MASTER

Developing an innovative culture
an application of chaordic systems thinking in practice

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Developing an Innovative culture

An application of Chaordic Systems Thinking in practice

This report is a master thesis describing the master thesis research project conducted at a Company Group Academy

In partial fulfillment of the requirements for the degree of Master of Science in Innovation Management at Technical University of Eindhoven

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Date: 04-09-2014
Preface

Dear reader, here you have my master thesis report, the summary of my research efforts during the final phase of my studies at the University of Technology Eindhoven. Written at a Dutch textile manufacturing company, it describes a design-oriented study focused on the development of the innovation capacity of the human resources.

My interest in this topic was ignited, during one of the courses of the masters program; namely, the course titled Human Performance in Innovative Organizations. During that course I was first exposed to the concepts of Chaordic Systems Thinking (CST). For me, the CST concepts provided a new and exiting paradigm from which to, not only, consider the challenges of innovation, but also to view the world.

I would like to extend a special thank you to Dr. F.M. van Eijnatten, whom not only introduced me to the CST concepts, as the previously mentioned course was taught by him, but whom also mentored me and supervised this project from the University. I would also like to especially thank my wife for her support and patience during the project, for I definitely recognize and acknowledge that she had her part in making this possible for me.

To everyone else whom assisted me during this project, I express my gratitude.

Ian William van Eenenmaal

August 2014, Eindhoven
Abstract

**Background**- This research project was performed at the training and development (T&D) institute of a Dutch textile manufacturing company. Convinced that the company should be more innovative, and that there is a role for the T&D institute to be played in making it so, the center’s management requested a design solution aimed at making the company more innovative.

**Results**- The results of the diagnosis revealed that the company's current culture is not innovative enough to meet mid- and long-term challenges. This research proposes a company wide training and development (T&D) program, to be implemented at the company's T&D center, aimed at teaching employees a mode of thinking and doing which will lead to a more innovation oriented culture.

**Conclusion**- Shifting towards a more innovation-oriented culture would benefit the company in terms of its ability to innovate and adapt to meet mid- and long-term challenges.

**Keywords**- Organization development, Organizational culture change, Industrial innovation

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1: For confidentiality reasons, the real name of the company is not used in this report. Confidential information can be found in the appendices, which are not publicly available.
Executive summary

Guided by the regulative cycle, the aim of this research project was twofold: first to establish the causes of the managerial problem; and second to employ Chaordic Systems Thinking (CST) guidelines in formulating a design, that is implementable at the Company Group Academy (CGA), and that is aimed at increasing the innovation capacity of the Human Resources (HR).

Problem definition

During initial conversations CGA management has voiced the desire to explore CGA’s potential role in increasing the company’s capacity to innovate, in order to more effectively be able to meet current and future challenges, and to align with the company’s strategy.

Management proceeded to imply that the current innovation capacity is considered to be insufficient. In exploring the possible underlying causes, both in light of the preceding literature study and the comments and rationalizations provided by management, an intuitive analysis has been made.

Diagnosis

The goal of the diagnosis stage was to determine the causes of the managerial problems.

Based on market development and the company’s innovation performance, it was established at the outset, that the company stands to benefit from increasing the company’s focus on innovation and the development of its capacity to innovate.

Then, in the diagnosis stage, the research proceeded to focus on the company’s organizational aspects of interest, in light of CST guidelines. CGA capabilities and limitations were considered, as was the current perception of innovation, and finally also the HR capacity to innovate.

A SWOT-analysis of CGA’s resources and in-house skills determined that CGA currently doesn’t contribute to the development of the HR innovation capacity.
With regard to the current perception of innovation at the company, it was established that there is an incomplete understanding of the concept of innovation, and some uncertainty about the individual responsibilities in the innovation process. The consideration of the innovation capacity of the HR led to the identification of bottlenecks, which where incorporated in a causal diagram, depicted in Figure 1.

Considering the causal diagram, through the lens of the Competing Values Framework, led to the conclusion that the company’s established conditions predominantly reflect a hierarchy culture with some aspects of a market culture. Both organizational cultures focus on stability and control, whilst the predominant hierarchy culture equates to an emphasis on an internal focus and integration. As the hierarchy culture is not apt to deal with the dynamics the company faces in its current markets, the direction in the design would be to formulate a Training and Development (T&D) program, to be implemented at CGA, aimed at teaching employees a mode of thinking and doing which will ultimately may lead to a more innovation oriented culture. The design primarily aims to mediate the bottlenecks that fall within the defined design scope (see Figure 1).
Design

In the design stage, the goal was to develop a solution aimed at solving the causes of the managerial problem. In doing so, CGA’s potential role in increasing the company’s capacity to innovate was considered.

