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Aligning Selected
Systems Thinking Tools
to Mitigate Key
Challenges
Encountered During the
Initial Stage of
Organizational Change

CAPSTONE REPORT

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Abstract

for

Aligning Selected Systems Thinking Tools to Mitigate Key Challenges Encountered During the Initial Stage of Organizational Change

This paper examines the potential for systems thinking tools to provide ways for organizational leaders (Senge, 1999) to address challenges within the organizational change process. Literature published after 1990 is reviewed concerning challenges encountered in the initiating phase of organizational change (Senge, 1999) and selected systems thinking tools: Causal Loop Diagram, Behavior Over Time graph ("Basic" 2004), The Iceberg (Kim, 1999), and Action-to-Outcome (Jones and Seville, 2003). Conclusions are presented for organizational change leaders.

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CHAPTER I – Purpose of Study

Brief Purpose

The purpose of this paper is to develop a table (see Table 3: Alignment of Systems Thinking Tools and Organizational Change Process Challenges) that presents selected tools of systems thinking, aligned with a set of selected challenges often encountered in the organizational change process, as these are defined by Senge (1999) and Senge and Kaeufer (2000). The intent of this paper is to examine the potential for systems thinking tools to provide ways for organizational leaders (Senge, 1999) to avoid and/or address selected challenges within the organizational change process.

The Ontario Prevention Clearinghouse ("A Discussion," n.d.) describes organizational change as a transformation that moves an organization from process-focused to learning-focused (Senge, 1994). Additionally, McNamara (1999a) states that for a change to be considered "organizational" it has to affect the entire organization and must be outside the standard business process. Examples provided by McNamara (1999a) include a change in vision or mission; or restructuring to address new business, technology, or collaboration. Cowings (2002) further suggests that organizational change may be initiated to respond to "organizational environments" such as competitive, customer, technology, regulatory, economic, or sociocultural changes that occur outside the organization but ultimately influence the organization in some way.

In *The Dance of Change: The Challenges to Sustaining Momentum in Learning Organizations*, Senge (1999) writes in detail about the lifecycle and process for creating organizational change. In this book and a later paper by Senge and Kaeufer (2000), ten challenges that an organization may encounter during the lifecycle of change are identified. These challenges are grouped into three sequential phases identified as "initiating," "sustaining," and "redesigning" (Senge, 1999 and Senge and Kaeufer 2000).

From the writings of Senge (1999) and Senge and Kaeufer (2000), it is clear that challenges of organizational change do occur, and that the types of challenges an organization is likely to encounter can be categorized not only by challenge type but also by phase or timing. For the purpose of this research, the focus is on challenges that occur during the initial phase or "initiating phase" (Senge, 1999) of organizational change. The question is what tools are available to organizational leaders (Senge, 1999) that will help them understand and address these challenges in the context of their own organization.

The larger method of study is literature review (Leedy and Ormrod, 2001). Literature review is chosen as an appropriate method for this study, as the purpose is to understand the relatedness of the variables. Literature is collected from materials published after 1990 in order to locate information pertaining to: (1) challenges during the initiating phase of organizational change as identified by Senge (1999) and (2) selected systems thinking tools: Causal Loop Diagram, Behavior Over Time graph ("Basic" 2004), The Iceberg (Kim, 1999), and Action-to-Outcome (Jones and Seville, 2003).

Once the necessary literature is collected, it is analyzed using conceptual analysis as defined by Palmquist et al. (2005) in order to identify selected tools that potentially provide ways to avoid and/or address selected challenges by analyzing their characteristics.

The results of the initial content analysis are presented in two tables that present: (1) the characteristics of challenges to organizations that arise during the initial stage of organizational change (see Table 1: Characteristics of Challenges Encountered During the Initial Phase of Organizational Change) and (2) the characteristics of situations that use each of the selected systems thinking tools (see Table 2: Characteristics of Selected Systems Thinking Tools).

These characteristics are then framed into the final outcome of the study: Table 3:

Alignment of Systems Thinking Tools and Organizational Change Process Challenges.

Table 3 presents selected tools of systems thinking, aligned with a set of selected challenges often encountered during the initial stage of the organizational change process.

Table 3 is designed for use by organizational leaders (Senge, 1999) and transition change managers, and is supported by discussion that explains why a specific tool would be useful in a particular situation.

Although the primary audience for this paper is organizational leaders as defined by Senge (1999), the outcome of this study may also be useful to executives, managers, and

individual employees ("A Discussion," n.d.) involved in planning for organizational change.

Full Purpose

According to Branch (2002), "Identifying the need for organization-wide change, and leading organizations through that change, is widely recognized as one of the most critical and challenging responsibilities of organizational leadership" (chap.4, pg.1). Challenges that arise during organizational change can affect a business's ability to function and survive (Senge, 1994). Brache (2002) suggests that organizational survival is dependent on "understanding and managing an intricate and entwined set of variables" (p.3). Failure to understand these variables and the challenges they produce can result in failure of an organization to change ("A Discussion," n.d.).

Systems thinking tools provide a means to understand organizational change and the variables that give rise to challenges (McNamara, 1999a). It is through our understanding of these variables that we can identify leverage points that will allow us to successfully implement organizational change (Bellinger, 2004).

Branch (2002) describes organizational change as change that is intentional, organization-wide, and intended to achieve an organizational goal. When framing organizational change in this context, two different levels of change are often discussed:

(1) fundamental or transformational; and (2) transitional or transactional (Branch, 2002).

For the purpose of this research, the focus is on the first level – fundamental or transformational.

Organizational change requires a systematic and comprehensive approach; the time required to implement change can span multiple years (Branch, 2002). To assist in the understanding of challenges that can arise during organizational change, Senge (1999) and Senge and Kaeufer (2000) break the change process into three phases. These phases are "initiating," "sustaining," and "redesigning" (Senge, 1999; Senge and Kaeufer, 2000). In Senge's book *The Dance of Change: The Challenges to Sustaining Momentum in Learning Organizations* (1999) and a later paper (Senge and Kaeufer, 2000) the authors describe each phase and the challenges that organizational leaders may encounter during the phases. For the purpose of this research, the focus is on challenges that occur during the initial phase or "initiating phase" (Senge, 1999) of organizational change.

Challenges that arise during the "initiating" (Senge, 1999) phase are grouped together because they are all likely to happen early in the change lifecycle. According to Senge and Kaeufer (2000), four challenges are often encountered during this phase: time, help, relevance, and walking the talk. Time challenges concern the amount of time required to institute a change compared to the time available. Help challenges arise when an organization believes it lacks the expertise to institute change or underestimates the amount of expertise required. Relevance challenges occur when it is not clear to those affected by the change why it should be important to them. Walking the talk challenges

occur when managers, change advocates, or sponsors do not model the behavior they are promoting.

The second phase of organizational change, "sustaining" (Senge, 1999), involves three challenges that often occur as initial problems are resolved and new people are initiated into the change, only to be faced by new problems. During the sustaining phase, fear and anxiety may be prevalent. The challenge is then to effectively manage and minimize the fear. Measurement also becomes a challenge in the second, sustaining phase, in that it is not always clear what or how to measure a change. True believers can also create challenges during the sustaining phase, as their feelings of superiority can create rifts in the organization.

During the final phase of organizational change, identified as "redesigning" (Senge, 1999), challenges occur as changes are transitioned to the larger organization. Integrating changes into new groups can result in governance challenges, as the change must be navigated through different governance systems. This can result in struggles over who has decision powers. This question of power can cause people to attempt to reinvent (or adapt) the change in their own terms, resulting in challenges of diffusion. Additionally, the strategies and purpose used to integrate the change into one group may not successfully apply to different groups.

Systems thinking has been around for many years as a means of understanding systems and how they interact (McNamara, 1999a). The theoretical foundations are based in the

study of system dynamics, founded in 1956 by MIT professor Jay Forrester (Aronson, 2003). The Ontario Prevention Clearinghouse describes systems thinking as "a conceptual framework, which encourages an organization to see patterns of organizational behavior, and then learn to reinforce or change them effectively" (n.d., Fostering Healthy Organizational Change section, para.11). The tools of systems thinking allow organizations to systematically analyze challenges as they arise (Bellinger, 2004).

There are many systems tools available, though deciphering which is best to address a specific challenge can be difficult (Goodman, 1997). The article Getting Started with Systems Thinking: Tools for Organizational Change by Pegasus Communications (2004) identifies Causal Loop Diagrams and Behavior Over Time graphs as basic tools of systems thinking. Daniel Kim (1999) uses The Iceberg as a tool to visualize the depth and breadth of a problem. Jones and Seville (2003) describe an Action-to-Outcome mapping tool, which is useful in examining the potential results of a selected action. While each of the above-mentioned tools may be useful in understanding challenges that arise during organizational change, understanding which tool is best for addressing a specific challenge may not always be clear.

Due to the qualitative nature of this study, the primary research method used to design the study is a literature review (Leedy and Ormrod, 2001). As this research seeks to provide insights into the relationship between challenges in organizational change and system thinking tools based on information presented in published materials, a literature

review is an appropriate method of study (Leedy and Ormrod, 2001). Pertinent materials are collected in the following areas:

- Organizational Change Literature focused on identifying challenges that arise during the initial stage of organizational change as described by Senge (1999).
 For the purpose of this study, the scope of analysis is limited to the initial stage of organizational change, because success is impossible in the following stages if the initial stage is unsuccessful.
- ❖ Causal Loop Diagrams Literature identifying the uses and benefits of Causal Loop Diagrams. Causal Loop Diagrams help teams develop shared pictures, or stories, of a situation (Goodman, 1997), which is essential during the initial stage of organizational change.
- ❖ Behavior Over Time Literature identifying the uses and benefits of Behavior Over Time graphs for addressing organizational change. Behavior Over Time graphs are important because they provide an array of perspectives into the challenges of organizational change ("Basic," 2004).
- ❖ The Iceberg Literature identifying the uses and benefits of The Iceberg for addressing organizational change, which is important as it provides a means of visualizing the underlying structures and processes that instigate challenges (Kim, 1999).
- ❖ Action-to-Outcome Literature identifying the uses and benefits of Action-to-Outcome mapping for addressing organizational change. Action-to-Outcome mapping provides teams with a means to investigate the outcomes of a set of actions in an uncertain environment (Jones, and Seville, 2003).

Conceptual analysis as defined by Palmquist et al. (2005) is used as the approach to data analysis, in order to identify the characteristics of the selected systems thinking tools that can potentially provide ways to avoid and/or address selected organizational change challenges. Conceptual analysis is performed in three different stages of research, employing the processes described by Palmquist et al. (2005). Stage one involves reading literature that identifies the characteristics of challenges that occur during the initial stage of organizational change as defined by Senge (1999). The results of the stage one analysis are presented in Table 1: Characteristics of Challenges Encountered During the Initial Phase of Organizational Change. This table presents the selected challenges, their characteristics, and the number of articles in which each characteristic is found.

Stage two involves reading literature about the goals of the selected tools of systems thinking: Causal Loop Diagram, Behavior Over Time graph ("Basic" 2004), The Iceberg (Kim, 1999), and Action-to-Outcome (Jones and Seville, 2003). The results of the stage two analysis are presented in Table 2: Characteristics of Selected Systems Thinking Tools. This table presents the selected systems thinking tools, their characteristics of use or the characteristics of situations in which the tools are used, and the number of articles in which each characteristic is found.

The third stage of the conceptual analysis includes an examination of the results of stage one and stage two and focuses on identifying a correspondences between the

identified characteristics of organizational change challenges and the identified tools of systems thinking.

The results of the three stages of content analysis are summarized in the outcome of the study, presented as a table (see Table 3: Alignment of Systems Thinking Tools and Organizational Change Process Challenges) that shows the characteristics of selected tools of systems thinking, aligned with the challenges often encountered in the initial phase of the organizational change process. The specific systems thinking tools incorporated into Table 3 are: Causal Loop Diagram and Behavior Over Time graph as these are defined by Pegasus Communications Inc. ("Basic," 2004). Other systems thinking tools examined are The Iceberg as defined by Daniel Kim (1999), and Action-to-Outcome as defined by Jones and Seville (2003). These tools are aligned with the organizational change challenges, often encountered in the initial stage of organizational change as defined Senge (1999). This table is supported by the characteristics of each of the challenges and systems thinking tools.

Although the primary audience for this paper is organizational leaders as defined by Senge (1999), the outcome of this study may also be useful to executives, managers, and individual employees ("A Discussion," n.d.) involved in planning for organizational change. The leaders of an organization are not necessarily just the president or CEO of a company. Leaders are characterized by diverse experience, high credibility, and demonstrated leadership skills (Kotter, 1998). According to Kotter (1998), these skills are

necessary to build a strong coalition capable of creating a vision and tackling the challenges that attempt to impede organizational change.

The intent of this study is two fold. One goal is to provide organizational leaders with an appreciation of challenges that occur during the initial stage of organizational change and the characteristics of these challenges. A second goal is to provide organizational leaders with an understanding of systems thinking and possible uses of selected systems thinking tools to assist in investigating variables that lead to these challenges. Once these insights are gained it is anticipated, as viewed from the standpoint of Kotter (1998) and Branch (2002) that organizational leaders can continue to tackle future challenges that arise during the lifecycle of organizational change.

Significance

Burke and Trahant (2000) describe the complex variables that drive the need for carefully planned and managed organizational change. They state:

Globalization, the disruptive influence of technologies, the emergence of e-business, and growing electronic connectivity among far flung financial markets are all accelerating the pace of commerce throughout the world today – in virtually every industry (Burke and Trahant, 2000, p. xi).

The ability of organizational leaders to understand and respond to world changes and the challenges that arise from them requires a broader focus (McNamara, 1999a) than more traditional management tools can provide (Parrish, 2003).

Kotter (1998) explains "to cope with new technological, competitive, and demographic forces, leaders in every sector have sought to fundamentally alter the way their organizations do business" (pg. 1). One way that organizational leaders have sought to do this is to adopt a systems thinking perspective.

Aronson (1998) explains how systems thinking differs from traditional forms of analysis: it focuses on the problem or challenge being studied as a component of a larger system. He further details how systems thinking is especially useful when the component being studied is complex and receives feedback from internal and external forces, all of which are true of the challenges of organizational change.

In response to these issues, this study seeks to provide organizational leaders with an appreciation of the challenges that occur during the initial stage of organizational change, and an understanding of systems thinking to assist in investigating variables that lead to these challenges. These insights may influence organizational leaders to fundamentally alter the way they address challenges to organizational change. Additionally, by pairing the challenges with the systems thinking tools that have similar characteristics this study may help practitioners choose which systems thinking tools to apply in a given challenge situation.

Limitations

Organizational change can be described as occurring at two different levels: (1) fundamental or transformational; and (2) transitional or transactional (Branch, 2002). As

systems thinking tools are most useful in addressing complex problems that are impacted by the surrounding environment (Aronson, 1998), this research will focus on the first type – fundamental or transformational – as it is the broader of the two.

