman, 2004). There are four main practices for collecting data (Silverman, 2001):

- Making analysis on text and documents
- Having interviews
- Observation
- Having observations recorded and transcribed

Considering Silverman's practices, I had an analysis on e-Power's current technical state as a web product and experienced that how the changes occurred within its technical conditions

forced its development organization to change. During this analysis period, I used my participant role and found a chance to involve within the progressing change process. I observed the procedure, methods and practices which are applied by e-Power's development team with comparing the change and IT management literature. The observations and findings are categorized and prioritized as guidelines which constitute the main subject of this study.

4.4.1 Selecting e-Power as a Case Study

The story of e-Power is very inspirational in considering that it was firstly designed and developed as a local product in Turkey. In time, it has become a global product of Amadeus and it's now available for the markets world-wide. E-Power as a web product developed in Turkey and its change experiences in time may inspire other companies having same external and internal conditions in Turkey. As e-Power being a web product in the field of online reservation, it's open to rapid development since people's air, hotel and car reservation demands are in an increasing fashion in the world. Thereby, change demands met by e-Power from global customers inspired me as a researcher so I started investigating the change experiences of e-Power within the scope of this study. I used having participant and observer role as an advantage of being a member in e-Power development team. It gave me advantage of high accuracy analysis chance to observe methods and practices in first-hand.

4.4.2 Implementation Method of Research

Regarding the research design and strategy concept created for this study, I focused on following steps to evaluate research method to explore guidelines:

1. Having analysis on small-scope change demands met by e-Power team
2. Having further analysis on a wide-scope change demand effecting e-Power's organizational structure
3. Having observations on e-Power's organizational re-structuring.
4. Participating the change process
5. Comparing change experiences with change and IT management literature.

Having analysis on small-scope and wide-scope change demands of e-Power offered me great opportunity for a deeper understanding the dynamic environment of e-Power so I started examining the underlying reasons that dragging e-Power into a technical change as a web product. I performed interviews with product managers and managers in the organizational team in e-Power. My questions are structured as open – ended because I find this way is more effective for me to get the results that I can compare with literature. These interviews are not recorded due to confidential reasons but my findings and observations presented as guidelines generalize the outputs of performed interviews.

4.5 Exploring Guidelines through a Living Product: e-Power

Emergent information and communication technologies, the effects of globalization caused unavoidable transformation for institutional and social dimensions. In public or private sectors, social demands of presentation of the services are productivity, efficiency, speed, decreased bureaucracy; managerial demands are transparency, accountability, sharing managerial control.

Change obtained through IT puts forth a presence of a dynamic process. From this perspective information society and e-government fact should be perceived as efficient public service and being integrated with all value of global world. There are some hints about related concepts are understood in the right form. For instance, in 3rd of November in 2002 elections, political parties gave in various project suggestions intended for e-government and information society in their election statements. "Citizen Oriented E-Government", "e-Turkey Project", "National Communication Infrastructure", "Information Society". Although these projects' content and chance of implementation is another subject of research, it's important putting forth perception of presence of information society process and the presence of interest about it.

In Turkey, lots of organizations in public or private industry started to find benefits of opportunities that information technologies served by making huge investment. Developments in information technologies revive new arrangement and change in the organizations.

According to the Bensghir's research made in Turkey including 100 organizations (Bensghir, 1996), Management Support Systems (MSS) used in organizations was managed by mostly IT departments, other relevant departments and organization department. %69.6 of organizations, MSS was managed by the IT departments as displayed in Figure 15.
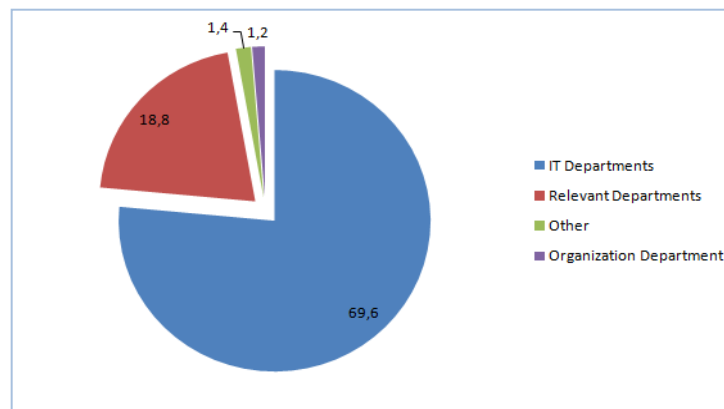

Figure 15 Units Managing Management Support Systems. Bensghir, 1996

When the importance of IS considered, this ratio becomes very important because it is an evidence that IT departments get more expertise with other department's business processes. When marketing department requests from IT department to change some modules of current CRM automation, IT and marketing departments may work together and have some agreements like building a development team just serve to marketing department till the time that change will be implemented. For the assigned team to create a project about re-

engineering the existing modules of current CRM automation, business processes of CRM department need to be fully understood and analyzed. It's important because it's a change that will be managed by IT department. Whatever it seems like technical implementations, Leavitt provides one useful way of thinking as suggesting that an organization's structures, technology, organizational objectives and people are interconnected which means that if a change project is implemented in one area, implications need to be considered in other areas and the balance between the four components as shown below:
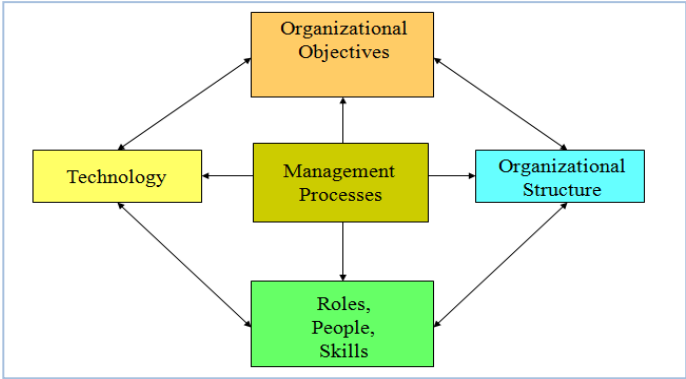
Figure 16 Adopted: Leavitt's Diamond Model. Leavitt, 1965

The person or the team managing the change as mentioned in CRM example need to analyze and investigate all prospective implications and estimate the results considering the other members of diamond.

Leavitt's Diamond Model illustrates that every item in the model is being affected by each other. The experiences of Regional Development Team in Istanbul of Amadeus Company which created E-Power prove that an IT based company may be affected by the product's increased value in the market and become vulnerable to change finally.

4.6 Determine Correct Actions at the Beginning

Before starting the change actions, there are some basic rules to get success at the end of change action. In order to start a healthy change project, the necessity of the change needs to be well understood by the team members. Therefore, a scheduled CAB is needed to identify planned change action by making assessment and prioritization. The Change Advisory Board (CAB) aims to deliver support to CM team for assisting and approving requested change actions. It is also important to clarify details of the change project. If there is a point that wasn't clarified during that meetings, there may be a problem with customer side or may have technical difficulties. For example, updating code behind process may be harder than starting over the code implementation. The members who are attending the CAB meetings have to be selectively chosen to evaluate change details according to technical and business perspective. E-Power team seems built its own CAB meetings. Meetings are being made every week with the participation of product management, technical experts and customer side representative. It's not called CAB but the concept and the idea behind it is the same.