While adhering to the previously mentioned design direction, the first step in the data collection stage of the design was to establish design requirements in collaboration with CGA’s management.

Then, a combination of expert advice and research literature was consulted in yielding design suggestions for the design. Each suggestion was then scored on the design requirements and on compatibility with other suggestions.

The final design incorporates the most promising design suggestions in a proposal for a company-wide T&D program. The program distinguishes between the organizational levels and corresponding T&D objectives. It is designed in such a way to instigate a desire to innovate and meet this desire with practical guidelines. These guidelines can be used to inform decisions about the setup and evaluation of projects in such a way, as to move the company towards a more innovative mode of being. However, prior to implementing the design, pilot testing is strongly advised.

Conclusion

It can be stated that the underlying cause of the managerial problem has been established, and with that, that the goal of the diagnosis stage has been achieved.

The cause of the management problem is the current organizational culture. Next, it can be stated that a plan for redesigning this organizational culture has been suggested, and with that, the goal of the design stage has been achieved.

However, to ensure that the designed T&D program provides a role for CGA, the design must be implementable at CGA. Unfortunately, a pilot to test this was not carried out.
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List of abbreviations

CGA: Company Group Academy
CST: Chaordic Systems Thinking
HR: Human Resources
T&D: Training and development
NCD: New Concept Development
Orgmind: Organizational mind
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1. Introduction

In this chapter, the research project will be introduced by addressing the nature and organization of the research (in section 1.1), the company description (in section 1.2), the research context and problem definition (in section 1.3), the research goals (in section 1.4), and finally the organization of the remainder of the report will be covered (in section 1.5).

1.1 Nature and organization of research

As mentioned previously, this section will address the nature and organization of the research project. In doing so, the type of research employed will be addressed (in section 1.1.1). Then the regulative cycle, the underlying research approach, will be addressed (in section 1.1.2). The research boundaries will also be covered (in section 1.1.3), and finally the research relevance will be addressed (in section 1.1.4).

1.1.1 Design oriented

The research approach adhered to in this project is defined as design oriented research. Van Aken (2005) describes this type of research as being pragmatic in nature. In general terms, the main objective is to develop knowledge to be used in designing solutions to field problems. To this end, descriptive and explanatory research approaches and results are combined with context specific knowledge and insights.

Descriptive research typically focuses on who, what, when and where type of questions. Whereas explanatory research, aims to explain what has been observed in the descriptive study.

1.1.2 Regulative cycle and scope

In this research, the regulative cycle (see Figure 2), as developed by Van Aken (1994) and Van Aken et al. (2007), will be adhered to. The regulative cycle, which starts with a problem definition, is by its very nature problem focused.
The regulative cycle prescribes a process that starts with the definition of a problem, then proceeds to determine the causes of that problem in the diagnosis stage, and finally aims to formulate a design solution to be implemented and evaluated in terms of the extent that it solves the defined problem. The cyclical nature of the process implies that multiple iterations may be required to solve the problems at hand.

The scope of this research, as can be seen in Figure 2, will only include the first steps, starting with the problem definition and concluding with a design. Thus, the delivered design should be considered a concept, as the intervention and evaluation steps will not be part of this project, both crucial in determining the actual impact of the design.

1.1.3 Boundaries of research

As part of the preparation, a literature study preceded this research project. This study, focused on the development of the innovation capacity in human resources (HR) as a means to dealing with a dynamically complex, unstable and unpredictable business environment.

Maintaining the research, and subsequent suggestions, within the boundaries of this focus, serves to provide conceptual and analytical strength. It also ensures that the diagnosis and design remain within, and thus are supported by, a researched scientific domain.
1.1.4 Research relevance

An important research suggestion in the preceding literature study was to the further explore practical applications of the Chaordic Systems Thinking framework in order to add to the required basis of empirical evidence.

As this research aims to develop a design applicable in practice, it will pave the way to more, much needed empirical applications of the framework. As such, this research contributes to the understanding of how, in practice, HR development can contribute to the innovation capacity of organizations.

1.2 Company description

For confidentiality reasons, the real name of the company will not be used. Instead, it will be referred to simply as “the company”.

The company, established in the mid 19th century, is based in the Netherlands and annually manufactures millions of yards of fabric, which it exports. In its markets, it is the leader in the high-end segment.

The manufacturing process starts with untreated cloth and finishes with printed fabrics ready to be used as or in clothing.

The company employs around 1200 workers and had an annual turnover of approximately 270 million euros in 2013.

The organizational structure is strongly compartmentalized and hierarchical, and is essentially managed by an executive board consisting of 15 members, including a CEO heading the organization.