Though Senge (1999) identifies ten challenges that impede change, this study only investigates challenges that are identified as occurring during the initial stage of organizational change. For this study the researcher takes the position that the initial stage is the most vital stage, because unless organizational leaders are able to navigate the challenges of the initial phase they will never have the opportunity to encounter the remaining challenges.

The tools of systems thinking selected for use in this study are chosen because, according to Kim (1999), they require only a basic understanding of systems thinking while providing a good foundation (Kim, 1999). Additionally, they are all tools with reported usefulness in the initial stage of organizational change.

- ❖ Causal Loop Diagrams help teams develop shared pictures, or stories, of a situation (Goodman, 1997), which is essential during the initial stage of organizational change in order to create the motivation for people to buy into the vision.
- ❖ Behavior Over Time graphs can provide an array of perspectives into the challenges of organizational change ("Basic," 2004). Having an array of perspectives is vital to being able to address changes that may arise from any corner of the organization (Kotter, 1998).

- ❖ The Iceberg can provide a means of understanding the underlying structures and processes that instigate challenges (Kim, 1999). An understanding of the structure, patterns, and events that constitute The Iceberg may help organizational leaders grasp the variables that feed challenges.
- ❖ Action-to-Outcome mapping provides teams with a means to investigate the outcomes of a set of actions in an uncertain environment (Jones, and Seville, 2003). As organizational change affects the entire organization, it may be important to test the proposed changes prior to implementing them.

Even though the study of systems thinking has been around for several decades (Aronson, 2003), literature collection for this research is limited to materials published between 1990 and 2005. The early date is chosen because in the paper Systems Thinking: Critical Thinking Skills for the 1990s and Beyond, Richmond (1992) suggests that then current systems thinking tools are adequate but are likely to improve in the coming years.

To ensure the credibility and relevance of the materials selected in the area of organizational change and systems thinking tools, the collection of literature is limited to authors who are members of or affiliated with:

- Professional or Non-Profit organizations: The International Society for the Systems Sciences (ISSS), Pegasus Communications, MAP for Nonprofits (MAP)
- U.S. and Foreign government agencies: Ontario Prevention Clearinghouse,
 Office of Science Department of Energy, U.S. Department of Energy Office of
 Planning and Analysis

❖ Professional magazines, journals, and web sites (print and online)

❖ Academic Institutions: The National Defense University Institute for National

Strategic Studies

Private Corporations: case studies

❖ Published Books

The collection of literature is limited to the sources above, based on the assumed

knowledge and professionalism of the authors. U.S. and foreign agencies and academic

institutes are included, as they are often first to integrate and examine new management

and organizational trends. Professional magazines, journals, and web sites are evaluated

based on their organizational sponsorships and general status of publishing materials

relevant to this study. Individual authors of articles and books are evaluated but not

necessarily excluded based on their presence in the fields of organizational change and/or

systems thinking; references are also evaluated for the presence of field leaders. Finally,

publishing produced by private corporations is included when presented in the form of a

case study depicting the use of one of the selected systems thinking tools or the

implementation of an organizational change.

The scope of this research is further limited by excluding the following concepts:

Traditional business analysis tools

❖ Maintaining organizational health

Organizational design

Traditional business analysis tools have a very different focus than systems thinking tools. Their purpose is to analyze a specific narrowly defined situation or problem without regard to the larger environment unlike systems thinking tools, which are designed to take in the big picture (Aronson, 1998). For this reason traditional business analysis tools are not evaluated as part of this study.

The challenges of maintaining organizational health or designing an organization are likely to differ in key ways from those of changing an organization. For this reason this study does not presume to cover challenges in these areas. Further research may be needed, both in these areas and in their relationships to systems thinking and organizational change.

Problem Area

Kotter (1998) describes how all organizations must change in order to handle the barrage of internal and external factors to which they must be able to respond in order to survive. Burke and Trahant (2000) identify some of these factors as globalization, disruptive technologies, e-business, and growing electronic connectivity.

Kotter (1998) estimates that fewer than 15 of the more than 100 companies he has studied have been able to accomplish their change goals. This implies that a desire to change is not enough to allow leaders to successfully implement change. He emphasizes

this by stating, "transforming an organization is the ultimate test of leadership, but the understanding of the change process is essential to many aspects of a leader's job" (pg.3).

According to Kotter (1998), when building a change coalition, organizational leaders must reach beyond their enterprise and build alliances within the company to join in leading the change. Successful creation of an organizational change coalition depends less on individuals and their specific roles in the company than on the cohesiveness of the group. He suggests that when building a change coalition, organizational leaders must actively seek out individuals with diverse views to create a coalition with the experience and chemistry necessary to counter resistance, regardless of where in the organization it arises.

The best way for organizational leaders to understand and respond to change is a matter of debate. McNamara (1999a) states that understanding these changes and challenges requires a broader focus – one that goes beyond that which traditional management tools can provide (Parrish, 2003).

One strategy that organizational leaders have adopted to effect change is to diagnose problems by learning to recognize larger patterns of interactions instead of examining the organization in separate pieces (McNamara, 1999a). A specific method that adheres to this strategy is systems thinking (Aronson, 2003). A paper by the Ontario Prevention Clearinghouse describes this way of thinking about the application of systems thinking tools as a conceptual framework. This framework can be used to encourage organizations

to recognize patterns of behavior; this understanding may also allow them to change effectively ("A Discussion", n.d).

Through an understanding of the underlying structure of challenges in organizational change, leaders can start to identify leverage points to effect change within the system (Bellinger, 2004). These leverage points can help an organization alter the structure by changing patterns of behavior to better align with the goals of an organization (Bellinger, 2004).

By providing organizational leaders with information about the characteristics of selected systems thinking tools, this study gives them a useful method for investigating variables that lead to challenges during organizational change. Use of this method may enable organizational leaders to fundamentally alter the way they address challenges to organizational change. In this way, this study seeks to bridge the gap between change attempts and successful change, as described by Kotter (1998).

CHAPTER II – Review of References

The review of references provides a detailed summary of the key literature used in developing the foundation for this research. Key literature is defined as a reference that was fundamental to the development of this research in the area of systems thinking and/or organizational change. Literature reviewed in this section is presented in alphabetical order. Each review includes a summary of the reference, information on how the reference is used in the paper, and the criteria used to determine the acceptability of the reference.

A Discussion Paper on Healthy Organizational Change. (n.d.). Ontario Prevention

Clearinghouse. Retrieved March 17, 2005 from

http://www.opc.on.ca/english/our_programs/hlth_promo/resources/healthy/healthy_chng.

httm

The authors of this paper discuss change as a constant, "change is about transformation...," and discuss how to foster healthy change by creating a learning organization. The paper outlines the elements of change that exist in a capable organization. It also highlights the importance of the individual in the change process. It includes discussion on Senge's five disciplines: systems thinking, personal mastery, mental models, shared vision, and team learning.

This article is used frequently in the Purpose section and Problem Area to establish the importance of using a systems thinking perspective during organizational change and to clarify the audience for this research. The Ontario Prevention Clearinghouse, as a government agency, is believed to write and publish a credible paper. Additionally, the paper cited several leaders in the field of organizational change including Senge.

Aronson, D. (2003). Overview of Systems Thinking. Retrieved March 17, 2005 from http://www.thinking.net/Systems Thinking/OverviewSTarticle.pdf

Aronson describes the theory of systems thinking and how it grew from the larger field of the study of system dynamics as a method to understand social systems and devise ways to improve them. The author describes systems thinking as a holistic view in which the whole is greater than the sum of the parts. Aronson also discusses the effectiveness of systems thinking to solve problems that are complex, reoccurring, and affected by the larger environments, and that lack obvious solutions.

This article is used to provide information on the founding of the field of systems thinking, presented in the Purpose section of this research. References to this article are also made in the Significance and Limitations sections to describe how systems thinking tools differ from other business analysis tools. Additionally, the definition used for systems thinking tools is derived from this article. The Aronson article is selected based on the prevalence of his writing in the field of systems thinking and his publications with Pegasus Communications, which has a reputation as a renowned publisher of articles and

books in the field of systems thinking and is cited in Senge's book *The Dance of Change:*The Challenges to Sustaining Momentum in Learning Organizations (1999).

Basic Tools of Systems Thinking (2004). Getting Started with Systems Thinking: Tools for Organizational Change. Essential Readings for the Innovative Organization. MA: Pegasus Communications Inc.

This article describes Causal Loop Diagrams, Behavior Over Time graphs and Systems Archetypes as basic tools of systems thinking. It is used in this paper to introduce and define Causal Loop Diagrams and Behavior Over Time graphs in the Purpose and Limitation sections. It is also used to define the categorization of the system thinking literature. Selection of this article is based on Pegasus Communications reputation as a renowned publisher of articles and books in the field of systems thinking and its citation by Senge, in his book, *The Dance of Change: The Challenges to Sustaining Momentum in Learning Organizations* (1999).

Bellinger, G. (2004). Systems Thinking a Disciplined Approach. Retrieved March 17, from http://www.systems-thinking.org/stada/stada.htm

Bellinger's article describes how a systems thinking approach is used to understand events, patterns, and structures. The author presents steps required to view a problem from a systems thinking perspective, including the use of systems thinking tools. He

describes the outcome as leverage points that can be used to develop alternative structures.

Bellinger's article is used to support the Purpose section of this research study by emphasizing the importance of systems thinking tools to organizational change, and the benefits that these tools can provide. Bellinger also provides the basis of the definition for systems thinking. In the Problem Area the article is referenced to highlight the need for leaders to understand the underlying structure of problems in order to create organizational change. The Bellinger article is selected based on the prevalence of his writing in the field of systems thinking and his affiliation with the International Society for the Systems Sciences (ISSS), a leading professional organization.

Branch, K. (2002). Management Benchmark Study. Office of Planning and Analysis, Ch.4. Retrieved April 5, 2005 from http://www.sc.doe.gov/sc-5/benchmark/Ch%204%20Change%20Management%2006.10.02.pdf

Branch provides an overview of change management in terms of organization-wide change. Some of the driving forces behind organizational change and the commitment required from leadership are identified in this chapter. The author also shows how important it is for leaders to understand the literature in the field of change management, and summarizes several theories, approaches, and tools as they relate to change management.

The Branch chapter is used to support the Purpose section of this research study, emphasizing the importance of organizational change and defining organizational change, the different levels of change, and the commitment required of leaders to support change. The article is used again in the Limitations section to support the decision to limit the research to the fundamental or transformational level. The Branch chapter is included as it is published by U.S. Department of Energy Office of Planning and Analysis, a government agency. Additionally, the author cited several leaders in the field of organizational change, including Senge and Kotter.

Cowings, J.S. (2002). Systems Thinking and Learning Organizations. Strategic Leadership and Decision Making. (Ch. 4). Retrieved March 17, 2005 from http://www.ndu.edu/inss/books/Books/800-

%201999/Strategic%20Leadership%20and%20Decision-making%20-%20Feb%2099/pt1ch4.html

Cowings' chapter presents an overview of systems paradigms and the key points for implementing a learning organization. Cowings also presents a comprehensive definition of organizational systems. The author discusses organizational interconnectedness with the environment and the importance of understanding the environment and covers data interpretation, information distribution, and memory. In the Purpose section, the Cowings chapter is used to identify the variables that trigger organizational change. The Cowings

chapter is published by The National Defense University Institute for National Strategic Studies.

Goodman, M. (March 1997). Systems Thinking: What, Why, When, and How? *The Systems Thinker: Building Shared Understanding*, 8(2).

The Goodman article describes systems thinking as a whole picture approach that is both a "philosophy" and "diagnostic tool" (Goodman, 1997, pg.12). Goodman describes the importance of team involvement in understanding problems. The article also lists characteristics of situations where use of systems thinking is appropriate.

In the Purpose section, the Goodman article is used to describe the number of systems thinking tools available. It is also used in this paper to introduce and define Causal Loop Diagrams in the Purpose and Limitations sections. Selection of this article is based on Pegasus Communications reputation as a renowned publisher of articles and books in the field of systems thinking and its citation by Senge, in his book, *The Dance of Change:*The Challenges to Sustaining Momentum in Learning Organizations (1999).

Jones, A. and Seville, D. (March 2003) Action-To-Outcome Mapping: Testing Strategy With Systems Thinking. *The Systems Thinker: Building Shared Understanding*, 14(2).

Jones describes Action-To-Outcome mapping: how it can be used to investigate an action chosen by the team, and the possible outcomes and responses.

Jones is used in this paper to introduce and define Action-To-Outcome mapping in the Purpose and Limitation sections. It is also used to define the categorization of the system thinking literature. Selection of this article is based on Pegasus Communications reputation as a renowned publisher of articles and books in the field of systems thinking and is cited in Senge's book *The Dance of Change: The Challenges to Sustaining Momentum in Learning Organizations* (1999).

Kotter, J. P. (1998). Winning at Change. Leader to Leader (10). Retrieved from http://www.pfdf.org/leaderbooks/121/fall98/kotter.html

Kotter describes the driving forces behind an organization's need to change and the skills and knowledge that are required for organizational change to be successful. In addition to identifying common problems that occur during organizational change, Kotter also provides possible solutions, emphasizing the role of the organizational change leader.

Kotter is used in the Purpose section to define the audience and describe the characteristics and skills of organizational leaders, and again in the Significance section, highlighting the need for leaders to be able to facilitate change. The article is used to

emphasize how commonly failure can occur when trying to change to address internal and external variables. It is also used to support the goal of the study, providing a tool to bridge the gap between success and failure. Kotter is recognized as a leader in the field of organizational change and is included based on this status.

McNamara, C. (1999a). Thinking About Organizations as Systems. Retrieved March 17, 2005 from http://www.mapnp.org/library/org thry/org sytm.htm

The article defines systems and systems thinking and discusses why it is important for organizations. McNamara also outlines the principles of systems thinking:

- Systems behavior depends on its structure
- Systems self balance to achieve perfect size
- Systems seek balance with the environment
- ❖ Systems must interact with the environment
- Systems are relationship between parts and whole

McNamara is used to define organizational change and provide examples of how organizational change differs from other changes a company may undergo. The article is used to support the relationship between systems thinking tools and organizational change in the Purpose section. It is also used in the Significance section to emphasis the broad focus leaders need if they are to achieve organizational change. In the Problem Area, the relationship between organization change and systems thinking is punctuated by what McNamara says is the need to recognize organizational change in terms of larger

patterns. McNamara is selected based on the prevalence of his writing in the field and his affiliation with MAP for Nonprofits (MAP), an organization focused building the capacity of nonprofit organizations to achieve mission-driven results and providing quality, affordable management consulting and board recruitment services to thousands of nonprofit groups.