4.6.1 Diagnose the Change Action Well

Change need should be comprehended within the team members because it affects the result of the change (Lippitt, Watson, and Westley, 1958). It's important to spread the change ideas to the team and have team felt like taking up the change ideas or requests seriously. It can only be possible by making need of organizational efforts transparent to the team. Organizations may provide that transparency to the team by using some tools like e-Power team do. E-Power team uses a tool named "Win@proach" which is actually being used by every person belong to Amadeus family including customers, managers, team etc. E-Power team uses that tool to track the CR items to watch their status and monitor ongoing progress. They are able to see the change items have communication with CR owners and customers. They can see the highly prioritized items for the incoming weeks and they carry those items into their own CAB meeting to evaluate the risk, details needed to be shared and sizing for each change action.

Figure 17 A screenshot view of Win@proach

By using Win@proach tool, e-Power team is able to see the importance of the items created by Product Management (PM) or the customers so they can take the necessary action about implementing solutions for them. This tool is also useful for e-Power customers that they can easily have a chance to look at the status of current CRs. Every CR has user stories, screenshot documents, mockups anything needed that attached by customers and PM to make CR clarified for e-Power team.
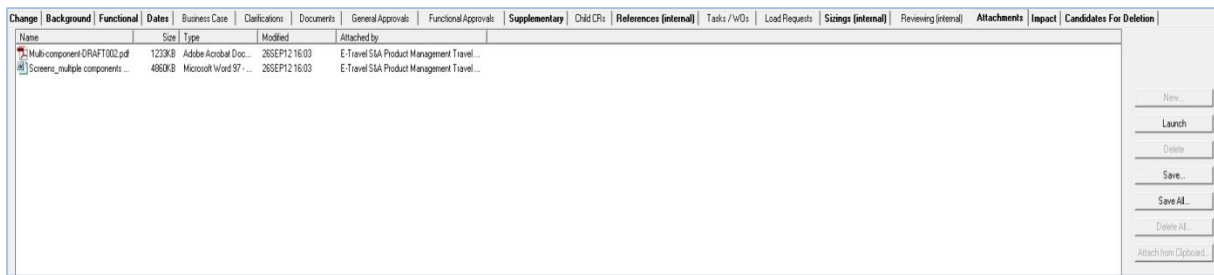
Figure 18 A screenshot View of Win@proach Showing Attached Documents

4.6.2 Create Sense of Urgency

If a prospective change is realized and created as a project concept, it's important that whole company really understands the change need and wants to execute the change project (Kotter, 1996). Kotter's mention here is important for organization to gain extra motivation to get the change applied.

Being honest and having convincing conversations within the team about what's currently happening in the market is important. Because people in the organization may start feeling encouraged about the change need and urgency may build itself. E-Power team has experienced a successfully created sense of urgency for their new customer. Since customer wanted to have very professional UI modules and working on latest frameworks published, team has reached maximum delivery capacity by feeling encouraged and considering that new product will be very successful.

Some of the key actions what need to create sense of urgency as follows:

- Analyze opportunities.
- Have honest discussions
- Stakeholder and customer support
- Identify convincing reasons to get people feeling encouraged
- Develop future plans and identify potential threads

Many times, e-Power team experience sense of urgency during development phases to complete development for important milestones. Some of the big customers may request important changes on the product that need to be delivered till the fair that important travel agencies have attended. Milestones like fairs, meeting with the customers, reporting stakeholders the progress etc. keep development team alerted and have them focus

development in a very concentrated fashion. It may seem like a natural behavior which earned as completing this kind of milestones very often for e-Power team but creating sense of urgency is needed for a successful change implementation and possible to apply any business area that is going to have a change process.

4.6.3 Create Short-Term Wins

Since success is the great motivation element, creating short term wins may provide team or organization a complete motivation during the change process (Kotter, 1996). Team may have a long-term goal to implement a change project, but creating smaller targets which may seem team more achievable and leaves only a small room for failure.

Some of the key actions mentioned below to create short-term wins as follow:

- Create small pieces from one long-term CR as needed.
- Transparently share all small CRs with stakeholders and customers of the main CR.
- Calculate the potential risks about conflicts during small CRs are on progress and consider the lack of time for each small CR completed
- Reward the people who have reached their goals

It's shown below that an important CR has divided into many child CRs to get early achievements and keep team motivated to main change idea.

Figure 19 A Screenshot View of Win@proach Showing Child CRs

4.6.4 Create Virtual Team

Change should be executed through a virtual team which involves employees, team members or consultants coming from different discipline and having interest to planned change, expertise on related organizational processes and being a good communicator. Team's goal must be clear and team should only focus on change and its implications within organization. Organization may have virtual teams for organization's daily activities like support or development, bug fixing etc. processes. In this case, one of the team may be in charge of

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change project. Making one team responsible among other teams may create organizational competence but the importance of change project needs to be considers at first plan. This is only an option to increase knowledge sharing and team dynamics to the highest levels.

E-Power team consists of three virtual teams for the daily activities. But there are two teams additional to before three teams are created for the weekly activities like deployment and test. Besides, there is one additional virtual team selectively chosen among the team members, customers and PM for planned CRs.

E-Power team has very dynamic team structure. It's not easy to implement this kind of dynamic team structure because it requires full concentration for organizational effort. On the other hand, this dynamic team structure has created as a result of a change. Need of human source was one of the key factors dragging e-Power team to change and some actions were taken as necessary. Before e-Power becoming a central product of Amadeus, e-Power was only consists of seven team members and there was no necessity to be organized within the team. After becoming a central product, team enlarged and delivery capacity expectations increased. Thus, in case of using team's capacity as much as effective team needed to be re-organized.

4.6.4.1 Adopt Ad-hoc organizing via Mixed Economic and Organizational Competence Approach

Traditional organizations tried to exceed low capacity, speed and reliability from limitation of manpower and technology by specialization. As a result of specialization, division of labor concept emerged and it became very important tool to increase organization's efficiency. But on the other side division of labor with separating business into pieces, coordination problem emerged. Employees had to be in coordination to finish a job in a desired state because every one of employee was making a part of related job. To maintain that coordinated working they needed to make continuous audit. Thus, hierarchical structure occurred within organizations

IT removed the limitations mentioned above. The facts that known as correct has started lost their validities like control area, hierarchical structure, information from down to up, decision from top to down. New structures which are available to this new and increasingly becoming dynamic environment come up: Ad-hoc organizing (Mintzberg, 1979).