1.2.1 The Company Group academy (CGA)

When a private equity firm acquired the company, it somewhat immediately announced its ambition to so-called “double the business”.

In order to do so, the company proceeded to hire approximately 100+ additional production workers. This gave rise to an internal demand for the development of these new employees. To meet this demand, the company academy was established in 2010, as part of the HR department, and has since developed into a company wide academy. Referred to in this report as the Company Group Academy (CGA).
As an internal training and development institute CGA aims to: Lead and develop employees using a strategic approach which is aligned with the business goals in order to build a culture of engagement and empower people’s capability and capacity (CGA, 2014).

CGA is divided in two general functional units, the first focuses on non-manufacturing employees and the second on manufacturing employees. This project was done within the CGA manufacturing unit.

Working at CGA are 1 secretary, 2 instructors, 1 coordinator, 1 manager, and 3 developers of educational material.

Furthermore, CGA has various facilities at its disposal, including 3 classrooms each fully equipped with audio and video installations, having each the capacity to accommodate approximately 15 to 20 participants.

Strategically, the HR director whom is also a member of the executive board leads CGA. The coordinator and manager are mainly responsible for the implementation of strategic plans.

1.3 Research context and problem definition

In this section, the research context and problem definition will be addressed. The research context will convey the organizational circumstances in which the research problem is embedded. The problem definition section will go into the nature of the research problem in more detail.

1.3.1 Research context

Traditionally, the company has enjoyed a stable and very much predictable demand according to which it configured and streamlined its organizational design. However, due to relatively recent developments, the company’s markets are transforming into upcoming markets. These developments are increasingly translating into shifts in market demand, shifts the company’s markets are not immune to.

Amid this changing business environment, the company is starting to realize that the ambition to “double the business”, more and more, equates to a demand for innovation; as the company will have to adapt to the shifting market to survive.
This realization is reflected in one of the company’s current strategic pillars, namely, to introduce new products in existing and new markets.

The above mentioned developments, internally translate to CGA’s management realizing that these developments will, sooner than later, alter demands on the HR. Which in turn impacts the internal HR development demands.

For CGA, as the company’s internal HR development institute, this means that it will have to determine how it can align itself with this strategy.

In the following paragraph the managerial challenge CGA faces, in light of this context, will be addressed.

1.3.2 Problem definition

During initial conversations CGA management has voiced the desire to explore CGA’s potential role in increasing the company’s capacity to innovate, in order to more effectively be able to meet current and future challenges, and to align itself with the company’s strategy.

Management proceeded to imply that the current innovation capacity is considered to be insufficient. In exploring the possible underlying causes, both in light of the preceding literature study and the comments and rationalizations provided by management, an intuitive analysis has been made. Figure 3 shows a causal diagram relating the causes, the management problem and the symptoms.

![Figure 3: Causal diagram of management problem](image-url)
1.4 Research goals

The overall goal of the research is twofold: first to identify the root causes of the management problem; then to provide a solution for the problem based on the identified causes. These two elements are respectively referred to as diagnosis and design.

1.4.1 Diagnosis

During the diagnosis, a deeper, more thorough understanding of the underlying causes of the management problem will be developed. This will result in a more detailed and empirically based causal diagram. First the theoretical framework that has been developed in the preceding literature study will be employed to establish the business parameters of interest. Then data will be collected on these parameters, which will then be analyzed. The diagnosis will provide the basis for the design direction.

1.4.2 Design

In the design stage a solution will be designed for the diagnosed root cause(s) of the managerial problem. This stage will also involve the gathering and analysis of data. However, here the data will be employed to develop an implementable solution aimed at increasing the innovation capacity of the company.

1.5 Organization of report

Here the organization of the remainder of the report will be covered. In the next chapter, chapter 2, the theoretical background of the research project will be addressed in detail. Chapter 3 discusses the research content. There the organizational aspects the diagnosis and design stages focus on will be determined. The 4th chapter will go into the research methodology. There the methods used in the diagnosis and design stages will be elaborated upon. This will include methods used in the data collection and analyses steps for both stages. In addition, for the design stage, the method of design will also be addressed.
In chapter 5, the results of the data collection and analyses, for both the diagnosis design stages will be provided. In addition to those results, the design result will also be covered in the final part of chapter 5.

In Chapter 6 an overall conclusion and recommendations will be formulated. The recommendations will relate to further theory development and to the company specifically. Chapter 7 will addressed the discussion of the research project. There the research limitations and relevance will be covered. In the final chapter, a reflection on some aspects of interest regarding the project will be provided.
2. Theoretical background

In this chapter, the theoretical background guiding this research project is addressed. Please refer to the preceding literature study for a more comprehensive coverage of the concepts drawn upon.