Senge, P.M. (1999). The Dance of Change: The Challenges to Sustaining Momentum in Learning Organizations. New York, NY: Currency Doubleday.

Senge's book describes organizational change, how to generate change, and the challenges often encountered in the phases of change: initiating, sustaining, and redesigning. This book is used extensively in this research to help establish the Purpose - from defining organizational leaders to presenting the challenges experienced in the organizational change process - and to define the challenges present during each phase. In the Limitations section, this work is used to support limiting this research to the initiating phase. The challenges identified as occurring during the initiating phase as presented in this book are used to define the coding rules of challenges to organizational change and are used as the initial set of coding terms during the conceptual analysis phase. Senge is recognized as a leader in the field of systems thinking and organizational change and is included based on this status.

Senge, P. M.; Kaeufer, K. H. (October 2000). <u>Creating Change</u>. Executive Excellence, 17 (10), p4

Senge and Kaeufer discuss the challenges of creating organizational change; these challenges are grouped into three phases: initiating, sustaining, and redesigning. The article also describes the challenges that occur in each phase and provides strategies for overcoming the challenges. This article is used to supplement the Senge's book *The Dance of Change: The Challenges to Sustaining Momentum in Learning Organizations* in the research and is often cited in the same context. It can be viewed as a summary of Senge's larger work in the area of systems thinking and organizational change.

CHAPTER III - Method

This study is intended to provide insights into the relationship between challenges of organizational change and system thinking tools. The primary research method used is literature review (Leedy and Ormrod, 2001). The purpose of a literature review is to collect, review, and analyze bodies of research on a specific topic to collect data (Leedy and Ormrod, 2001). Literature review is chosen as the primary research method because one of its goals is to understand the relatedness of variables (Leedy and Ormrod, 2001). In the case of this study, the variables are defined as challenges to organizational change and systems thinking tools.

The data analysis approach selected for use in this study is conceptual analysis, defined by Leedy and Ormrod (2001) as the systematic analysis of the collected data for identifying themes or patterns. The specific conceptual analysis process adapted for use in this study is articulated by Palmquist et al. (2005). This eight step process is chosen as the means of identifying the characteristics of selected system thinking tools and challenges to organizational change that occur during the initial stage, as these elements appear in the literature.

Data Collection

Initial data collection for this study focused in two areas; (1) literature related to organizational change and (2) literature related to systems thinking. These initial searches

are conducted using the Internet. The following concepts are used to drive literature selection: organizational change, challenges to organizational change, systems thinking, and systems thinking tools. These terms are selected by reviewing literature on organizational change and systems thinking that are part of the researcher's private library. These initial searches resulted in identification of: 3 journals, 6 relevant web sites, 2 articles, and 1 reference to Senge's books, which are used to develop additional search terms. Literature identified during this initial search is scanned for keywords. These keywords are then used to define additional search terms for searching the internet, electronic databases, and book reviews for additional literature.

The resulting search terms are grouped into two primary categories:

- (1) Search terms targeted at identifying challenges of organizational change:
- Organizational issues
- Organizational problems
- Business environmental analysis tools
- Environmental uncertainty
- Typical organizational problems
- Typical organizational issues
- Typical organizational challenges
- Definition of organizational change lifecycle
- Organizational issues
- Management of organizations references

- (2) Search terms targeted at identifying systems thinking:
- System thinking tools organizational health
- System thinking tools organizational change
- System thinking tools uses
- System thinking tools application
- System thinking tools
- Systems paradigm
- Using the tools of systems thinking
- Goals of systems thinking tools
- Tools for systems thinking
- Getting started with systems thinking
- Causal Loop Diagram
- Behavior Over Time graphs
- The Iceberg
- Action-to-Outcome mapping

A third category is targeted at finding literature with explicit ties to the goal of this study; the use of systems thinking tools to address challenges to organizational change:

- Using system thinking tools to solve organizational problems
- System thinking tools organizational problems
- Organizational change and systems thinking
- Organizations and systems thinking

These search terms are then used to search the internet using the search engine Google (www.google.com), the web crawler DOGPILE (www.dogpile.com), and internet based databases and report repositories:

- ❖ Gartner Online provider of research and analysis on the global IT industry.
- ❖ Forester Online access to independent technology research company.
- ❖ EBSCO Host Research Data Online access to print and electronic journal subscription services, research database development and production, online access to more than 100 databases and thousands of e-journals, and e-commerce book procurement.

These searches produced 9 web sites, 36 articles, and 2 books that are relevant to the study. When a relevant source is identified, the link is copied into a spreadsheet organized by the search type and keyword. A source's relevance is determined by quickly scanning the content for relationships to systems thinking or organizational change. Systems thinking literature related to the selected tools or general systems thinking overview are reserved and all others are discarded. Literature on the topic of organizational change is also reviewed. If a source references organizational change or challenges of organizational change, it is reserved. Also noted in the spreadsheet is the type of source: website, article, or book. The process produced many relevant sources including Senge's books, cited in this research. Additional sources are located by reducing the link to its root, clicking on a homepage link, or clicking on referenced links to locate other relevant literature. Using this method, an additional 2 websites, 22 articles,

and 1 book are located. The sites listed below, individual articles, and books from the researcher's private library made up the majority of the materials used for this research.

- Pegasus Communications (http://www.pegasuscom.com/) Online provider of conferences, newsletters and other publications, and other materials for the systems thinking community.
- ❖ Free Management Library (http://www.managementhelp.org/topics.htm) Library of management resources for nonprofit and for-profit businesses.
- Mental Model Musings (http://www.systems-thinking.org/) A web site dedicated to systems thinking and its application to businesses and organizations.
- Thinking Page (http://www.thinking.net/) Online source for information on improving organizational and individual thinking.

Data Analysis

Conceptual analysis involves quantifying and tallying the presence of characteristics of the selected systems thinking tools and challenges of organizational change as defined by Senge (1999). This analysis is performed employing the eight step process described by Palmquist et al. (2005). Conceptual analysis for this research is conducted in three stages.

Prior to beginning the analysis process the selected literature is divided into two groups: (1) literature about the challenges of organizational change and (2) literature about system thinking tools. When possible this latter category is further broken out by

the specific tool: Causal Loop Diagram, Behavior Over Time graph ("Basic" 2004), The Iceberg (Kim, 1999), and Action-to-Outcome (Jones and Seville, 2003).

Coding Guidelines for Stage One Content Analysis

In stage one of the conceptual analysis process, literature regarding organizational change is read to identify challenges. Coding of the literature pertaining to the four challenges encountered during the initial stage of organizational change as defined by Senge (1999), including time, help, relevance, and walking the talk is conducted using a pre-defined set of concepts (Palmquist et al., 2005).

Organizational change data are coded for the existence of concepts rather than for frequency (Palmquist, 2005). Due to the diversity of the literature reviewed, coding for frequency will not enhance the interpretation of the data. Additionally, as the intent of stage one is to determine characteristics of challenges to organizational change. Terms used in coding are applied broadly. This means that synonyms, business jargon, and phrases are included in the coding (Palmquist, 2005).

Literature on the challenges of organizational change is reviewed as a whole in order to understand context to the fullest extent and no text is considered irrelevant (Palmquist, 2005). If the text contains synonyms, business jargon, or phrases related in some apparent manner to the four challenges encountered during the initial stage of organizational change as defined by Senge (1999), it is considered relevant.

The results of stage one content analysis are tracked using Excel. An example of the coding template can be seen below, in Figure 1.

Challenge of Organizational Change	Characteristic	# Articles
Time		
Help		
Relevance		
Walking the talk		

Figure 1: Stage One Coding Template

The resulting output of stage one is a table (see Table 1: Characteristics of Challenges Encountered During the Initial Phase of Organizational Change) that presents the characteristics of each of the challenges that occur during the initial phase of organizational change as defined by Senge (1999).

Coding Guidelines for Stage Two Content Analysis

Stage two of the conceptual analysis process involves reading literature on the selected tools of systems thinking: Causal Loop Diagram, Behavior Over Time graph ("Basic" 2004), The Iceberg (Kim, 1999), and Action-to-Outcome (Jones and Seville, 2003).

Literature on systems thinking tools is divided into selections by the tool addressed and each section is coded separately for characteristics of use. Text that pertains to tools outside those addressed in this research is considered irrelevant and ignored (Palmquist, 2005).

Coding of stage two literature regarding systems thinking tools is conducted using a pre-defined set of concepts (Palmquist, 2005) based on the positive characteristics of use and negative characteristics of use. Positive characteristics are defined as situations in which the tool is used effectively, as reported in a given context and negative characteristics are defined as situations in which the tool use is reported to be ineffective.

As in stage one, systems thinking tool data are coded for the existence of concepts and not frequency (Palmquist, 2005). As in stage one, synonyms, business jargon, and phrases are included in the coding (Palmquist, 2005).

The results of stage two content analysis are tracked using Excel. An example of the coding template can be seen below in Figure 2.

System Thinking Tool	Characteristic	# Articles
Behavior Over Time graph		
The Iceberg		
Action-to-Outcome mapping		
Causal Loop Diagram		

Figure 2: Stage Two Coding Template

The resulting output of stage two is a table (see Table 2: Characteristics of Selected Systems Thinking Tools) that presents the characteristics of each of the selected systems thinking tools.

Coding Guidelines for Stage Three Content Analysis

In stage three the output of stages one and two are compared. In coding for stage three, data are coded for potential overlaps of concepts (Palmquist, 2005). The positive and negative characteristics of each tool complied in stage two are compared to the characteristics of each challenge compiled in stage one. When a positive tool characteristic is found to match a challenge characteristic it is noted as +1. When a negative tool characteristic is found to match a challenge characteristic it is noted as -1. The results are tracked in a matrix presenting challenges by tool (see Appendix D).

The results of stage three content analysis are tracked using Excel. An example of the coding template can be seen below in Figure 3.

		Beha Time	avior C	ver	Iceberg Theory		Causal Loop Diagram		Action-to- Outcome				
		Characteristic 1	Characteristic 2	Characteristic 3	Characteristic 1	Characteristic 2	Characteristic 3	Characteristic 1	Characteristic 2	Characteristic 3	Characteristic 1	Characteristic 2	Characteristic 3
Time	Characteristic 1												
	Characteristic 2												
	Characteristic 3												
Help	Characteristic 1												
	Characteristic 2												
	Characteristic 3												
Relevance	Characteristic 1												
	Characteristic 2												
	Characteristic 3												
Walk the talk	Characteristic 1												
	Characteristic 2												
	Characteristic 3												

Figure 3: Stage Three Coding Template

Data Presentation

The combined results of the content analyses are framed and summarized in a table (see Table 3: Alignment of Systems Thinking Tools and Organizational Change Process Challenges) that presents the selected tools of systems thinking, aligned with the challenges often encountered in the initial phase of the organizational change process. Table 3 identifies the matched positive and negative characteristics, as these are defined above in the Data Analysis section. Positive characteristics appear in green and negative characteristics appear in red. A template for the design of this final outcome of the study is presented below in Figure 4.

	Behavior Over Time	Causal Loop Diagram	Action-to-Outcome
Time			
Help			
Relevance			
Walking the talk			

Figure 4: Template for Table 3 – Final Outcome of Study

Table 3 is supported by a discussion explaining the alignment of the systems thinking tools and the challenges of organizational change. The goal of Table 3: Alignment of Systems Thinking Tools and Organizational Change Process Challenges is to help organizational leaders determine when to use a specific tool. The goal of the discussion is to provide organizational leaders with the knowledge of why a specific tool would be successful in a particular situation. This combination of "when" and "why" should provide organizational leaders with the tools and knowledge to alter existing patterns of behavior in order to produce a desired change (Bellinger, 2004) and have a better chance at transforming an organization (Kotter, 1998).

CHAPTER IV – Analysis of Data

The Report of Stage One Content Analysis

As described in the Data Analysis section of Chapter III, stage one content analysis focuses on quantifying and tallying the presence of characteristics of selected challenges often encountered during organizational change processes, as defined by Senge (1999). Data from four sources is analyzed for this purpose, following the guidelines outlined in Coding Guidelines for Stage One Content Analysis, presented in Chapter III.

Stage one content analysis focuses on identifying the characteristics of the four challenges encountered during the initial stage of organizational change as defined by Senge (1999), including, time, help, relevance, and walking the talk. In order to understand the literature to the fullest extent, each article is reviewed as a whole and no text is considered irrelevant. Each data source is reviewed twice, once to identify the challenge type: time, help, relevance, or walking the talk, and a second time to identify the challenge characteristics. The data are then transferred to an Excel spreadsheet where they are reviewed, and multiple occurrences of a characteristic are eliminated. At the same time, keywords are highlighted to emphasize the characteristic and the surrounding text is maintained to provide context. The results of this analysis can be seen in Appendix B – Initial Organizational Challenge Characteristic List.

The goal during stage one data analysis is to compile a single list of characteristics for each challenge. The resulting characteristics for each challenge are compiled in an Excel spreadsheet and multiple occurrences of a characteristic are eliminated. The number of data sources that includes each characteristic is also noted. The results of this analysis can be seen in Table 1: Characteristics of Challenges Encountered During the Initial Phase of Organizational Change.