Change project related to IT may be executed with an ad-hoc organizing due to very dynamic structure of IS in organizations. Ad-hoc organizing structure basically has compact organic structure, less formality, vertical and compact training and orientation processes, functional and grouping according to the market structure (Mintzberg, 1983). In this kind of organizing, experts coming from different discipline find an opportunity to work on a project compatibly. Ad-hoc organizing is not suitable for making routine business process. It is more suitable making ordinary business process (Ward, 2005). In this type of organizing taking decisions are distributed every stage of organization according to the decision type between managers and employees. Taking decision is a collective action anymore. It avoids all traps of

bureaucratic structure, more formal behaviors, planning and control systems and the division of manpower is remarkably stable (Mintzberg, 1983).

If an IT based change is planned for the organization, it would be very high possibility of acceptance for whole organization due to change project unit adopted ad-hoc organizing made it without press and decision hierarchy. But change still may not have enough acceptances from the organization. Because, change is much considered as organizational operation, economic conditions and impacts are also needed to be considered.

Economic approach basically doesn't focus on organization's culture, team dynamics or required organizational effort. It only focuses financial sources of organization. During a change process, economically approaching to change may not be enhancing motivation for the team members but it needs to be considered by the PM and stakeholders to see the outcomes of change and evaluate change if it's economically creating a problem or not.

Change is possible for any business area and it should involve human factor every time in the first plan. Organization's goal may be having competitive advantage by investing lots of money for change actions but if human factor is not considered during a change process, it becomes open to failure.

In IT related change actions, units executing this process may accept economic and organizational competence approach and organizing with ad-hoc organizing model to get maximum level of productivity. This kind of organizing will be most suitable management model due to complex and dynamic environment of IS

4.7 Identify the Elements for Change

The elements classified into three groupings are explored for managers and change executers to find their way on the prospective change project as follow:

4.7.1 Models for Organizational Diagnosis

Understanding organization's status is important to identify if organization is planning to get a change action. Therefore, organizations need to find out the point that they are currently in. Thus, they can consider the results and outcomes of planned change.

4.7.1.1 Weisbord's six-box organizational model

Weisbord's model focuses on understanding organization's current state with six key fields (Weisbord, 1976):

1. **Purpose -** Members of the organization need to be clear about the mission.
2. **Relationships** – Role definitions of team members need to be clearly defined.

3. **Leadership** – In a team, leadership has to defined and accepted among the other team members.
4. **Structure** – There need to be compliance between the purpose and the internal structure within the organization.
5. **Rewards -** There need to be a rewarding system to have all individuals' performance improved
6. **Helpful Mechanisms –** Organization's supportive units' tasks need to be clearly defined to achieve organizational purposes.

This is a very useful model to review root and branch interactions but it's more difficult to have constant professional positions to employ someone for ownership of tasks.

4.7.1.2 7-S model

Waterman, Peters and Philips developed an approach as suggesting that there were seven aspects of an organization that needed to harmonize (1980). If each aspect supports the others, then the organization may be called organized. This model is known as 7-S model regarding all of its elements are titled beginning with 'S':

1. **Strategy:** Have some planned actions to reach the identified goals by using organization's allocated limited resources with the most productive way.
2. **Structure:** Explore the functions of the organization and identify the interconnections within the organization.
3. **Systems:** Analyze procedures, policies and daily processes to understand movement of information within the organization.
4. **Staff:** Identify the professional categories within the organization
5. **Style:** Analyze the characteristics of key professionals' behaviors in order to achieve the organizational goals.
6. **Shared values:** Identify the concepts that an organization inspires in its members.
7. **Skills:** Explore a skill map to have the idea of key professionals' capabilities in the organization.

4.7.1.3 PESTELI

This is a kind of checklist model in case of analyzing key factors to have the rational idea about the current state of organization. With this model, organizations may explore the key points to gain advantage for the way of having their goals.

• **Political factors:** Political constraints and opportunities that may directly affect external status of the organization.

• **Economic influences:** Internal and external economic pressures that organizations may face during a change process.

• **Sociological trends:** Individuals' living and working quality, trend and work style changes that could be experienced in an organization.

• **Technological innovations:** Organization's technological approach for the current technology resources. It can be applied continuously if necessary for the technological infrastructure.

political

- ecological/environmental issues
- current legislation home market
- future legislation
- international legislation
- regulatory bodies and processes
- government policies
- government term and change
- trading policies
- funding, grants and initiatives
- home market lobbying/pressure groups
- international pressure groups
- wars and conflicts

economic

- home economy situation
- home economy trends
- overseas economies and trends
- general taxation issues
- taxation specific to product/services
- seasonality/weather issues
- market and trade cycles
- specific industry factors
- market routes and distribution trends
- customer/end-user drivers
- interest and exchange rates
- international trade/monetary issues

social

- lifestyle trends
- demographics
- consumer attitudes and opinions
- media views
- law changes affecting social factors
- brand, company, technology image
- consumer buying patterns
- fashion and role models
- major events and influences
- buying access and trends
- ethnic/religious factors
- advertising and publicity
- ethical issues

technological

- competing technology development
- research funding
- associated/dependent technologies
- replacement technology/solutions
- maturity of technology
- manufacturing maturity and capacity
- information and communications
- consumer buying mechanisms/technology
- technology legislation
- innovation potential
- technology access, licencing, patents
- intellectual property issues
- global communications

Figure 20 Original PEST Analysis Tool. www.businessballs.com, 2013

Recently three other elements are added into original PEST model and now includes following:

• **Ecology:** Analyzing of the outer system which organization may play important role and have an interaction with analyzed ecological system.
• **Legislation:** Analyzing the political rules and optimize organizational behaviors according to legislative requirements.
• **Industry:** Analyzing the opportunities and structural factors of the industry which organization currently involved.

4.7.1.4 Five "Whys"

This tool is formed within series of "Why" questions which aim to point particular events rather than organizational issues to analyze a problem. It may help managers to deal with the real problem instead of struggling generalized causes.

When a problem occurred, first "Why" question should be asked and a series of "Why" question should follow the first question until a particular cause is found. This case becomes completed until five sequential "Why" questions have been processed. In most cases, the whole process is completed when five questions are repeated. If necessary, additional questions need to be considered to identify the root reason of the problem.

4.7.1.5 Root cause analysis

Organizational problems generally have more than one solution approaches which require different resources to plan and execute. Organization chooses necessary solution which is more expedient to organization's existing situation. But organizations have to focus on root cause of experienced problem rather than solutions. Therefore, organizations might focus on found root cause and prevent the problem just before it's reoccurred. When the root cause is found it becomes possible to implement permanent change to process or flow to avoid repeated problems for the same root cause. A successful root-cause analysis is only defined the root cause is identified and related problems are not repeated in the future.

E-Power team uses root cause analysis with a natural reflex. In order to keep the stability and increase the quality of e-Power, team makes sure that bugs or configuration errors experienced during the daily operations may cause a change action to be handled in the future. If there any little possibility occurs which can cause a change, it's evaluated by the virtual team includes expert individuals about related subject.