Table 1: Characteristics of Challenges Encountered During the Initial Phase of Organizational Change

Table 1.1: Time

Challenge	Characteristic	# Articles
Time	Benefits from an investment in learning initiatives	1
	If time invested is low, then time scarcity will limit project growth by 1) "time invested in the initiative will be ineffective," 2) "people will be unwilling to commit in the first place"; this is a limiting process	3
	Leverage lies in investigating the tacit assumptions and attitudes that underlie the lack of time flexibility	1
	Schedule time for focus and concentration, value unstructured time, experiment with time; reflection, dialogue, discussion, practice, and learning	2
	Trust people to control their own use of time	2
	Say no to political games and nonessential demands	2
	Establish a sense of urgency; change will take longer than you think	2
	Recognize that time is a strategic resource ; manage and operate in multiple timelines / timeframes	3
	Plan for and create short term wins; balance these short term results with long term vision for sustained success, do not declare victory before the war is over	3
	Integrate initiatives, set a focus, build capabilities for eliminating busy work, and help people make appropriate trade-offs	2

Table 1.2: Help

Challenge	Characteristic	# Articles
Help	Building self-awareness, on both and individual and team level	2
	Gap between the group's current performance and its aspirations	1
	Understand attitudes about seeking help	4
	Doubt that there are effective means to accomplish major organizational	
	change	1
	Build a guiding coalition	2
	Work with people outside your organization, consider using a consultant	2
	Work as a team , not just a collection of individuals	3
	Investigate the need for help early and invest early	2
	Create internal capacity for coaching into line managers responsibilities	3
	Find partners who can counsel one another	3

Table 1.3: Relevance

Challenge	Characteristic	# Articles
Relevance	Failure to develop a compelling business case for change precludes any significant momentum from developing	3
	Establish a clear strategy behind the initiative by establishing a clear , authentic , convincing story about the relevance of a change initiative	2
	Tie initiatives to the big picture , business and customer needs, and the business's long-term health	2
	If a commitment gap develops people will not participate fully	2
	Underlying limit or constraint behind this challenge is management's ability to widely communicate a clear business case for change	2
	Potential long delays before business results improve can be discouraging	1
	Requires a critical number of leaders	1
	Strong level of trust among pilot group members develop with shared vision exercises	1
	Explicitly raise questions of relevance in pilot groups and revisit relevance periodically	2
	Make information available to pilot group members	2
	Keep training linked tightly to business results	1
	Increased and sustained communications and education on the vision	2
	Identify every possible variable that contributes to complacency; brainstorm specific ways to counter each variable	1
	Build awareness among team leaders	1
	Make sure that people who become enthusiastic don't alienate others	2

Table 1.4: Walking the Talk

Challenge	Characteristic	# Articles
Walking the	Need individuals to take responsibility for changes and new ways of	_
Talk	operating; empower others to act on the vision	2
	Business as usual is how the challenge perpetuates itself, insidiously and unseen, masked by complacency, resignation, and taken-for-granted	
	political games-playing	2
	Assumptions will only change gradually, through reflection, experimentation, and example; reflection gap develops if people do not become more	
	reflective	3
	Limiting process , trust required increases and the previously taken-forgranted low trust becomes an issue, creating a trust gap	2
	With credible and authentic advocates , the credibility of the initiative will benefit	2
	Requires a shared understanding of the values of company	2
	Build the credibility by demonstration, not by articulation; lead by example	4
	Work with partners , a partner is someone with whom we can speak openly and challenge our thinking	2
	Cultivate patience under pressure	2
	Reflect on values and think carefully about your beliefs about people	3
	Develop a greater sense of organizational awareness	2
	Many are inherently cynical about change	3
	Organization-wide change often goes against the very values held dear by members; keep perspective	2
	Get as much feedback as practical	1
	Align behaviors on the part of senior executives	3
	Leaders must win the support of employees, partners, investors, and regulators	2
	Willingness to push themselves out of their own comfort zones and take risks; quest for learning	3
	Develop aims and values that are credible; underlying limit is the clarity and credibility	2

The Report of Stage Two Content Analysis

The purpose of stage two content analysis is to quantify and tally the presence of characteristics of selected systems thinking tools. Data from fourteen sources is analyzed, following the guidelines outlined in Coding Guidelines for Stage Two Content Analysis, presented in Chapter III.

Stage two content analysis focuses on identifying the characteristics of four systems thinking tools: Causal Loop Diagram, Behavior Over Time graph ("Basic" 2004), The Iceberg (Kim, 1999), and Action-to-Outcome (Jones and Seville, 2003). During stage two the goal of the data analysis is to compile two lists for each of the four selected systems thinking tools. One list presents the positive characteristics of the particular tool and the other list presents the negative characteristics. Some references address characteristics of multiple tools. In these cases, only text pertaining to a selected tool is coded for characteristics. Each data source is reviewed once. During the coding process, both positive and negative characteristics are identified and differentiated with different colored highlighter markers. Data from each data source are then compiled in an Excel spreadsheet where they are reviewed and multiple occurrences of a characteristic are eliminated. At the same time, keywords are highlighted to emphasis the characteristic and the surrounding text is maintained to provide context. The results of this analysis can be seen in Appendix C – Initial Systems Thinking Tools Characteristic List.

The resulting lists of positive and negative characteristics for each of the four selected systems thinking tools are compiled in an Excel spreadsheet, multiple occurrences of a characteristic are eliminated and the number of data sources that includes each characteristic is noted. Because no negative characteristics are identified during this stage, they are excluded from the remainder of the study. The results of this analysis can be seen in Table 2: Characteristics of Selected Systems Thinking Tools.

Table 2: Characteristics of Selected Systems Thinking Tools

Table 2.1: Behavior Over Time (BOT)

Systems Systems	avior Over Time (BOT)	
Thinking Tool	Combined	# Articles
Behavior Over	Easy to learn and use	2
Time (BOT)	Medium to formulate thoughts more carefully and broadly and express	
	them	3
	Forces explicitness	2
	Begin to focus on change over time rather than focusing on static events	5
	Look at the change itself, and what is causing it, the underlying system structure and mindset	5
	Understanding of the issue and team members perception of it; different interpretations of the stated variables are definitely possible	5
	Recognize exponential growth	2
	Understand what happens if you change the behavior of the variables over time	5
	Should not include qualitative words	1
	Map multiple variable on graph; variables can be compared for possible interdependencies and causal relationships	5
	Engaging work and lively discussions	5
	Prepare people for further work in system dynamic thinking and develop dynamic thinking skills	2
	Does not require that variable can be measured in conventional units soft variables can be examined	1
	Focus discussion on variables that are the most important and central to the issue	3
	Work individually or in groups	2
	Support by management (conducting BOT)	1
	Helps to have someone with whom to discuss ideas and obstacles (planning BOT session)	1
	Willingness to make mistakes, start over	1
	Requires time to think	1
	Identify leverage points	2
	Understand difficult delayed dynamics	
	Value of the mapping comes from the creation and shared analysis of the	
	maps	2
	Use to examine patterns of behavior and their causes	3
	Big picture	1
	Generate hypotheses	3

Table 2.2: The Iceberg

Systems		# A 41 1
Thinking Tool	Combined	# Articles
The Iceberg	Story telling in a group	2
	A simple three level diagram used to differentiate events, patterns, and	
	structures	2
	Encourage looking more deeply for the underlying structure to help	
	understand what's going on and why; begin identifying higher-leverage	
	actions	5
	Causal connection	3
	Mental models, these are an even deeper kind of structure, showing	
	different ways of seeing the world	5
	Combination of top-down and bottom-up strategies	2
	Seek to close the gap between current performance and an	
	organizations potential	1
	Helps us to understand deeply ingrained assumptions about how the	
	world works; shape our habits and minds	4
	Developing an image of an organizational structure , a problem area, or	
	the future, we gain insight into how our organization operates and what it will	
	take to change	2
	Capabilities of the system as a whole or the interrelationship of processes	
	especially as they relate to the overall goals	2
	Consensus building, participatory decision-making, and all the other skills	
	needed for teams to function effectively	2
	Trust that the resulting shifts in power will be of benefit to the organization	
	Shift from this event orientation to focusing on the internal system	
	structure, you improve possibility of improving business performance	4
	Patterns are trends or changes in events over time	3

Table 2.3: Causal Loop Diagram

Systems Thinking Tool	Combined	# Articles
Casual Loop		
Diagram	Diverse action-oriented teams	2
Diagram	Specific help in addressing questions	
	Exploring the existing causal theory; chain of cause and effect	3
	Uncovering critical mindsets	3
	Looking for opportunities	2
	Identify intermediate indicators that the group can use to measure process	3
	Identify important reinforcing loops that the group's actions may trigger	
	Ways that the actions may get amplified and lead to goals	2
	Understanding how the system can resist change or push back on the group's effort through balancing loops	2
	Reveals possible problems that the team needs to address in the strategy, but also an important disconnect between the intermediate indicators and	
	long term goals	2
	Listing of external forces , while sobering, helps the group see how it's actions fit into a larger picture and prompts members to consider how they might influence any of the external factors	3
	Identify potential supporting actions, new areas of focus, and areas for further exploration	2
	Account the important feedback affects	2
	Surfacing a team's assumptions	2
	Maintaining a focus on strategy	2
	Direct action based on the data collection and analysis	2
	Focus the group conversation on the most critical strategic issues or questions, facilitation methodology	3
	Identify systemic drivers of change and leverage points	3

Table 2.4: Action-to-Outcome

Systems	Combined	# 44: -1
Thinking Tool	Combined	# Articles
Action to	Understand the system structures which cause the pattern of behavior	3
Outcome	Graphically presents relationships that are difficult to verbally describe	2
	It is often necessary to consider feedback within management systems to understand what is causing the patterns of behavior	
	Starting point for analyzing what is causing a particular pattern of behavior	2
	Helps to show balancing structures in which the difference between the desired state and the current state creates a gap	3
	Multiple actors within the system, each with their own perceptions of what the desired state should be	2
	Develop a collective understanding taking into account the purpose and the audience	2
	May be perceived that the effort necessary to develop alignment is an investment for which the necessary time and energy are not available	1
	Understand and communicate the interactions that determine the dynamics of a system	3
	Show causal relationship and illustrates circular feedback	2
	Help you tell a story or express you interpretations or mental models of how a system works	2
	Indicate the effect of the influence	1
	If there is significant amount of time between the action of one variable and the reaction of the next variable in the loop, a time delay can be indicated	2
	Hypothesize about solutions to your problem and then test them	1
	Helps show reinforcing loops: compound change in one direction with more change in the other direction	1
	Helps identify resist change: if growth falters or never quite starts; unproductive behavior never gets dropped	1

Report of Stage Three Content Analysis

The purpose of stage three content analysis is to align the characteristics of challenges encountered during the initial stage of organizational change with the characteristics of selected systems thinking tools. Data collected during stage one and two are analyzed, following the guidelines outlined in Coding Guidelines for Stage Three Content Analysis,

presented in Chapter III. (See Appendix B – Initial Organizational Challenge

Characteristic List and Appendix C – Initial Systems Thinking Tools Characteristic List).

Stage three content analysis focuses on identifying the common characteristics of the four challenges encountered during the initial stage of organizational change and characteristics of the four systems thinking tools. During stage three the goal of the data analysis is to compile a list of common characteristics between selected challenges to organizational change and selected systems thinking tools. To achieve this goal, using the characteristics listed in Tables 1 and 2, each characteristic of the challenges to organizational change is compared to each characteristic identified for the systems thinking tools. Since the language and wording of the characteristics is not identical, the characteristics are evaluated for meaning or goal, not keywords. Data collected in stage one and two are compiled in an Excel spreadsheet where it is reviewed. Occurrences of common characteristics are marked with an "x." The results of this analysis can be seen in Appendix D – Organizational Change Challenges and Systems Thinking Tools Characteristic Matrix.

Data from the resulting matrix are compiled. Characteristics of systems thinking tools that are similar to characteristics of challenges to organizational change are listed in an Excel spreadsheet. If a specific systems thinking tool characteristic matches multiple challenge characteristics, this is marked in the Excel worksheet but the characteristic is only recorded once in the final table. The results of this analysis can be seen in Table 3: Alignment of Systems Thinking Tools and Organizational Change Process Challenges.

Table 3: Alignment of Systems Thinking Tools and Organizational Change Process Challenges

Table 3.1: Time

Tuble J.1.			Causal Loop	
	Behavior Over Time	The Iceberg	Diagram	Action-to-Outcome
Time	Begin to focus on change over time rather than focusing on static events	Seek to close the gap between current performance and an organizations potential	Diverse action- oriented teams	It is often necessary to consider feedback within management systems to understand what is causing the patterns of behavior
	Understanding of the issue and team members perception of it; different interpretations of the stated variables are definitely possible	Helps us to understand deeply ingrained assumptions about how the world works; shape our habits and minds	Identify important reinforcing loops that the group's actions may trigger	Starting point for analyzing what is causing a particular pattern of behavior
	Map multiple variable on graph; variables can be compared for possible interdependencies and causal relationships	Capabilities of the system as a whole or the interrelationship of processes especially as they relate to the overall goals	Reveals possible problems that the team needs to address in the strategy, but also an important disconnect between the intermediate indicators and long term goals	Helps to show balancing structures in which the difference between the desired state and the current state creates a gap
	Does not require that variable can be measured in conventional units soft variables can be examined	Consensus building, participatory decision-making, and all the other skills needed for teams to function effectively	Identify potential supporting actions, new areas of focus, and areas for further exploration	May be perceived that the effort necessary to develop alignment is an investment for which the necessary time and energy are not available
	Focus discussion on variables that are the most important and central to the issue		Surfacing a team's assumptions	
	Requires time to think		Maintaining a focus on strategy	
			Focus the group conversation on the most critical strategic issues or questions, facilitation methodology	

Table 3.2: Help

	Behavior Over Time	The Iceberg	Causal Loop Diagram	Action-to-Outcome
Help	Look at the change itself, and what is causing it, the underlying system structure and mindset	Mental models, these are an even deeper kind of structure, showing different ways of seeing the world	Uncovering critical mindsets	Multiple actors within the system, each with their own perceptions of what the desired state should be
	Understanding of the issue and team members perception of it; different interpretations of the stated variables are definitely possible	Combination of top- down and bottom- up strategies	Ways that the actions may get amplified and lead to goals	Develop a collective understanding taking into account the purpose and the audience
	Work individually or in groups	Seek to close the gap between current performance and an organizations potential	Focus the group conversation on the most critical strategic issues or questions, facilitation methodology	Understand and communicate the interactions that determine the dynamics of a system
	Helps to have someone with whom to discuss ideas and obstacles (planning BOT session)	Helps us to understand deeply ingrained assumptions about how the world works; shape our habits and minds	Identify systemic drivers of change and leverage points	

Table 3.3: Relevance

	Behavior Over Time	The Iceberg	Causal Loop Diagram	Action-to-Outcome
Relevance	Easy to learn and use	Story telling in a group	Specific help in addressing questions	Understand the system structures which cause the pattern of behavior
	Medium to formulate thoughts more carefully and broadly and express them	A simple three level diagram used to differentiate events, patterns, and structures	Exploring the existing causal theory; chain of cause and effect	Graphically presents relationships that are difficult to verbally describe
	Focus discussion on variables that are the most important and central to the issue	Encourage looking more deeply for the underlying structure to help understand what's going on and why; begin identifying higher-leverage actions	Identify intermediate indicators that the group can use to measure process	Understand and communicate the interactions that determine the dynamics of a system
	Understand difficult delayed dynamics	Developing an image of an organizational structure, a problem area, or the future, we gain insight into how our organization operates and what it will take to change	Ways that the actions may get amplified and lead to goals	Show causal relationship and illustrates circular feedback
	Big picture	Consensus building, participatory decision- making, and all the other skills needed for teams to function effectively	Reveals possible problems that the team needs to address in the strategy, but also an important disconnect between the intermediate indicators and long term goals	Help you tell a story or express you interpretations or mental models of how a system works
		Trust that the resulting shifts in power will be of benefit to the organization	Listing of external forces, while sobering, helps the group see how it's actions fit into a larger picture and prompts members to consider how they might influence any of the external factors	If there is significant amount of time between the action of one variable and the reaction of the next variable in the loop, a time delay can be indicated
		Shift from this event orientation to focusing on the internal system structure, you improve possibility of improving business performance	Direct action based on the data collection and analysis	Helps identify resist change: if growth falters or never quite starts; unproductive behavior never gets dropped
			Focus the group conversation on the most critical strategic issues or questions, facilitation methodology	