4.7.2 Evaluating Capacity for Change

4.7.2.1 SWOT analysis

SWOT analysis states that there are four elements of an organization. These are strengths, weaknesses, opportunities and threats. These stated elements are important to evaluate organization's current situation. Internal factors; strengths and weaknesses and external factors; threats and opportunities must be analyzed simultaneously to identify organization's change need. Analysis' result should be used to identify the change action priorities (Ansoff, 1965).

Figure 21 SWOT Analysis

Organizational unit writes down its purpose and mission then identifies all its strengths, weaknesses, opportunities and threats preparing a checklist. This checklist may also become helpful for the further investigations and analysis.

Below two questions are further questions to explore the internal strengths and weaknesses identified in the checklist:

1. Is identified item blocking our business process? Is identified item really necessary to get the business goal or achievement?
2. What is the main cause of the identified item?

If the answers of above questions are positively convincing and have positive impact, it may be considered as strength. Otherwise, it should be considered as weakness.

In order to explore external threads and opportunities, following questions for the identified items within the checklist may be helpful:

1. Does the identified item have positive impact on related business steps? How does it impact? Does it block organization's mission?
2. How should the organization respond to identified thread or opportunity?

The analyst investigating the explored SWOT analysis needs to handle all components with questions and responses to build relationship to set priorities for the change action to address.

4.7.2.2 "Force-Field" analysis

According to Cork (2005), in order to foresee the success probability of a specific change, some preliminary work is needed to be done. Kurt Lewin (1951) proposes to use force-field analysis over other prediction techniques which can be used in order to get success probability. This analysis states that, during implementation of any change, there can be several factors helping achievement of change drivers as well as other factors impeding change restrainers. Improving staff or patient conditions may be a good example of a driver. In the opposite, resistance to change or low staff morale may be a restraining factor. Removing any resisting force is easier than creating more driving forces because resisting force will be stronger if we try to compensate (Lewin, 1951). By this approach, realization of drivers/restraints and consideration of ways in which these can be in less in certain situations will become possible.

This analysis mostly includes a visual diagram which shows the driving and resisting forces, presented with lines with different strengths in order to indicate the importance. All forces should be clearly identified.

Many managers gave examples of their own experiences where they tried to increase driving forces instead of removing resisting forces, and as a conclusion, they had just increased the resistance.

4.7.3 Achieving Change Action

4.7.3.1 Content, context and process model

This model was originally developed by Pettigrew and Whipp (1991) to create insight view for some private sector organization to provide them managing strategically change and increasing competitive performance. Change occurs in a historical, economic, cultural and political context. Below factors are important in shaping performance of change:

1. Environmental assessment.
2. Human resources as assets.
3. Linking strategic and operational change.
4. Leading change.
5. Overall coherence.

It focuses on stressing the importance of merging components. Successful change becomes finalized when the components aiming the goals of change, aiming how to process the change and focusing organizational context of change are interacted successfully.

4.7.3.2 The Hard Systems methodology

The Hard Systems methodology provides stability and problems are clearly defined during the change process being implemented. It assists change process with a sequential approach. Every stage in the methodology is numbered to provide the regularity. Therefore, it's possible to go previous stage and start iteration for the organizational team executing the change process. As a result of the re-iteration, uncertain elements which previously hadn't been taken into account may be clarified.

Stages	Questions
Problem Identification	What should we need to change?
Analyzing Existing State	What is the current state of organization?
Determining Objectives And Goals	What are the objectives to reach to desired state?
Operating Ways to Meet the Goals	What are the ways to meet the goals?
Performance Measurement	What are the ways to measure if reached state was desired state?
Manage Alternatives	What are the options to have backup options?
Test Identified Alternatives	Are these alternatives acceptable?
Define Selected Alternative	How should we choose most wanted alternative?
Implement Selected Alternative	What will be the results of implementing alternatives

Table 8 The Hard Systems methodology stages. Iles and Sutherland, 2001

4.7.3.3The Soft Systems methodology

The Soft Systems methodology provides to track problematic situations that organizations may experience in real-world. There is not a sharp distinction for the problematic situation that this methodology investigates as hardiness or softness. This methodology deals with each problem that may be called as hard or soft. In contrast to the hard systems methodology, the soft systems methodology mainly deals with human activity problems within an organization. It provides solutions for the organizational complex situations which involved lack of agreement (Checkland, 1981).

The stages of The Soft Systems methodology as follow:

1. **Expressing problematic situation.** It's the stage that problematic situation is identified. Models and management technics from other fields ranging from politics, engineering and culture may be looked at. Creative techniques like brainstorming may be a good workshop to identify organizational problems.

2. **Analyzing the problematic situation.** This stage involves having environmental detail of all elements that all individuals think are involved within the problem. Analysis may show that agreed interests or conflicts.

3. **Formulating relevant systems and root definitions.** Issues and key tasks found out at the analysis phase are the basis elements to define relevant systems. It should be a short mission statement as minimum that individuals agreed on and also describing individual's real activity. This stage probably the most beneficial part of this methodology when really agreed on root definition.

4. **Building conceptual model.** At this stage, the best model is chosen with participation of all individuals are involved to build the ideal system and apply it to the organization. Following criteria that Checkland suggest to choose the best one (1981): Efficacy, efficiency, effectiveness, ethically and elegance. These criteria are important to select the ideal system if it's effective to work with minimum resources, it's ethical, beautiful and possible to work and it's possible to contribute to the organization.

5. **Comparing the conceptual model with real world.** At this stage, the selected conceptual model within the previous step is used for comparison with organization's existing system. This stage is important to identify the elements blocking organization do things the ideal way. Knowledge achieved at this stage may influence planned change process.

6. **Defining feasible and desirable changes.** At this stage, organization needs to put together and evaluate feasible and desirable change actions.

7. **Taking action.** Agreed change actions at previous stages need to be performed. This implementation is a human activity because all individuals are involved to all stages of this methodology and decided the ideal change action together. Due to completion of all discussions about defining change action or about necessity of change process till this stage, individuals will be more focused on change process implementation and achievement of targeted goals.