Table 3.4: Walking the talk

10000000	waiking the taik		Causal Loop	
	Behavior Over Time	The Iceberg	Diagram	Action-to-Outcome
Walking	Prepare people for	A simple three level	Diverse action-	Starting point for
the talk	further work in	diagram used to	oriented teams	analyzing what is
	system dynamic	differentiate events,		causing a particular
	thinking and develop	patterns, and		pattern of behavior
	dynamic thinking	structures		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
	skills			
	Does not require that	Mental models,	Looking for	Multiple actors within
	variable can be	these are an even	opportunities	the system, each with
	measured in	deeper kind of		their own
	conventional units	structure, showing		perceptions of what
	soft variables can	different ways of		the desired state
	be examined	seeing the world		should be
	Helps to have	Combination of top-	Identify important	Understand and
	someone with	down and bottom-	reinforcing loops	communicate the
	whom to discuss	up strategies	that the group's	interactions that
	ideas and obstacles		actions may trigger	determine the
	(planning BOT			dynamics of a system
	session)		D 1 "'	
	Value of the mapping	Helps us to	Reveals possible	Show causal
	comes from the	understand deeply	problems that the	relationship and
	creation and shared	ingrained	team needs to	illustrates circular
	analysis of the	assumptions about how the world works;	address in the	feedback
	maps	shape our habits and	strategy, but also an important disconnect	
		minds	between the	
		Hillius	intermediate	
			indicators and long	
			term goals	
		Developing an image	Account the	Helps show
		of an organizational	important feedback	reinforcing loops:
		structure , a problem	affects	compound change
		area, or the future,		in one direction with
		we gain insight into		more change in the
		how our organization		other direction
		operates and what it		
		will take to change		
		Trust that the	Surfacing a team's	
		resulting shifts in	assumptions	
		power will be of		
		benefit to the		
		organization		
		Patterns are trends	Focus the group	
		or changes in events	conversation on the	
		over time	most critical strategic	
			issues or questions,	
			facilitation	
			methodology	

CHAPTER V - Conclusion

As indicated by Table 3: Alignment of Systems Thinking Tools and Organizational Change Process Challenges, there are many common characteristics between the challenges encountered during the initial stage of organizational change and selected systems thinking tools. In the case of two challenges, time and relevance, there is clearly a best match with a specific tool. Both the challenges of time and relevance have the greatest number of matching characteristics with the Causal Loop Diagram tool. For the challenge of time, the least alignment is noted between two systems thinking tools, The Iceberg and Action-to-Outcome. In the case of the challenge of relevance, the Behavior Over Time tool has the fewest aligned characteristics.

The number of aligned characteristics for each tool relative to the help challenge is low across all the tools. This is a unique situation among all the challenges. The systems thinking tools, Behavior Over Time, The Iceberg, and Casual Loop Diagram all have four matching characteristics, while the Action-to-Outcome tool only has three.

For the challenge walking the talk, two of the tools have the same high number of aligned characteristics while the remaining two tools have much lower numbers of aligned characteristics. The Iceberg and the Causal Loop Diagram tools both have seven characteristics in common with the challenge, while Action-to-Outcome only has five and Behavior Over Time graph has even fewer with four.

A summary of these results can be seen in Table 4: Number of Aligned Systems

Thinking Tools Characteristics and Organizational Change Challenges Characteristics.

Table 4: Number of Aligned Systems Thinking Tools Characteristics and Organizational Change Challenges Characteristics

	Behavior Over Time	The Iceberg	Causal Loop Diagram	Action-to-Outcome
Time	6	4	7	4
Help	4	4	4	3
Relevance	5	7	8	7
Walking the talk	4	7	7	5

In reviewing the trends in the data, the specific alignments between challenges of organizational change and the systems thinking tools appear to be consistent with general statements in the literature.

Overcoming the challenge of time requires understanding the processes in the organization and having the ability to differentiate between necessary and unnecessary tasks that individuals may be performing daily (Senge, 1999). The systems thinking tool that has the greatest number of aligned characteristics is Causal Loop Diagram, which can be used to graphically depict how processes affect one another ("Basic," 2004). By using a graphical representation of the processes and their interactions, the task of deciphering necessary tasks from unnecessary tasks can be less daunting.

To overcome the challenge of help, it is important to perform a skills assessment to understand to what degree the capabilities for creating lasting organizational change exist

within the company (Senge, 1999). If the expertise is not available from within the company, then it is best to look to an external resource, such as a consultant. The limited number of aligned characteristics across all tools for this challenge can be explained by the fact that none of the tools involves a skills assessment. The characteristics where alignment is found are related to understanding the mindset of the organizational change team, which is a by-product of using any of the systems thinking tools. While understanding mindset is important in helping to understand any resistance that may be encountered when trying to gain support for bringing in outside help, the tools are not able to assist with the initial skills assessment.

Addressing the challenge of relevance requires an in depth understanding of the internal and external variables that are driving the need for change in the organization and the ability to communicate this to the larger organization (Senge, 1999). Causal Loop Diagrams can help an organization form this understanding by showing how variables affect one another ("Basic," 2004). Having a clear picture of the cause and effect of variables allows an organizational leader to convey the need for change.

The Iceberg also has a high number of aligned characteristics with the challenge of relevance. This makes sense as The Iceberg provides a formalized structure that can be used to help communicate how current events can be traced to the underlying structures and can be used to help drive decisions from a systems perspective (Kim, 1999).

Relevance is the only challenge with which the Action-to-Outcome tool is significantly aligned. This can be attributed to the need, when facing this challenge, to be able to convey the big picture. This big picture must include not only information on the current forces pushing for the change but also the ability to convey the impact of the proposed changes. By providing a means to identify indicators, feedback loops, mental models and external forces the Action-to-Outcome tool can be used to evaluate the potential outcomes of an action or set of actions (Jones, and Seville, March 2003).

The final challenge during the initial stage of organizational change is walking the talk. A large part of addressing this challenge involves not only communicating the need for change but also supporting the change by setting an example. While there is no tool that can teach an organizational leader to lead by example, the tools with the greatest number of aligned characteristics are those that provide a good understanding of the big picture. These tools are Causal Loop Diagrams and The Iceberg, both of which are efficient at helping an organizational leader develop a good understanding of the current situation and providing a structure in which to communicate the need for change.

This study is by no means exhaustive, and leaves many challenges and systems thinking tools yet to be examined. Yet the findings indicate that the method of comparing the characteristics of a specific challenge with those of a systems thinking tool can be used to evaluate the effectiveness of using the tool to help understand and overcome the challenge. Additionally, by focusing on the initial challenges of organizational change and the basic tools of systems thinking, this paper can provide organizational change

leaders with a starting point as they initiate an organizational change. The focus on basic tools also works to introduce systems thinking to organizational leaders and provides examples of practical and valid uses for the tools.

APPENDICES

Appendix A - Definitions

Action-to-Outcome Method - A systems thinking tool that can be used to identify indicators, feedback loops, mental models and external forces; used to evaluate the potential outcomes of an action or set of actions (Jones, and Seville, March 2003).

Behavior Over Time Graph (BOT) - A systems thinking tool that can be used to depict patterns of behavior to explore from a systems thinking perspective ("Basic," 2004).

Causal Loop Diagram (CLD) - A systems thinking tool that can be used to show how variables affects one another ("Basic," 2004).

Lifecycle - A lifecycle identifies the phases a product goes through from conception to obsolescence.

Organizational Change - A change that is organization-wide, as opposed to smaller changes such as adding a new person or modifying a program. Examples of organization-wide change include a change in mission, restructuring operations, or introduction of a new technology. Often this term designates a fundamental and radical reorientation in the way the organization operates (McNamara, 1999b).

Organizational Change Leader - Leaders exist at all levels of an organization.

Organizational leaders are individuals tasked with implementing "organizational change" (Kotter, 1998).

Systems Thinking - "Systems thinking is an approach for developing models to promote our understanding of events, patterns of behavior resulting in the events, and even more importantly, the underlying structure responsible for the patterns of behavior" (Bellinger, 2004, para.1).

Systems Thinking Tools - System thinking tools focus on how the thing being studied interacts with the larger system and its components (Aronson, 2003).

The Iceberg - Visual representation of the three levels, events, pattern, and systemic structures that can be used to help drive decisions from a systems perspective (Kim, 1999).

Appendix B - Initial Organizational Challenge Characteristic List

Table B-1: Challenge of Time Characteristic List	ristic List		
The Dance of Change, Senge (1999)	Basic Context for Organizational Change, McNamara (1999)	Winning at Change, Kotter (1998)	Creating Change, Senge and Kaeufer (2000)
 A lack of flexibility in scheduling and managing time managing time Time restraints can be a expressed as a limits-to-growth Benefits from an investment in learning initiatives If time invested is low, then time scarcity will limit project growth by 1) "time invested in the initiative will be ineffective," 2) "people will be unwilling to commit in the first place." This is a limiting process Leverage lies in investigating the tacit assumptions and attitudes that underlie the lack of time flexibility Benefits from integrating initiatives and concentration, value unstructured time, experiment with time Trust people to control their own use of time Say no to political games and nonessential demands 	Organizational change will take longer than you think	 Establish a sense of urgency Do not declare victory before the war is over Manage and operate in multiple timelines / timeframes Recognize that time is a strategic resource Plan for and create short term wins, balance these short term results with long term vision for sustained success Defining a vision of the future does not happen according to a timetable or flowchart Day to day demands inevitably pull people in different directions, help people make appropriate trade-offs 	Integrate initiatives and set a focus and eliminate unnecessary work Trust people to control their time Value unstructured time for reflection, dialogue, discussion, practice, and learning Say no to political game playing Say no to political game playing

Table B-2: Challenge of Help Characteristic List	eristic List		
The Dance of Change, Senge (1999)	Basic Context for Organizational Change, McNamara (1999)	Winning at Change, Kotter (1998)	Creating Change, Senge and Kaeufer (2000)
 "I can do it myself" attitude Perception that asking for help is a sign of incompetence Managers unaware they need help The stronger the profound change growth process the greater the requirements for coaching, guidance, and support Building self-awareness, on both and individual and team level Gap between the group's current performance and its aspirations Feelings and attitudes may make it difficult to accept help Invest early in help Create capacity for coaching Find a partner Understand attitudes about seeking help 	 Many doubt there are effective means to accomplish major organizational change Consider using a consultant 	 Build a guiding coalition Engage the right talent Assemble the necessary skills, experience, and chemistry Work with people outside your organization Working as a team, not just a collection of individuals 	 Investigate the need for help early Create internal capacity for coaching into line managers responsibilities Find partners who can counsel one another

The Dance of Change, Senge (1999)	Basic Context for Organizational Change, McNamara (1999)	Winning at Change, Kotter Creating Change, Senge (1998) and Kaeufer (2000)	Creating Change, Senge and Kaeufer (2000)
 Establish relevance Failure to develop a compelling business case for change precludes any significant momentum from developing Many never feel deeply committed, they are unclear how it would impact the business Establish a clear strategy behind the initiative by establishing a clear, authentic, convincing story about the relevance of a change initiative Tie initiatives to the big picture, employees and customer needs, and the business's long-term health Commitment is a basic requirement for starting a change initiative Focus on key business needs, how they fit in, if these needs are met or not of a commitment gap develops people will not participate fully Underlying limit or constraint behind this challenge is management's ability to communicate a clear business case for change Potential long delays before business results improve can be discouraging Requires a critical number of leaders Strong level of trust among pilot group members develop with shared vision exercises Explicitly raise questions of relevance in pilot groups and revisit relevance periodically Make information available to pilot group members Keep training linked tightly to business results Inquire openly about perceptions that some people are getting carried away 	not be e of trategy some ustained is and icate the e	 Identify every possible variable that contributes to complacency; brainstorm specific ways to counter each variable each variable Communicate the vision business results who become enthusias don't alienate others 	dentify every possible variable that contributes to complacency; brainstorm each variable communicate the vision Communicate the vision And talienate others On't alienate others each variable who become enthusiastic don't alienate others

Table B-4: Challenge of Walking the Talk Characteristic List			
The Dance of Change, Senge (1999)	Basic Context for Organizational Change	Winning at Change, Kotter (Creating Change, Senge and Kaeufer (2000)
 Need for individuals take responsibility for changes and new ways of 	 Provoke organization- 	 Can not write a memo instead Develop aims and	 Develop aims and
operating	wide change when a new	of lighting a fire	values that are
 Business as usual is how the challenge perpetuates itself, insidiously and 	chief executive's new	 Talking too much and saying 	credible
unseen, masked by complacency, resignation, and taken-for-granted political	and unique personality	too little	 Build credibility by
games-playing	pervades the entire	 Align behaviors on the part 	demonstration not
 Managers committed to change must be prepared to work through a thick layer 	organizations	of senior executives - lead by	articulation
of cynicism	 People think things are 	example	 Work with partners
 Assumptions will only change gradually, through reflection, experimentation, 	already just fine	 Create a vision 	who help you see how
and example	 Many are inherently 	 Leaders must win the 	your behavior may
 Limiting process: trust required increases and the previously taken-for-granted 	cynical about change	support of employees,	communicate
low trust becomes an issue	 Organization-wide 	partners, investors, and	unintended messages
 Need credible and authentic advocates, the credibility of the initiative will 	change often goes	regulators	 Develop patience
benefit	against the very values	 Grow the coalition 	under pressure
 Underlying limit is the clarity and credibility 	held dear by members	strategically	
 Reflection gap develops if people do not become more reflective 	 Involve top management 	 Show a genuine care for 	
 The trust gap influences whether or not there is a reflection gap 	 Get as much feedback 	individuals but a tough-	
 Encourage reflective depth at work 	as practical	mindedness about results	
 Develop espoused aims and values that are credible in terms of the living 	 Delegate decisions 	 Leading by example is 	
quality of the organization	 Keep perspective 	essential to communicating	
 Requires a shared understanding of what the company stands for 		a vision	
build the credibility by demonstration, not by articulation		 Quest for learning 	
 Work with partners, a partner is someone with whom we can speak openly and 		 Willingness to push 	
challenge our thinking		themselves out of their own	
 Cultivate patience under pressure 		comfort zones	
 Reflect on values and think carefully about your beliefs about people 		Take risks	
 Develop a greater sense of organizational awareness 		 Empower others to act on 	
Make room to talk about individual's values		the vision	
 Practice shuttle diplomacy 			

Appendix C - Initial Systems Thinking Tools Characteristic List

Table C-1: Behavior Over Time Graphs Characteristic List	me Graphs Characteris	tic List		
Why Use Behavior-Over-	Tins for Behavior-Over-	Getting Started with Behavior Over Time Granhs	Foundation Dynamics	Fveryday Behavior Over Time
Time graphs, Lynesis (n.d.)	Time graphs, Catalina (1997)	nardson and Lyneis (1998)	Sustainability Institute (2001)	Graphs, Stamell and Lyneis, (2001)
Easy to learn and use	 Means to observe 	 Focus on patterns of change over time rather then on 	 Help break the 	 Broaden and sharpen thinking
 Medium to formulate 	how a variable	single event	pattern	about changes over time
thoughts more carefully	changes over time	 Engaging work and lively discussions 	 Identify leverage 	 Line graph that shows a pattern
and broadly and express	 Should not include 	 Think more deeply about what is happening and why and 	points	of change over time
them	qualitative words	the underlying causes of changes focus on patterns of	 Identify what interacts 	 Variable is a quantity that can
 Forces explicitness 	 Map multiple variable 	change rather than on isolated events or little details	with different parts	increase or decrease with time
 Begin to focus on change 	on graph, variables	 Another way to express and communicate ideas 	of the system	 Be sure everyone has the same
rather than focusing on		 Prepare people for further work in system dynamic thinking 	 Understand difficult 	understanding of what labels
static events	possible	and develop dynamic thinking skills	delayed dynamics	mean
 Look at the change itself, 	interdependencies	 Easy to start 	 Understand what 	 Focus on patterns of behavior not
and what is causing it, the	and cansal	 Does not require that variable can be measured in 	unforeseeable non-	particular details
underlying system	relationships	conventional units soft variables can be examined	linearity in the	 Rate at which something is
structure	 Different 	 Soft variable require discussion to set scale 	system could lead	changing
 Watch events unfold 	interpretations of the	→	the action to be	 Ask why and make predictions
 Understanding of the 	stated variables are	 Requires no special equipment 	tripped up	 Draw related variables on the
issue and team members	definitely possible	 Avoid aettina stuck in too much detail 	 Start with multiple 	same graph
perception of it	• Discussion of the	Brainstorm list of changes	theories to explain	 Graphs can have many right
 See patterns and 	differences should	 Focus discussion on variables that are the most 	issue	answers
relationships	take place		 Explore systemic 	 Use to examine patterns of
 Recognize exponential 	 Discussion of when 	•		behavior and their causes
growth	and where a trend or)		 Broaden our thinking
 Understand what happens 	pattern of behavior	 Understand why changes are important 	theories	Big picture
if you change the	starts, ends, or	 Understand if variables are related 	Theories should	 Another way to express and
behavior of the variables	cnanges direction is	 How parts of the system fit together, think about what 	describe different	defend ideas
 Analyze until you 	recommended	Causes them	views on what drives	 Make predictions, express what
understand how the		• Be specific	the patterns of	they think will happen to a
system works		• Support by management (conducting ROT)	penavior and events	variable in the future
 Engaged learning 		 Helps to have someone with whom to discuss ideas and 	 Value of the mapping 	 Generate hypotheses
 Precise thinking 		obstacles (planning BOT session)	creation and shared	 Express alternatives
		 Willingness to make mistakes, start over 	analysis of the	 Produces graphs as output to
		 Requires time to think 	maps	interpret
		 Looking for different view on the same variable 		

Toble C 3. The leahest	to it is in the interest of th			
Table 6-4: The Iceberg Characteristic List	racteristic List			
How to find Structure, Katash Why is Change so Hard?	Theories and thoughts about			Systems Thinking Basics From
(1996)	organizational change process, Hohn (1998)		agrams,	Concepts to Causal Loops,
		Where, and How?, Goodman (1997)	Kirkwood (n.d.)	Anderson and Johnson (1997)
 Story telling in a group 	 Combination of top-down and bottom-up strategies 	 To get the full 	 Higher leverage for 	 Systems are built on structures
 A simple three level 	 Seek to close the gap between current performance and an 	story out	lasting change in the	 Structure is the overall way in
diagram used to	organizations potential	emphasize the	system structure	which the system components
differentiate events ,	 Synthetical thinking or systems thinking 	iceberg framework	(base of the iceberg)	are interrelated -the organization
patterns, and structures	 Helps us to understand deeply ingrained assumptions 	the	 The internal 	of a system
 Encourage looking more 		problem from all		 If event focused you can only
deeply for the underlying	 Developing an image of an organizational structure, a 	three angles:	system is often the	react to each new event rather
structure to help	problem area, or the future, we gain insight into how our	event, patterns,	most important	than anticipate and shape them
understand what's going	organization operates and what it will take to change		 Events-causes- 	 Solutions designed at the event
on and why	ible - the	 Get different 	events orientation	level tend to be short lived
 Causal connection 	logistics	perspectives		 Uncovering elusive systemic
 Mental models, these are 	 Logistics (first level) is not insignificant but can be addressed 	 Framework to 	doesn't lead to very	structure that drives events, you
an even deeper kind of	with creative thinking	discuss patterns	powerful ways to alter	can begin identifying higher-
structure	 Second (level) iceberg, way business is done or habit, 	and discover how	the undesirable	leverage actions
 Structure is the network 	contains existing strategies; if operating norms of a	different people		 Patterns are trends or changes
of relationships of	program are ones of isolation, authoritarianism, and mistrust,	e same	 Shift from this event 	in events over time
things, not the things	then the organization environment will be hostile to a	event		 Detecting a pattern helps you put
themselves	participatory planning process		on the internal system	the most recent event in the
 Showing different ways 	 Third (level) iceberg is mindset, which embraces the many 		structure, you	context of other similar events
of seeing the world	assumptions, beliefs, and values that underlie the behavior of		sibility	 Thinking at the structural level
 Noticing causal 	programs and practitioners		ot improving	means thinking in terms of
connections	 Capabilities of the system as a whole or the interrelationship 		pusiness	causal connections
 Distinguish between 	of processes especially as they relate to the overall goals		performance	 Structure holds the key to lasting,
internal structure	 Consensus building, participatory decision-making, and 			high leverage change
(mental models) and	all the other skills needed for teams to function effectively		•	 Actions taken at the structural
external structures	 Participatory planning process assumes internal motivation 			level are creative, because they
(others)	 Trust that the resulting shifts in power will be of benefit to the 			help you to shape a different
 Notice not just the mental 	organization			tuture, the tuture that you want
model, but also the cause	•			
and check minages	organization from top and spreads it throughout the			
	organization			

Table C-3: Action-to-Outcome Characteristic List		
Action-To-Outcome Mapping: Testing Strategy with Systems Thinking, Jones and Seville (2003)	Action-to-Outcome Mapping: A Facilitation Method that Integrates Systems Thinking and Indicators Jones, Seville, Hamilton, Sawin, and Rice, 2003	Exploring Community Indicators with Systems Thinking Facilitation and Simulation Modeling Jones and Seville, n.d.
 Action-oriented teams Working on a range of actions to achieve some long term outcome Implementing a policy that they believe will have broad, positive effects Specific help in addressing questions Exploring the existing causal theory; chain of cause and effect Adding feedback Uncovering critical mindsets Looking for opportunities Articulate actions and outcomes and create a map connecting the two Identify intermediate indicators that the group can use to measure process Starting with simple one way causal chain Identify important reinforcing loops that the group's actions may trigger Ways that the actions may get amplified Understanding how the system can resist change or push back on the group's effort through balancing loops Reveals possible problems that the team needs to address in the strategy, but also an important disconnect between the intermediate indicators and long term goals Address both structure and mind sets in way that reinforce each other Think of the forces that may have impact on the outcome Listing of external forces, while sobering, helps the group see how it's actions fit into a larger picture and prompts members to consider how they might influence any of the external factors Identify potential supporting actions, new areas of focus, and areas for further exploration Account for important feedback affects Surfacing a team's assumptions Maintaining a focus on strategy 	• Focuses on strengthening current strategy • Interested in building on an effort where they've identified key indicators and start where the group is and start where the group is and start where the group is e. How actions lead to goals • How actions lead to goals • How windset slow or accelerate change • How external forces push on outcomes • How external forces push on outcomes • Moportunities • Apportunities • Tacilitation methodology to incorporate indicators and start where the group is • How actions lead to goals • H	• Indicator projects • Diverse teams • Direct action based on the data collection and analysis • Where are the deep rooted drivers • Where are the deep rooted drivers • What can we do to change the future behavior • Powerful leverage points • Focus the group conversation on the most critical strategic issues or questions • Build a shared understanding • Systemic drivers of change • Surface and test people's assumptions • Incorporate data and previous studies • Create system maps • Create system maps

Table C-4: Causal Loop Diagrams Characteristic List	grams Characteristic List		
System Behavior and	So You Think You Want To Change Something, Bellinger (2004)	Tips for Causal Loop Diagrams	Systems Thinking Basics From
Causal Loop Diagrams,		(CLDs),	Concepts to Causal Loops, Anderson
Kirkwood (n.d.)		Catalina Foothills School District (n.d.)	and Johnson (1997)
 Understand the system 	The way the situation is initially perceived is as a balancing structure	 Understand and communicate 	A graphic depiction of structure
structures which cause	in which the difference between the desired state and the current state	the interactions that determine	 Lets you explore dynamic
the pattern of behavior	creates a gap. A gap which activity is intended to reduce over time	the dynamics of a system	interrelationships
 Shows relationships 	 Multiple actors within the system, each with their own perceptions of 	 Show causal relationship and 	 Hypothesize about solutions to
among the elements	what the desired state should be. And each actor probably has	illustrate circular feedback	your problem and then test them
 Presents relationships 	different perceptions of what the current state actually is	 Identify important CLDs by 	 Like simplified maps of the
that are difficult to	developing a collective understanding among the actors of a single	looking for causal relationships	connections in a closed loop system
verbally describe	perception of the current state, the desired state, and the appropriate	 Taking into account the purpose 	of cause and effect relationships
because normal	action to move the current state towards the desired state		 Reinforcing loops: compound
	 May be perceived that the effort necessary to develop alignment is an 	 Help you tell a story or express 	change in one direction with more
interrelations in linear	investment for which the necessary time and energy are not available,	you interpretations or mental	change in the other direction, see a
cause and effect chains	without that investment the attainment of the most appropriate end	models of how a system works	steady upward or downward line,
 When an element of a 	results is also sacrificed	 All variables in a CLD must be 	exponential upward or downward
system indirectly		able to increase or decrease	curve
influences itself creates		 Indicate the effect of the 	 Balancing loops: try to bring things
feedback or causal loop -		influence	to a desired state and keep them
closed sednence of		 A CLD may be reinforcing, and 	there, if certain conditions keep
cause and effects		grow, or shrink until acted	coming back to some kind of nom,
 It is often necessary to 		upon by a limiting force, or	no matter what anyone does
consider feedback within		balancing and more toward,	 Resist change: if growth falters or
management systems		return to, or oscillate around a	never quite starts; unproductive
to understand what is		particular condition	behavior never gets dropped
causing the patterns of		 If there is significant amount of 	 Problems: failure to take delays
behavior		time between the action of one	into account, take too long to
 Starting point for 		variable and the reaction of the	perceive feedback, measure results,
analyzing what is		next variable in the loop, a time	decide how to respond to results,
causing a particular		delay can be indicated	implement solutions
pattern of behavior			 Describing their causal relationships
			can bring about diversity of
			knowledge, perspective, and
			opinions within the group
			• Exploring the breadth of views
			among team members

Appendix D - Organizational Change Challenges and Systems Thinking Tools Characteristic Matrix