4.8 Enable Change

4.8.1 Players Involved in the Change

4.8.1.1 Sponsor of change

Change in any field should have a sponsor. Sponsor can be a manager or director who expects benefit at the end of change action. Sponsor is responsible for applying and completing change action. Sponsor should have authorization about defining scope of change action, providing necessary sources, approving or rejecting finished change action. A change sponsor should have these specialties (Luecke, 2004):

- Defending change action project at very top level
- Overcoming organizational barriers
- Supplying necessary source for success.
- Effectively communicating with CEO and other stakeholder

4.8.1.2 Change Manager

Every change project has only one change manager. Change manager plans tasks to be done and responsible for daily processes of change action. Change manager takes authorization from sponsor plays important role designing, organizing, finalizing and evaluating the change action. Change manager should follow below tasks like traditional managers:

- Assign efficient participants
- Define framework of change actions
- Clarify change vision
- Provide coordination for activities
- Communicate with sponsor or top level authorized people
- Manage conflicts
- Define necessary sources
- Define milestones

- Manage the budget
- Achieve goals of change action on time and on budget

4.8.1.3 Change Team Leader

Change team leader, is the person who leads change team and reports to change manager. Change team leader should work like other team members. There are five specialties that change team leader should follow:

- **Take the initiative** – change team leader should always be the first taking the initiative.
- **Model** – Change team leader to arrange team's behaviors and increase team's performance may show itself as a model.
- **Negotiator** – Change team leader should be negotiating due to team's needs.
- **Listener** – Change team leader should be a good listener to avoid conflicts or troubles
- **Coaching** – Change team leader should find a way to help team members to improve their technical or non-technical business experiences

4.8.1.4 Members of the Change Team

Members of change team are the engine of all studies of a change action. Sponsor opens the way for a change and provides sources. Manager motivates the individual's performance and protects goal of the study. But the main part of change action is done by the change team members. While creating a change team, you should consider the following elements:

- **Commission** – Sponsor calls employees who are available for the team.
- **Voluntary** – Employees showing interest to change come forward
- **Nomination** – Employees who are already included in the team can nominate employees if they trust their expertise.

It's important to build change team with right employees. According to this, there are some criteria that team leader should follow:

- **Technical skills** – financial expertise, marketing research, software specialist
- **Problem solving skills** – ability to analyze and produce solution in hard conditions.
- **Human relationship skills** – ability to efficiently communicate with people
- **Organizational skills** – ability to communicate with other business units in organization.

4.8.2 Work in Pieces

After completing all preliminary actions, business will be made through change should be separated into small pieces. When change becomes very large scale, to decrease complexity of change actions, goal should be separated into small businesses. Managing actions after separated into small pieces actions will be easier to manage.

Change manager should prefer this due to estimate, commission employees, monitor development and clarify team member's capacity. When these small pieces implemented to unit, change manager can estimate time and cost needed.   But after, during the implementation of this application, it can be clarified that team has not enough skills to complete the change too many times.

4.8.3 Scheduling

Business calendar is an important mechanism for change managers to control activities by sorting them. If a calendar is not generated change process can take months at the same time it causes waste of resources and opportunities to escape. For efficient and useful business calendar the below credentials should be followed:

1. Work in pieces
2. Investigating the relations between tasks
3. Creating a schedule draft
4. Perfecting the schedule

The first step was explained above so detailed explanation will continue by explaining the other three.

4.8.3.1 Investigating the relations between tasks

Many tasks may be in a relationship with each other so they may be required to be done with some sequential steps. Let's consider a change project of a web site. Developers would like to re-design codes for efficiency. First of all, there should be a design that defines which part of the codes will change and implementation will cover what part of functionality? According to this design, first codes should be written and implemented and then they required to be tested. These tasks should be done sequentially due to relationship between the tasks. Figure 22 shows us task line that planned sequential so to start testing the codes you should wait codes implemented.
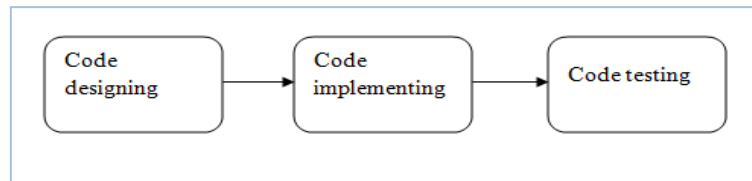
Figure 22 Demonstration of Sequentially Designed Tasks

But there is a fact that these tasks can be planned by taking action parallel. Because testing and implementing codes are not related to each other they separately related to design. Figure 23 shows a demonstration that tasks can be done in parallel. Managers should consider that possibility of making tasks planned to be done in parallel gives the advantage of finishing projects in a shorter time period.
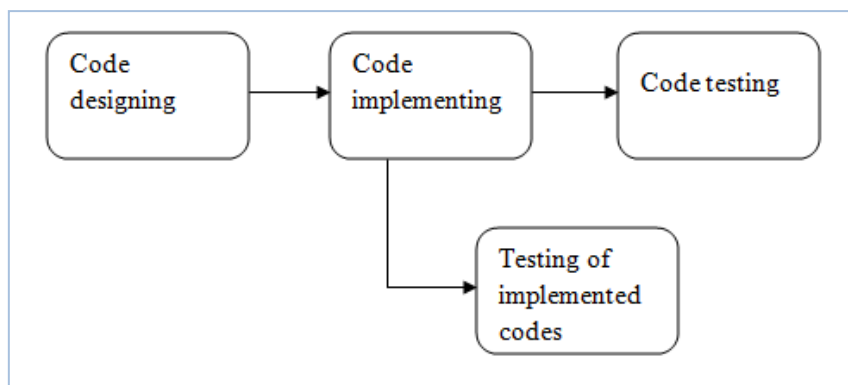
Figure 23 Demonstration of Tasks Designed in Parallel

4.8.3.2 Creating a schedule draft

At this point, change team has the information to practice a change project: Tasks list, time estimations of tasks and relationships of tasks. First we should create a schedule draft. Later we will be more experienced on planned tasks so we can see bottlenecks, conflicts or other negative issues. A business calendar should involve these:

- All tasks with start and finish dates
- Time estimations of tasks
- Relationships between tasks

4.8.3.2.1 Gantt chart

Gantt chart is a schema to build business calendar preferred by many managers. Tasks listed on left top column and tasks demonstrated as blocks which show time limitation of each task.

Gantt chart involves these items:

- State of the completed tasks
- Estimated time
- Estimated time of tasks
- Order of tasks

Gantt chart is very popular tool due to simplicity and user friendly interface. It gives possibility to achieve information about project and time scales by looking once. But Gantt chart doesn't show the relationship between tasks.

4.8.3.2.2 Critical Path

Other important information that is not included in Gantt chart is critical path. Critical path is set of tasks that define total time of project. This is the longest path for the project and delay occurred here will extend projects total time.
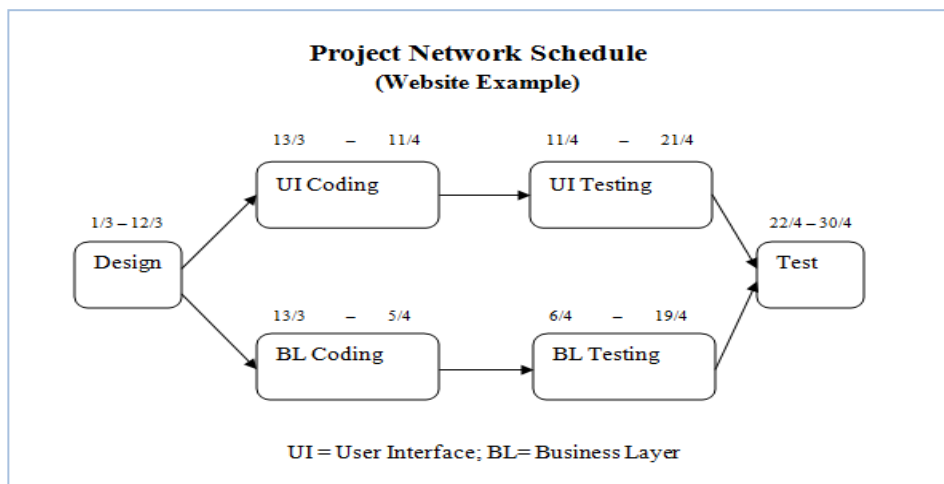
Figure 24 Demonstration of a Project Network Schedule Showing Critical Path

Figure 24 demonstrates web item change scenario that is mentioned before and task to be done. Project Network Schedule shows all relationships between tasks different from Gantt chart and shows the critical path. In above example, critical path consist of the following tasks:

1) Design,
2) UI Coding,
3) UI Testing,
4) Website testing.