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	Generate hypotheses											\perp	
	Big picture												
	Use to examine patterns of behavior and their causes												
	Value of the mapping comes from the creation and shared analysis of the maps												
	Understand difficult delayed dynamics												
	ldentify leverage points												
	Requires time to think				×								
	Willingness to make mistakes, start over												
	Helps to have someone with whom to discuss ideas and obstacles (planning BOT session)												
	Support by management (conducting BOT)												
	Work individually or in groups												
	Focus discussion on variables that are the most important and central to the issue								×				
	Does not require that variable can be measured in conventional units soft variables can be examined												
	Prepare people for further work in system dynamic thinking and develop dynamic thinking skills Description and the formula of											+	
	Engaging work and lively discussions											1	
	- confirmation that the character and												
	Map multiple variable on graph; variables can be compared for possible interdependencies and causal relationships												×
	Should not include qualitative words												
	Understand what happens if you change the behavior of the variables over time												
	Recognize exponential growth												
	Understanding of the issue and team members perception of tit, different interpretations of the stated variables are definitely possible			×									
	Look at the change itself, and what is causing it, the underlying system structure and mindset												
me	Begin to focus on change over time rather than focusing on static events		×										
ver I	Forces explicitness												
Behavior Over Time	Medium to formulate thoughts more carefully and broadly and express them												
Beh	Easy to learn and use												
Table D-1: Challenge of Time and Behavior Over Time Tool		Benefits from an investment in learning initiatives	If time invested is low, then time scarcity will limit project growth by 1) "time invested in the initiative will be ineffective," 2) "people will be unwilling to commit in the first place" this is a limiting process	Leverage lies in investigating the tacit assumptions and attitudes that underlie the lack of time flexibility	Schedule time for focus and concentration, value unstructured time, experiment with time; reflection, dialogue, discussion, practice, and learning	ne	_	nal	.ce;		these short term results with long term vision for sustained success, do not declare victory		integrate initiatives, set a focus, build capabilities for eliminating busy work, and help people make appropriate trade-offs
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Over Over		earni	scar ted in ill be a lim	t he ta at und	oncer vith tin and le	use	ones	orgar u thin	gic re	vins; I	long eclare	-	s, bui
vior		nt in I	times inves ple w ple w	ting t es th	and cone nent v tice, a	ir ow	and r	ncy,	trate Iltiple	erm v	with not d		and h
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and		n inve	is lov by 1) ' e, " 2) st pla	inve ind at	for for for ne, ex	cont	sal ga	se of Plong	time erate	ate s	T re	s ove	tives lusy v le-off
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ge of		fits fr	e invect gro	Leverage lies in investigating the tacit assumptions and attitudes that under of time flexibility	Schedule time for focus and concentration unstructured time, experiment with time; refailedgue, discussion, practice, and learning	Frust people to control their own use of time	Say no to political games and nonessential demands	Establish a sense of urgency , organizational change will take longer than you think	Recognize that time is a strategic resource; manage and operate in multiple timelines / timeframes	Plan for and create short term wins; balance	inese snort term results with long term vis for sustained success, do not declare victory	before the war is over	Integrate initiatives, store eliminating busy wappropriate trade-offs
allen,	Matrix	Bene	If tim proje will b comn	Level assu of tim	Sche unstr dialog	Trus	Say no to demands	Estat chang	Reco mana timefi	Plan	tnes for su	befor	Integ for el appro
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	Patterns are trends or changes in events over time										
	performance										
	Shift from this event orientation to focusing on the internal system atructure, you improve possibility of improving business										
-	noisazingro										
	Trust that the resulting shifts in power will be of benefit to the										
	the other skills needed for teams to function effectively						X				
-	Processes especially as they relate to the overall goals Consensus building, participatory decision-making, and all										
	Capabilities of the system as a whole or the interrelationship of processes especially as they relate to the overall goals									×	
-	organization operates and what it will take to change										
	problem area, or the future, we gain insight into how our										
	Developing an image of an organizational structure, a										
	how the world works; shape our habits and minds			×							
	Helps us to understand deeply ingrained assumptions about										
	an organizations potential		×								
-	Seek to close the gap between current performance and										
ļ,	Combination of top-down and bottom-up strategies										
	Mental models, these are an even deeper kind of structure, showing different ways of seeing the world										
-	enutaints to brild reneet never as ease the state of										
	Causal connection										
	to help understand what's going on and why; begin identifying higher-leverage actions										
	Encourage looking more deeply for the underlying structure to help understand what so sing on and why begin identifying										
erg	patterns, and structures										
cek	A simple three level diagram used to differentiate events,										
The Iceberg	Story telling in a group										
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			limit project growth effective," 2) "peopl his is a limiting	_	value unstructured .e, discussion,			ake		tern ot	inat
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alle		Benefits from an investment in learning init i	If time invested is low, then time scarcity will limit project growth by 1) "time invested in the initiative will be ineffective," 2) "people will be unwilling to commit in the first place" this is a limiting process	Leverage lies in investigating the tacit assumptions and attitudes that underlie the lack of time flexibility	Schedule time for focus and concentration, value unstruct time, experiment with time; reflection, dialogue, discussion, practice, and learning	Trust people to control their own use of time	Say no to political games and nonessential	Establish a sense of urgency , organizational change will take longer than you think	Recognize that time is a strategic resource ; manage and operate in multiple timelines / timeframes	Plan for and create short term wins; balance these short term results with long term vision for sustained success, do not declare victory before the war is over	Integrate initiatives, set a focus, build capabilities for eliminating busy work, and help people make appropriate trade-offs
Table D-2: Challenge of Time and The Iceberg Matrix		Ř	<u>চ</u> হ ত ≖	at E	P. tir	Ė	ιχ	ЩΘ	ᅑᇕ	교 2 용	<u>도</u> 집
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	Identify systemic drivers of change and leverage points										
	Focus the group conversation on the most critical strategic issues or questions, facilitation methodology							×			
'	Direct action based on the data collection and analysis										
	Maintaining a focus on strategy								×		
	Surfacing a teams s'maest s gnisatus			×							
	Account the important feedback affects										
	Identify potential supporting actions, new areas of focus, and areas for further exploration										×
	factors										
	to consider how they might influence any of the external										
	how it's actions fit into a larger picture and prompts members										
	intermediate indicators and long term goals Listing of external forces, while sobering, helps the group see										
	the strategy, but also an important disconnect between the									×	
	Reveals possible problems that the team needs to address in										
	back on the group's effort through balancing loops										
	Understanding how the system can resist change or push										
	Ways that the actions may get amplified and lead to goals										
	Identify important reinforcing loops that the group's actions may trigger		×								
	measure process										
	Identify intermediate indicators that the group can use to										
5	Looking for opportunities										
agrai	Uncovering critical mindsets										
Casual Loop Diagram	Exploring the existing causal theory; chain of cause and effect										
I Loc	Specific help in addressing questions										
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Ö	Diverse action-oriented teams		>- v						te		_
			If time invested is low, then time scarcity will limit project growth by 1) "time invested in the initiative will be ineffective," 2) "people will be unwilling to commit in the first place" this is a limiting process		eq			Φ	d operate	Ε	minating
			grow sople pro	ਠੂ	Schedule time for focus and concentration, value unstructured time, experiment with time; reflection, dialogue, discussion, practice, and learning			take	b p	t term not	mins
			If time invested is low, then time scarcity will limit project (1) "time invested in the initiative will be ineffective," 2) "pe be unwilling to commit in the first place" this is a limiting	everage lies in investigating the tacit assumptions and attitudes that underlie the lack of time flexibility	Schedule time for focus and concentration, value unstruct time, experiment with time; reflection, dialogue, discussion, practice, and learning			Establish a sense of urgency , organizational change will longer than you think	Recognize that time is a strategic resource ; manage an in multiple timelines / timeframes	Plan for and create short term wins; balance these short results with long term vision for sustained success, do declare victory before the war is over	
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و		ts fr	inve e in Millin	Leverage lies in investigating the tacit assum attitudes that underlie the lack of time flexibility	Schedule time for foc time, experiment with practice, and learning	Frust people to control their own use of time	Say no to political games and nonessential demands	Establish a sense of onger than you think	Recognize that time is a strateg i in multiple timelines / timeframes	Plan for and create short term wins; t. results with long term vision for surdeclare victory before the war is over	Integrate initiatives, set a focus, build capabilities for el busy work, and help people make appropriate trade-offs
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Challena		Benefits from an investment in learning initiatives	If tin 1) "t be u	Lev. atti t	Sch tim pra	Tru	Say	Est	ë E	Pla res	Inte bus
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Table D-3: Challenge of Time and Casual Loop Diagram Matrix		Time Bene	If tin 1) "t be u	Lev	Sch tim pra	Tru	Say	Est lon	in r	Pla res dec	Inte bus

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	Starts; unproductive behavior never gets dropped										
	Helps identify resist change: if growth falters or never quite										
	Helps show reinforcing loops: compound change in one direction with more change in the other direction										
	Helps show reinforcing loops: compound shape in one										
	Hypothesize about solutions to your problem and then test										
	time delay can be indicated										
	variable and the reaction of the next variable in the loop, a										
	ano fo notize at the setween the action of one and the setion of one										
	Indicate the effect of the influence										
	mental models of how a system works										
	Help you tell a story or express you interpretations or										
	Show causal relationship and illustrates circular feedback										
	determine the dynamics of a system										
	and energy are not available Understand and communicate the interactions that										
	alignment is an investment for which the necessary time								L.		
	May be perceived that the effort necessary to develop								×		
	purpose and the audience										
	Develop a collective understanding taking into account the										
	perceptions of what the desired state should be										
	Multiple actors within the system, each with their own										
	between the desired state and the current state creates a gap										
	Helps to show balancing structures in which the difference									×	
	pattern of behavior										
	Starting point for analyzing what is causing a particular		×								
	patterns of behavior										
٩	management systems to understand what is causing the						×				
5	It is often necessary to consider feedback within										
٥	verbally describe										
\$	Graphically presents relationships that are difficult to										
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Action-to-Outcome	Understand the system structures which cause the pattern of										
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Table D.4: Challenge of Time and Action to Outcome Matrix		Be	± (1 € 6 € 6 € 6 € 6 € 6 € 6 € 6 € 6 € 6 €	Le att	Sc tir pre	Ĕ	Sa	R o	盗.드	를 할 하	E a
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		Big picture											
		analysis of the maps Use to examine patterns of behavior and their causes			_								
		Value of the mapping comes from the creation and shared											
		Understand difficult delayed dynamics											
		Identify leverage points											
		Requires time to think											
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		Willingness to make mistakes, start over											
		obstacles (planning BOT session)											×
		Helps to have someone with whom to discuss ideas and											
		Support by management (conducting BOT)											
		Work i ndividually or in groups						×					
		and central to the issue			+								\vdash
		Focus discussion on variables that are the most important											
		conventional units soft variables can be examined			T								
		Does not require that variable can be measured in			\perp			L					
		and develop dynamic thinking skills			T	T							
		Prepare people for further work in system dynamic thinking			\perp								Ш
		Engaging work and lively discussions											
		possible interdependencies and causal relationships											
		Map multiple variable on graph; variables can be compared for											
		Should not include qualitative words											
		variables over time											
		Understand what happens if you change the behavior of the											
		Recognize exponential growth											
		possible											
		it; different interpretations of the stated variables are definitely			,	×				×			
		Understanding of the issue and team members perception of											
		underlying system structure and mindset			×								
		Look at the change itself, and what is causing it, the											
	ne	static events											
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	<u> </u>	Tool Matrix	Building self-awareness , on both and individual and team level.	Gap between the group's current	performance and its aspirations	Inderstand attitudes about seeking help	Doubt that there are effective means to accomplish major organizational change	Build a guiding coalition	Work with people outside your organization, consider using a consultant	Work as a team , not just a collection of ndividuals	nvestigate the need for help early and nvest early	Create internal capacity for coaching into ine managers responsibilities	Find partners who can counsel one another
	Table D-5: Challenge of Help and Behavior Over Time	<u>o</u>	ച്ച ഇ	ပြိ	<u>8</u>	5	ĕ Ğ	B	<u>≶</u> 8	<u>``</u> ≧	≦.≧	ర <u>క</u>	违
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	Identify systemic drivers of change and leverage points				×						
	Focus the group conversation on the most critical strategic issues or questions, facilitation methodology					×		×			
	Direct action based on the data collection and analysis										
	Mainfaining a focus on strategy										
	Surtacing a team's assumptions										
	Account the important feedback affects										
	areas for further exploration										
	to consider how they might influence any of the external factors ldentify potential supporting actions, new areas of focus, and										
	how it's actions fit into a larger picture and prompts members										
	Listing of external forces, while sobering, helps the group see										
	intermediate indicators and long term goals										
	the strategy, but also an important disconnect between the										
	Reveals possible problems that the team needs to address in										
	on the group's effort through balancing loops										
	Understanding how the system can resist change or push back										
	may trigger Ways that the actions may get amplified and lead to goals		×								
	Identify important reinforcing loops that the group's actions										
	measure process										
	Identify intermediate indicators that the group can use to										
Ξ	Looking for opportunities										
iagra	Uncovering critical mindsets			X							
Casual Loop Diagram	Exploring the existing causal theory; chain of cause and effect										
al Lo	Specific help in addressing questions										
Casu	Diverse action-oriented teams										
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aller		Building self-awareness, on both and individual and tea	Gap between the group's current performance and its aspirations	Understand attitudes about seeking help	Doubt that there are effective means to accomplish maj organizational change	Build a guiding coalition	Work with people outside your organization, consider us consultant	Work as a team, not just a collection of individuals	nvestigate the need for help early and invest early	Create internal capacity for coaching into line managers responsibilities	Find partners who can counsel one another
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Table D-7: Challenge of Help and Casual Loop Diagram Matrix											
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	starts; unproductive behavior never gets dropped										
	direction with more change in the other direction Helps identify resist change: if growth falters or never quite										
	Helps show reinforcing loops: compound change in one										
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	Hypothesize about solutions to your problem and then test										
	time delay can be indicated										
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	If there is significant amount of time between the action of one										
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	Help you tell a story or express you interpretations or										
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alle		Building self-awareness, on both and individual and team	Gap between the group's current performance and its aspi	Understand attitudes about seeking help	Doubt that there are effective means to accomplish major organizational change	Build a guiding coalition	Work with people outside your organization, consider using consultant	Work as a team, not just a collection of individuals	nvestigate the need for help early and invest early	Create internal capacity for coaching into line managers responsibilities	Find partners who can counsel one another
Table D-8: Challenge of Help and Action-to-Outcome Matrix		ш	J			<u> </u>	ں حر	<u>ح</u>		ے ت	
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Forces explicitness Begin to focus on change over time rather than focusing on static events Look at the change itself, and what is causing it, the underlying system structure and mindset berception of it; different interpretations of the stated variables are definitely possible Recognize exponential growth Understand what happens if you change the behavior of the variables over time Should not include qualitative words

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	Table D-10: Challenge of Relevance and The Iceberg Matrix			<u> U 0</u>			0	<u> </u>	_	J U)	<u> :</u>		_		_ 3		_ 0
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``		Identify systemic drivers of change and															
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Fallenstein - 79		critical strategic issues or questions, facilitation					×			×						×	
ana		Focus the group conversation on the most															
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L		Direct action based on the data collection and	×														
		Maintaining a focus on strategy														₩	
		Surfacing a team's assumptions															
		Account the important feedback affects															
		of focus, and areas for further exploration															
		Identify potential supporting actions, new areas															
		they might influence any of the external factors															
		picture and prompts members to consider how															
		the group see how it's actions fit into a larger			×												
		Listing of external forces, while sobering, helps															
		and long term goals															
		disconnect between the intermediate indicators						J									
		address in the strategy, but also an important						×									
		Reveals possible problems that the team needs to															
		balancing loops															
		or push back on the group's effort through															
		Understanding how the system can resist change														₩	
		Ways that the actions may get amplified and lead to goals															×
		group's actions may trigger														\vdash	
		Identify important reinforcing loops that the															
		can use to measure process															
		Identify intermediate indicators that the group											×				
		Looking for opportunities															
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ı,	Jiac	cause and effect Uncovering critical mindsets												<u> </u>			
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	Casual Loop Diagram	Specific help in addressing questions									×						
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	Table D-11: Challenge of Relevance and Casual Loop Diagram Matrix			<u>ு ச</u>	a ⊥i	=	⊃ E ၓ	₫ ;;	Ŕ	জ চ	ú) <u>@</u>	Σ	ᇫ	<u> ⊆ :</u> ⋝	<u> </u>	Ω	≥ ઇ
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	never quite starts; unproductive behavior never				×											
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	Hypothesize about solutions to your problem and															
	If there is significant amount of time between the action of one variable and the reaction of the next variable in the loop, a time delay can be indicated						×									
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	Help you tell a story or express you interpretations or mental models of how a system works		×										×			
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	May be perceived that the effort necessary to develop alignment is an investment for which the necessary time and energy are not available															
	Develop a collective understanding taking into account the purpose and the audience															
	Multiple actors within the system, each with their own perceptions of what the desired state should be															
	Helps to show balancing structures in which the difference between the desired state and the current state creates a gap															
	Starting point for analyzing what is causing a particular pattern of behavior															
Outcome	It is often necessary to consider feedback within management systems to understand what is causing the patterns of behavior															
to-Out	Graphically presents relationships that are difficult to verbally describe	×														
Action-	pattern of behavior									×						
Table D-12: Challenge of Relevance and Action-to-Outcome Tool Matrix Action-to-		Failure to develop a compelling business case for change precludes any significant momentum from developing	Establish a clear strategy behind the initiative by establishing a clear, authentic, convincing story about the relevance of a change initiative	Tie initiatives to the big picture , business and customer needs, and he business's long-term health	If a commitment gap develops people will not participate fully	Underlying limit or constraint behind this challenge is management's ability to widely communicate a clear business case for change	Potential long delays before business results improve can be discouraging	Requires a critical number of leaders	Strong level of trust among pilot group members develop with shared vision exercises	Explicitly raise questions of relevance in pilot groups and revisit relevance periodically	Make information available to pilot group members	Keep training linked tightly to business results	Increased and sustained communications and education on the vision	Identify every possible variable that contributes to complacency; brainstorm specific ways to counter each variable	Build awareness among team leaders	Make sure that people who become enthusiastic don't alienate others
able D-12: Challenge of R		Relevance Failure to develo	Establish a clear authentic, conv initiative	Tie initiatives to the big picture the business's long-term health	If a commitmen	Underlying limit ability to widely c	Potential long de discouraging	Requires a critic	Strong level of tr i vision exercises	Explicitly raise questi relevance periodically	Make information	Keep training lin	Increased and so vision	Identify every pc brainstorm speci	Build awarenes	Make sure that p others

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1		Understand difficult delayed dynamics																		
		ldentify leverage points																		
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	-	Requires time to think									\vdash									
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		Helps to have someone with whom to discuss ideas and obstacles (planning BOT session)								×										
		Support by management (conducting BOT)															T			
		Work individually or in groups																		
		Focus discussion on variables that are the most important and central to the issue																		
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		Does not require that variable can be measured in conventional units soft variables can be				×														
	(Prepare people for further work in system dynamic thinking and develop dynamic thinking and develop											X]					
		Engaging work and lively discussions																		
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	-	Map multiple variable on graph; variables can be compared for possible interdependencies and																		
		Should not include qualitative words																		
		behavior of the variables over time																		
	-	Understand what happens if you change the														-				
		Recognize exponential growth																		
		Understanding of the issue and team members perception of it; different interpretations of the stated variables are definitely possible																		
	-	the underlying system structure and mindset																		
4	Sild	Look at the change itself, and what is causing it,																		
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ć	<u>5</u> (5	Need individuals to take responsibility for changes and new ways of operating; empower others to act on the vision	Business as usual is how the challenge perpetuates itself, insidiously and unseen, masked by complacency, resignation, and taken-for-granted political games-playing	Assumptions will only change gradually, through reflection, experimentation, and example; reflection gap develops if people do not become more reflective	Limiting process, trust required increases and the previously taken-for-granted low trust becomes an issue, creating a trust gap	With credible and authentic advocates , the credibility of the initiative will benefit	Requires a shared understanding of the values of company	Build the credibility by demonstration, not by articulation; lead by example	Work with partners , a partner is someone with whom we can speak openly and challenge our thinking	Cultivate patience under pressure	Keflect on values and think carefully about your beliefs about people	Develop a greater sense of organizational awareness	Many are inherently cynical about change	Organization-wide change often goes against the very values held dear by members; keep perspective	Get as much feedback as practical	Align behaviors on the part of senior executives	Leaders must win the support of employees, partners, investors, and regulators	Willingness to push themselves out of their own comfort zones and take risks; quest for learning	Develop aims and values that are credible; underlying limit is the clarity and credibility
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	Table D-14: Challenge of Walking the talk and The Iceberg Tool																			
	<u>e</u>		Walking the talk																	
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u-u		Identify systemic drivers of change and leverage points																		
Fallenstein		methodology																		
Sus		critical strategic issues or questions, facilitation						×												
\exists		Focus the group conversation on the most																		
F2		siaylans																		
		Direct action based on the data collection and																		
		Maintaining a focus on strategy																		
		Surfacing a team's assumptions										×								
		Account the important feedback affects														×				
		of focus, and areas for further exploration																		
		Identify potential supporting actions, new areas																		
		they might influence any of the external factors																		
		picture and prompts members to consider how																		
		the group see how it's actions fit into a larger																		
		and long term goals Listing of external forces, while sobering, helps																		
		disconnect between the intermediate indicators																		
		to address in the strategy, but also an important																		×
		Reveals possible problems that the team needs																		
		through balancing loops																		
		change or push back on the group's effort																		
		Understanding how the system can resist																		
		ead to goals																		
		group's actions may get amplified and Ways that the actions may get amplified and																		
		Identify important reinforcing loops that the				×														
		can use to measure process																		
		Identify intermediate indicators that the group																		
	٦	EZONING TOT OPPORTURES		×																
	ran	Looking for opportunities																		
	iag	Uncovering critical mindsets																		
	ρD	cause and effect																		
	8	Exploring the existing causal theory; chain of																		
	a	Specific help in addressing questions																		
	Casual Loop Diagram	Diverse action-oriented teams	×																	
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	Table D-15: Challenge of Walking the talk and Casual Loop Diagram Matrix 🏻		Walking the Need individuals to take responsibility for changes and new ways of alk operating; empower others to act on the vision	<u>a</u> <u>a</u> 8	B & B	i g	\$ ≥	٣	⊕ ⊗	≱ ջ	ರ	ď	ے	Ž	Ōδ	Ğ	Ι Α	٦, Ę,	l≽ is	a D
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Fallenstein		Helps identify resist change: if growth falters or	İ																			
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L ₂		Helps show reinforcing loops: compound change	İ																			
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		then test them	İ																			
		Hypothesize about solutions to your problem and	İ																			
		variable in the loop, a time delay can be indicated																				
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		action of one variable and the reaction of the next	İ																			
		If there is significant amount of time between the	İ																			
		Indicate the effect of the influence	İ																			
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		interpretations or mental models of how a	İ																			
		Help you tell a story or express you	İ																			
		feedback feedback																				
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		Show causal relationship and illustrates circular																				
		that determine the dynamics of a system																				
		Understand and communicate the interactions	1																×			
		the necessary time and energy are not available	\vdash	+		1	-						$\vdash \vdash$		\vdash					$\vdash \vdash$		
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		own perceptions of what the desired state should	1											J					1			
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		Multiple actors within the system, each with their											Ш									
		current state creates a gap																				
		difference between the desired state and the	İ																			
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		Helps to show balancing structures in which the																				
		particular pattern of behavior	İ																			
		Starting point for analyzing what is causing a	İ				×															
	ø	causing the patterns of behavior		+																\vdash		
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	ဗ	ai sement systems to understand what is	İ																			
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	Ė	Graphically presents relationships that are																				
	Action-to-Outcome	the pattern of behavior	l				T															
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References

- A Discussion Paper on Healthy Organizational Change. (n.d.). Ontario Prevention Clearinghouse. Retrieved March 17, 2005 from http://www.opc.on.ca/english/our_programs/hlth_promo/resources/healthy/health-y-chng.htm
- Aronson, D. (2003). Overview of Systems Thinking. Retrieved March 17, 2005 from http://www.thinking.net/Systems Thinking/OverviewSTarticle.pdf
- Basic Tools of Systems Thinking (2004). Getting Started with Systems Thinking: Tools for Organizational Change. Essential Readings for the Innovative Organization. MA: Pegasus Communications Inc.
- Bellinger, G. (2004). Melting the Tip of the Iceberg. Retrieved March 17, from http://www.systems-thinking.org/iceberg/iceberg.htm
- Bellinger, G. (2004). So You Think You Want to Change Something. Retrieved March 17, from http://www.systems-thinking.org/change/change.htm
- Bellinger, G. (2004). Systems Thinking a Disciplined Approach. Retrieved March 17, from http://www.systems-thinking.org/stada/stada.htm
- Brache, A. (2002). How Organizations Work Taking a Holistic Approach to Enterprise Health. NY: John Wiley & Sons, Inc.
- Branch, K. (2002). Management Benchmark Study. Office of Planning and Analysis, Ch.4. Retrieved April 5, 2005 from http://www.sc.doe.gov/sc-5/benchmark/Ch%204%20Change%20Management%2006.10.02.pdf
- Burke, W. and Trahant, W. (2000). Business Climate Shifts: Profile of Change Makers. Boston, MA: Butterworth Heinemann.
- Catalina Foothills School District. (1997). Tips for Using System Dynamics Tools. Retrieved May 2, 2005 from http://www.watersfoundation.org/images/media/tool%20tips.pdf
- Cowings, J.S. (2002). Systems Thinking and Learning Organizations. Strategic Leadership and Decision Making. (Ch. 4). Retrieved March 17, 2005 from http://www.ndu.edu/inss/books/Books%20-%201999/Strategic%20Leadership%20and%20Decision-making%20-%20Feb%2099/pt1ch4.html
- Goodman, M. (March 1997). Systems Thinking: What, Why, When, and How? *The Systems Thinker: Building Shared Understanding*, 8(2).

- Hohn, M.D. (1998). Why is Change So Hard? Theories and thought about the organizational change process. Focus On Basics.
- Jones, A. and Seville, D. (March 2003). Action-To-Outcome Mapping: Testing Strategy With Systems Thinking. *The Systems Thinker: Building Shared Understanding*, 14(2).
- Jones, D., Seville, D., Hamilton, H. Sawin, B., and Rice, P. (March 2003). Action-to-Outcome Mapping: A Facilitation Methodology That Integrates Systems Thinking and Indicators. Retrieved May 2, 2005 from http://www.sustainabilityindicators.org/about/Meetings/TorontoMeeting/jonesv2002.pdf
- Jones, D. and Seville, D. (n.d.). Exploring Community Indicators with Systems Thinking Facilitation and Simulation Modeling. Retrieved May 2, 2005 from http://www.rmi.org/images/other/ER-InOpp-ExplorCommIndic.pdf
- Karash, R. (1996). How to Find "Structure." Retrieved May 2, 2005 from http://world.std.com/~rkarash/structure/
- Kim, D.H. (1999). Introduction to Systems Thinking. MA: Pegasus Communications Inc.
- Kirkwood, C. (2001). System Behavior and Causal Loop Diagrams, Ch. 1. Retrieved May 2, 2005 from http://www.public.asu.edu/~kirkwood/sysdyn/SDIntro/ch-1.pdf
- Kotter, J. P. (1998). Winning at Change. Leader to Leader (10). Retrieved from http://www.pfdf.org/leaderbooks/l2l/fall98/kotter.html
- Leedy, P. and Ormrod, J. (2001). Practical Research Planning and Design (7th ed.). Upper Saddle River, NJ: Merrill Prentice Hall
- Lynesis, D. (n.d.). Why Use Behavior-Over-Time Graphs? Retrieved May, 2, 2005 from http://www.clexchange.org/ftp/documents/whyk12sd/Y_2000-04WhyUseBOTGs.pdf
- McNamara, C. (1999a). Thinking About Organizations as Systems. Retrieved March 17, 2005 from http://www.mapnp.org/library/org_thry/org_sytm.htm
- McNamara, C. (1999b). Basic Context for Organizational Change. Retrieved April 2, 2005 from http://www.mapnp.org/library/mgmnt/orgchnge.htm#anchor493930
- Palmquist, Mike, et al. (2005). Content Analysis. Writing@CSU. Colorado State University Department of English. Retrieved March 17, 2005 from http://writing.colostate.edu/references/research/content/.

- Parrish, D. (2003). Environmental Analysis or External Audit. Retrieved March, 17, 2005 from http://www.davidparrish.com/environment.html
- Richardson, G. and Lynesis, D. (1998). Getting Started with Behavior Over Time Graphs: Four Curriculum Examples. *The Creative Learning Exchange*, 7(5).
- Senge, P. M.; Kaeufer, K. H. (October 2000). Creating Change. *Executive Excellence*, 17 (10), p4.
- Senge, P.M. (1994). *The Fifth Discipline The Art and Practice of the Learning Organization*, 2nd Edition. New York, NY: Currency Doubleday.
- Senge, P.M. (1999). The Dance of Change: The Challenges to Sustaining Momentum in Learning Organizations. New York, NY: Currency Doubleday.
- Smith, M. K. (2001) 'The learning organization', *the encyclopedia of informal education*, http://www.infed.org/biblio/learning-organization.htm
- Stamell, G. and Lynesis, D. (2001). Everyday Behavior Over Time Graphs. *The Creative Learning Exchange*, 10(5).
- Sustainability Institute. (2001). Foundation Dynamics: Exploring the Leverage Points for Successfully Founding Sustainability. Retrieved May 2, 2005 from http://www.sustainabilityinstitute.org/pubs/FoundationDynamics.pdf

Bibliography

- Anderson, V. and Johnson, L. (1997). Systems Thinking Basics From Concepts to Causal Loops. MA: Pegasus Communications Inc.
- Argyris, C. (May/Jun 1998). Empowerment: The Emperor's New Clothes. Harvard Business Review, 76 (3), p98.
- Bellinger, G. (2004). It Depends! Retrieved March 17, from http://www.systems-thinking.org/itdpnds/itdpnds.htm
- Cecere, M. and Symons, C. (2002). Common Mistakes in Organizational Design. Retrieved March 17, 2005 from http://www.forrester.com/Research/PDF/0,5110,27362,00.pdf
- Garcia, H. (2001). Overcoming Typical Organizational Dysfunctions in Managing Crisis Communications Retrieved March 23, 2005 from http://www.crisisnavigator.org/atcc4-e.htm
- Gerloff, E. (December 1991). <u>Three Components of Perceived Environmental</u>
 <u>Uncertainty: an Exploratory Analysis of the Effects of Aggregation</u>. *Journal of Management*.
- Glossary of Terms. (2004). Retrieved March 23, 2005, from http://www.pegasuscom.com/glossary.html
- Goodman, M. (April 1991). Systems Thinking as a Language. *The Systems Thinker:* Building Shared Understanding, 2(3).
- Goodman, M. (March 1997). Systems Thinking: What, Why, When, and How? *The Systems Thinker: Building Shared Understanding*, 8(2).
- McNamara, C. (1999a). Thinking About Organizations as Systems. Retrieved March 17, 2005 from http://www.mapnp.org/library/org_thry/org_sytm.htm
- Organizational Issues in Strategy (2002). Retrieved March 23, 2005, from http://www.mgmtguru.com/mgt499/TN7.htm
- Ossimitz, G. (August 1997). The Development of Systems Thinking Skills Using System Dynamics Modeling Tools. Retrieved March 31, 2005, from http://www.uni-klu.ac.at/users/gossimit/sdyn/gdm_eng.htm
- Pak Tee Ng (2004). The learning organisation and the innovative organisation. Human Systems Management, 23 (2), p93.

- Parrish, D. (2003). SWOT Analysis. Retrieved March, 17, 2005 from http://www.davidparrish.com/swot.html
- Rozycki, E.G. (2001). The Organizational Problem: Illusion and Reality. Retrieved March 17, 2005 from http://home.comcast.net/~erozycki/OrgProb.html
- Senge, Peter M. (May 2003). Taking personal change seriously: The impact of Organizational Learning on management practice. Academy of Management Executive, 17 (2), p47.
- Takahara, T. (2003). Application Area of Thinking or Problem Solving Tool. Retrieved March 24, 2005 from http://www.triz-journal.com/archives/2003/06/e/05.pdf
- The 'New' Tools (n.d). Retrieved March 18, 2005 from http://www.vanderbilt.edu/Engineering/CIS/Sloan/web/es130/quality/newtool.htm
- Zulauf, C. (July 2004). Systems Thinking. Executive Excellence, 21 (7), p13