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This task arrangement creates the longest path so this is critical path. The other task arrangement in above example consist BL Coding and BL Testing is two days shorter than the critical path. Team members executing task through this path can extend their schedule for two days without effecting whole project.

4.8.3.3 Perfecting the Schedule

The last step building a business calendar is making the calendar arrange for much better state. Here change manager and team review the draft with a very sensitive approach. This review involves below points:

1. Mistakes
2. Escaped points
3. Overloading
4. Bottlenecks
5. Workload imbalances
6. Possibilities to reduce estimated time

4.9 Manage Change

4.9.1 Levels: individual, teams, organization

If an IT based change effects whole organizational structure, this change action should be managed separately in individual, team and organizational levels. Prospective issues taking place within each level and possible effects occurred in one level affecting another should be considered by the change team or change manager.

Participation to the change action with the most productive way is important for management side of change. Basic way to provide participation is to get an individual committed to the goals and values of the organization. For the second level participation, organizations need to establish goods and provide face to face relationship within the functional teams. Finally, all units joint to change actions as an individual or as a team make change functional and completed for the organization and its internal and external environment.

4.9.1.1 Individual level

Schein (1980) emphasizes that any kind of change is mediated through individual level. It doesn't matter if change focuses on organization's structure, reward systems or based on a complete technological structure. "Many change initiative may fail because of organizations underestimating the importance of individual level and cognitive-affective nature of organizational change" (Devos and Buelens, 2006)

Following schools of thought considering individual change are stated by Cameron and Green in 2005:

The **behaviorist** approach is totally related with rewarding strategies of organization. Change initiative has to be accepted by the individuals first. This approach focuses on changing the behaviors of the individuals with the reward and punishment strategies who are resisting change. Performance monitoring, skills training, management competencies and feedback mechanisms are some of the interventions that could facilitate the change process.

The **cognitive** approach is about understanding goals within individual level to achieve in a change process. Organization may give coaching to the individuals to achieve targeted results. Organization may rebuild planning and objective framework if they decide it wasn't effective.

The **psychodynamic** approach is about concentrating on the inner world of change. Individuals need to understand the change dynamics. Change managers need to counsel people through the change.

The **humanistic** approach is about building healthy development and growth. In this approach, interventions are encouraging the communication and developing the learning organizations.

4.9.1.2 Teams

Regarding the increased number of interactions between participants, the team level concept is more complex than the individual level. Teams are important for organization for organizational tasks to be performed with cooperative and efficient way.

People may react differently when they are a member of a team than being active in the individual level (Cameron and Green, 2005). When change initiative starts thorough having a team adopted to change, it's easier to have other team affected by the first adopted team's behavior. Thus, change becomes accepted by the whole organization as quicker than having people accepted with the individual level. Individual's thought flow about new change process as follows:

1. **Nothing is broken, no fix required.** Some individuals may think that there is no negative effect came out to have a change action.
2. **Considering future state.** Some individuals may think that change may suit its personal future goals.
3. **Decide to do it.** Some individuals are only interested in having action for the things now.

4. **Get the change action.** Some individuals are interested in trying different things. At the end, all individuals will be attended.

Research has been performed by Belbin (1981) to understand the individuals characteristics which need to have a team to function effectively. His research aimed to understand the certain individual characteristics which are involved within high and low performing teams. Following member of roles belong to higher performing teams have been explored by his research:

> • **The chairman:** Makes the coordination work for the team regarding its goals and targets and provides people involved within the team focused. In order to provide that coordination, management and communication skills are required.
> • **The shaper:** Concentrates on team's progress towards assigned tasks with proactive attitude.
> • **The plant:** Creates concepts by inspiring team's intelligence and working capacity.
> • **The monitor:** Tracks the work that is being performed by the team and gets the information by aiming to produce meaningful data.
> • **The company worker:** Translates ideas and concepts into tangible work orders by aiming stability of the product.
> • **The resource investigator:** Individual with skill to research external environment to get the necessary resources appropriate to organization's demands.
> • **The facilitator:** Focuses on the team dynamics and predicts difficult tasks or challenges which may have a potential dead-end.
> • **The completer:** Aims to meet the deadlines by having disciplined approach to complete the tasks.

Belbin identified if a team was created with keeping individual's working behaviors and preferences in mind; team would have better team dependence and goal oriented working style.

Organizational change process typically includes temporary working teams committed to the organization's goals. In order to form a goal oriented change team with higher performance, organizations need to consider individual's preferences and working styles.

4.9.1.3 Organization

Goals and tasks of an organization need to have an organizational identity to be acceptable in a competitive environment. Eventually, an organization needs to have capability of dealing with opportunities and threats from the external environment by reflecting its strengths and weaknesses. The evaluation of opportunities, threats, weaknesses and strengths conclude for a selected process which constitutes services and programs. It's important for an organization

having procedures or policies to adapt demands coming from external environment and aim to reach goals or targets of the organization (Coghlan and McAuliffe, 2003).

The discussions across the organization about the necessity for change point a critical process (Quirke 1996). Each act sourced by individual and targeting to interdepartmental team is a recursive process (Rashford and Coghlan, 1994). Therefore, when individual's position adopted by other team, it strengthens the individual. Likewise, when a particular team's position adopted by other team, that strengthens that team and also when a new service adopted by customers of the organization, that strengthens the organization. Thus, IT related change which effects whole organization needs to be handled by focusing required attention for each level.

4.9.2 Response to Change

In a change process or during the preparation process for a change action, communication is very important to gather people's honest and direct expressions about the reasons for change to help people open to change (Heathfield, 2006). Accordingly, change action reaches its goal when the whole organization participated in the effort (Kanter, 1985).

4.9.3 Failure

Change projects are often expensive and advanced processes which do not conclude a successful change (Beer et al. 1996). The estimated success rates of noticeable change projects are between %20 and %50 (Garside, 1998). The reason of high failure rates of change projects is difference of understanding change between management and employee side. According to the management side, change is an opportunity for the organization to have a survival strategy. According to the employee side, it is destructive and intrusive (Strebel, 1996). Below reasons are explored by Kotter (1990) stating the reasons of change projects which may fail:

- Increased complexity
- Failed building a substantial political coalition
- Lack of clear vision
- Failed communicating the vision clearly
- Failed protecting the change vision
- Failed planning short-term wings
- Failed declaring the time of victory
- Failed institutionalizing changes in organizational culture.

4.9.3.1 Minimizing the Risk of Failure

In order to reduce the risk of failure in software projects which are having change processes, organizations need to consider the failure reasons as Kotter mentioned in the previous part. In course of time, there may be many implementations on organization's software product regarding market or customer requirements. Consequently, performed implementations may prevent extendibility for the new requirements. Moreover, extendibility of a software product may be prevented by the increased complexity. The complexity may be related with business demands or coding issues. Generally, the main concept of the complexity with the business demands are related with the recursive requirements in the specific interest area of the organization's current business. In this case, organizations need to analyze the additional customer or market demands with the development unit to keep the software product stable for the future change actions. The extendibility case with the coding issues is about technical coding plan. Organization orders small scope business automation and the only important element for the organization is time. Development unit performs necessary coding and implements the automation to the live environment in the planned schedule. If organization keeps giving new requirements in addition to already planned and implemented automation, development unit tries to handle code complexity while new requirement is still in coding progress. Since the automation was planned and designed in a limited time for a specific demand, the new requirements incoming recursively may create new change scenarios for the automation.

When a change action is planned with joint resolution involved all departments of an organization, there may be many requests for the software product which is having a change process. Each department or unit would want to add their own specific business cases to be automated with already planned change action in a specific purpose. In this case, change agents should build political relations with the involved units by negotiating on their demands aiming to keep loyal to planned change process. Thus, change agent may provide stability on the vision of the change action. Since the clearly defined change vision is important in itself, keeping change vision stable becomes as an important political challenge.

Determining a change vision clearly has vital importance to minimize change failure risk. Each individual should understand and accept the change with a clearly defined change vision. Organization should announce the change with its vision and scope for all individuals that are involved or not involved within the change process. Change agents may analyze if change vision is clear for an organization with a series of meetings with the individuals divided into small groups so they can identify if there is a problem with the already defined change vision.

A wide-scope change process in a software project may create negative feelings for the stakeholders or even for the developers involved within the process that there were no improvements from the day process started. Dividing that wide-scope change process into a series of small-scope change processes will reverse the negative winds into positive ones.

Each day since change process started, stakeholders or change agents may see the improvements clearly thanks to small-scope changes so they can analyze the risks and act proactively.

Completion phase of a change process is a very critical point because all individuals, departments, sponsors wait for declaring completion and make business plans accordingly. If a change agent declares the completion phase earlier due to analyzing problems, then things get more difficult to handle after organization started a specific business plan into execution. In this context, change agent or team should analyze the completion phase well and act accordingly if they identify a possible risk which could extend the time of finish date of the completion phase.

After a change process completed, organization needs to take some actions to institutionalize change item for the organization. Consequently, the experiences learned or the methodology developed during the change process need to be determined within the organizational culture so organization gets stronger for the future change actions.

4.9.4 Working with Resistance

In an organization, resistance of stakeholders for change may have powerful restraining force according to Lewin's force field analysis. Regarding Lewin's force field analysis, Cameron and Green (2005) stated additional driving force as survival anxiety and restraining force as learning anxiety. Stakeholders resist change not only for emotional reasons (Kanter 1985). The noticeable and predictable reasons that stakeholders may resist change are as follow:

• **Parochial self-interest:** Stakeholders may assume to lose organizational returns like company share and management power. They may also think that they will have extra workload and feel career insecurity as a result of a change implementation. It's a problematic situation that might prevent focusing to be successful during change being implemented.

• **Resentment:** Resentment may be caused by increased presence of authority of people sponsoring change as a result of the directives that almost unavoidable from top management in executing change.

• **Change Comprehensions:** Comprehending change depends on individual's position in an organization. Since individual's access to information may be provided by different channels within the organization, it's possible to mention that person's perception of change proportional to the way of accessing information.
• **Lack of trust:** Lack of trust generally caused by the poor communication between individuals within an organization.

- **Low tolerance for change:** Having the fear of being unable to gain new skills which implemented change may bring up.

Resistance has to be considered as a natural fact during the way of understanding change. Individuals may have different reasons to resist change and organizations may evaluate those resistant points to overcome and continue to the change process. Every change process may experience with the resistance both technically or organizationally. Therefore, organizations need to have strong communication internally and if needed externally. Resistance is generally observed by two groups of people: change promoters and people defending not to change. Understanding perspective of people who defend not to change is important as understanding the perspective of change promoters. Change agent or the organizational team executing the change project need to review and modify it in the light of feedbacks coming from change promoters and defenders (Coghlan and McAuliffe, 2003).

4.9.5 Institutionalize Success through Policies, Systems and Structures

This is needed for upcoming changes. After a successful or failed change actions change team should prepare policies, structures or develop model due to organization's specific characteristics (Luecke, 2003). Being prepared for upcoming change prevents crises becoming chronic and approaching change with fear. When change team complete and implement a change, necessary documents or papers should be prepared and published by the change team to organization which includes goals and achievements stating contributions to the organization. In case of implemented change is about developmental case, team members included within the change team need to prepare technical and functional documents. Technical documents may be used as a guide for another change team who will work on a similar change project. Functional documentation is needed for product management mostly. Product managers or decision-maker may use functional documents to analyze what needed and to finalize what implemented. Functional documents are also necessary due to possible conflicts. Another change projects requested by the customers or other external environment may cause a conflict with previously implemented change action. Product management needs to analyze all functional documents and use them as a guide for evaluating future change requests.

Organizations need to institutionalize implemented change projects to make them permanent. In terms of considering a change project applied to payment flow of software, stakeholders need to know if applied change affects customers in the way of shopping effectively and securely. All the info about applied change have to be clear by the stakeholders side so they can improve our quality by using applied change and proposing our product for the new possible customers. Thus, organizations may experience of having resistance possibility about prospective change projects decreased internally and externally.

4.10 Overview of Guidelines in Ten Steps

In the light of guidelines context explored through e-Power, below steps are identified to summarize guidelines as in ten sequential steps.

4.10.1 Analyze change need and capacity

Organizations which are having IT related change need to determine every possible change action in the technical basis. At the same time, the risks of change spreading organizational basis should be considered as well. As in previously stated e-Power example, change planned in the technical basis may spread to organizational basis. Change actions both planned in technical and organizational basis require particular analysis phase. Consequently, change capacity and need becomes identified with its all risks and details.

4.10.2 Analyze team capacity

In an IT related change, organizations have development team to implement planned change into current automation or software. Development team's capacity need to be identified in the light of determined change need and capacity. Organizations may have additional human source to increase the team capacity if they think that change capacity is bigger than team's productive capacity. In this context, organization may see the barriers that blocking team to progress faster within the planned change process.

4.10.3 Identify change action and capacity

All change actions planned within the whole change process should be identified clearly. Furthermore, their economical and human resource cost should be identified well so the product owners or stakeholders can judge that the change actions included within the change process are necessary or not.

4.10.4 Prioritize change actions and plan short-term wins

All identified change actions within the whole change process should be prioritized according to their identified necessities and capacities. Prioritization should be performed with the all individuals joint resolution. Each individual should join this resolution not to miss any detail about a change action to understand if it comes earlier than the others. Moreover, a wide-scope change action may be divided into several small-scope change actions to make monitoring easier on the wide-scope change. By doing so, change team can create short-term wins to provide change sponsors or product owners the transparent progress monitoring.

4.10.5 Identify roles and responsibilities

The roles and responsibilities for all involved individuals should be clearly identified. Each individual should understand his or her responsibility clearly not to block the change progress. In this context, change team or organization needs to have a backup plan for the individuals who have important responsibility in the change process. Change team should analyze the risks for those individuals to minimize the damage if organization experiences any negative action that possibly drags whole change process into a critical point. Therefore, identification roles and responsibilities should consider the human function as it's the most important element in a change process.

**4.10.6 Identify milestones and enable change**

Before enabling change process, all milestones which reflect significant importance for the change progress should be identified. When the progress came into such milestone point, there may be evaluation meetings arranged to argue the progress of change process.

4.10.7 Manage change with participation of individuals from each level

Change team or change manager should involve all individuals during the important phases of change action. It's useful to have small-scope monitoring meetings to have the idea about the change progress so each individual feel responsible about the progress. Furthermore, if these small-scope monitoring meetings are planned as regular, bottleneck or blockage points will rise to the surface. Hereby, change manager may identify the points that create advantage or disadvantage for the change progress and clearly determine if change progress require additional individual source with specific expertise from different level of organization.

4.10.8 Maintain change with critical points: resistance, failure, system or individual response

Change manager is responsible to keep the change progressing in spite of critical points reflecting resistance or failure situations. These critical situations are possible to occur in any change process, the main issue is, how effective they can be solved. The best practice to a handle a failure or resistance issue is to predict. Regularly planned monitoring meetings are the perfect tools to predict a resistance or failure issue.
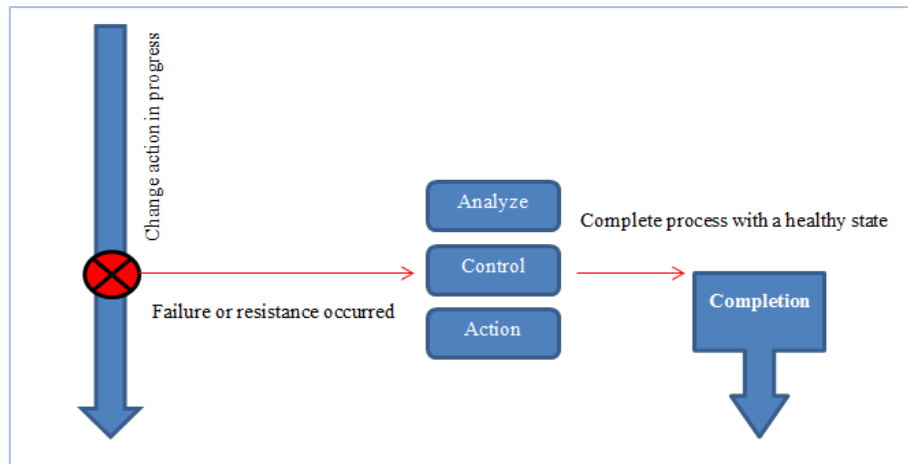
Figure 25 Demonstration of Processing Critical Points

In terms of failed situations in predicting a failure or resistance issue occurred, change manager needs to control the situation in order to complete change process in a healthy state. As demonstrated in the Figure 26 above, there needs a further capacity to evaluate the problematic situation with three phases: Analyze, Control and Action. In order to handle the problematic situation, further capacity may be transferred from the already planned capacity for the change process or new source of capacity can join the change process.

4.10.9 Clearly state the result point gained through change process

After a change process completed, change manager or change team should prepare a report showing the previous state and the point that change process completed. Identifying the result clearly is an important process for the organization to have individuals joint the change process clear idea about how change implemented and what gained at the end. At the end, the successfully completed change process can be institutionalized within organizational culture for the future change projects.

4.10.10 Terminate change with analyzing points that open to future change action

Terminating phase is the last phase of the change process. In identified guidelines context through e-Power, terminating phase is just a preparation for the prospective change projects. In IT related change projects, the prospective change points should be identified by the change team. It is important to be prepared for a prospective change to turn change into an opportunity. Consequently, while the change project is being terminated, prospective change points should be analyzed and necessary preparations should be completed just before predicted change arrived.

Chapter 5

Conclusion

5.1 Objective of the Chapter

The goal of this chapter is to conclude the study with thesis' idea and summarization.

5.2 Thesis Idea and Summarization

In this study, guidelines are provided for the organizations dealing with IT related changes frequently in Turkey. This study aims to explore guidelines through examining literature about managing changes and their effects to the related fields such as IT and PM. All of the considerable writings and documents in the literature which were found out during thesis investigation were mostly about organizational CM and their effects on organizational structure. IT is gaining importance not just only about applied technologies and techniques. It is gaining importance on change processes effecting organizations internally and externally due to IT's nature. Therefore, this study includes guidelines for CM adopting today's modern IT projects which are the largest portion of the organizational processes that could affect many organizational steps if an IT related change occurs.

From the early studies, it used to be conceived that change is need to be handled by applying top down approaches in a hierarchical way but now one can claim that today's current organizational processes requires participation from all levels of organization in order to plan change actions due to dynamic nature today's organizations. Due to increasing importance of IT in organizations and rapid developments in IT in rapidly changing world, organizations must clearly understand, apply and control an IT related change by considering the dynamic environment. Therefore, in order to meet the dynamic process requirements of the change, organizations should be organized with virtual teams managing change adopting adhocracy. There is no certain model that suits every organization. Organizations must follow their own change strategy formed according to its organizational processes.

Organizations should be aware of their current states and measure the contributions of the change request. Without such analysis the organization would not have a benchmark on considering the further change requests. Organizations can only provide this by having advanced Information Systems. Therefore, IT departments in organizations gain importance in terms using the information source and providing necessary information to business units.

This study gives information about managing IT related change in Turkey. Information is an important weapon to have competitive advantage and organizations can only keep competitive if they have effective information usage. This importance is applicable for all countries as it is in Turkey.

Finally, participation of people to any change process is the key component for a successful change projects. In order to gain fast adoption and more affectivity, the change teams leading the IT related change should avoid bureaucracy, and should focus on internal and external elements. Multi-disciplinary teams should be formed in order to provide advanced expertise and increase success possibility. Importance of managing change and rapid developments revive IT related change for organizations. Explored guidelines aim to be useful for the organizations in Turkey in terms of managing IT related change.

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