2.1 Chaordic systems thinking

Change and unpredictability have increasingly become inextricable aspects of contemporary organizational contexts. Organizations have grown and in the process have become ever more complex.

In these organizations, seen as systems, both Chaos and order coexist (Van Eijnatten, 2003). As explained by Van Eijnatten (2003), Chaos is essentially the science addressing all entities both chaotic and orderly. To emphasize the coexistence of both Chaos and order the term chaordic is preferred over Chaos.

Defined by Fitzgerald (1997) a chaordic system is:

“A complex and dynamical arrangement of connections between elements forming a unified whole the behavior of which is both unpredictable (chaotic) and patterned (orderly) ... simultaneously.”

Explained by Van Eijnatten (2003), CST is a way of interpreting and understanding systems. It provides an approach to designing complex organizational systems that recognizes the system not as a rigid structure but rather as a ‘flow’. It provides concepts with which uncontrollability, uncertainty and complexity in an enterprise can be dealt with. CST is the main theoretical lens guiding this research project.

2.2 Discontinuous growth

Discontinuous growth refers to the lifecycle of a chaordic system. As Van Eijnatten (2004) explains, a chaordic system’s lifecycle initiates with its birth after which it enters a linear development phase towards maturity. Once the system reaches its limits of growth, the system may make a developmental leap to a higher level of complexity or die, see Figure 4. Note, that the developmental leap often manifests itself in the form of a radical innovation.
When reaching this limit of growth, the system will start to bifurcate. This point of bifurcation initiates a far from equilibrium (FFE) period of relative instability, unpredictability and non-linear growth. During this period of instability, the system becomes sensitive to minor external variations. This property is referred to as the “Sensitive Dependence on Initial Conditions” (SDIC).

Another important aspect in the life cycle is the moment at which the system starts to bifurcate. Figure 5 shows three different situations (a, b & c) with regard to this moment. From Figure 5 it becomes evident that for situation a the extend of growth at \( t_r \) is most and for situation c this extend of growth at the same point in time is least (Van Eijnatten, 2004).
2.3 Holon

In this section the definition of the holon and its properties will be covered. The Hungarian journalist Arthur Koestler defines the concept of the holon, as an entity that is both a whole and a part at the same time (Fitzgerald, 2002). Consider the following example to clarify this concept. Think of yourself. You are a human being and as such you are whole. Perhaps you are also a member (part) of a household, which in turn is also a whole but also a part of a neighborhood, which is also both a whole and a part as it forms part of a city and so on. This proceeds to include all in an overarching holon with an infinite number of sub-holons (Fitzgerald, 2002).

2.3.1 Holonic development

A system, seen as a holon, may make a developmental leap to a higher level of complexity. Inherent to the holon is its ability to develop into higher complexity
levels, see Figure 6. Four fundamental capacities make this development possible. These are (Wilber, 1996):

(1) agency or identity;
(2) communion or membership;
(3) self-transcendence or to go beyond what went before; and
(4) self-dissolution or decomposing into sub-holons.

As holons differ with regard to their levels of complexity, they also differ in the degree to which they can tap into their “holonic capacity” (Fitzgerald and Van Eijnatten, 1998). The holonic capacity of a holon refers to its ability to operate with greater mindfulness, expanded awareness, “control- and response-ability”. Here control-ability stands for the degree to which a holon can influence the outcome of future events. And response-ability stands for the holon’s ability to respond to highly variable conditions.

Figure 6: Holonic development at various levels of complexity (Van Eijnatten, 2004: p. 439)
Thus, higher complexity levels correspond with higher holonic capacity, which in turn increases the holon’s ability to deal with change and see "the window of opportunities" when arriving at "the edge of Chaos" (Van Eijnatten, 2004).

### 2.3.2 Wilber’s adapted quadrants

Wilber (1996) conceptualized holon’s as existing of an interior & exterior and an individual & collective dimension. Wilber captured this in a quadrant framework. However, this framework contains some inconsistencies, which may be a source of confusion. Edwards (2007) addressed these inconsistencies and adapted this initial framework, see Figure 7.

In Edwards’s adapted version, Wilber’s individual & collective dimensions have been replaced by agency & communion. Edwards (2007) explains that holons are simultaneously a subject and an object and have agency (self-preservation) and communion. Emphasizing that the quadrants together refer to a single holon.

![Wilber's quadrants adapted by Edwards](http://www.integralworld.net/edwards8.html)

As covered previously, a holon is both a part and a whole at the same time. Notice in Figure 7 that the two upper quadrants, of agency, relate to the holons identity as a whole. And the bottom two quadrants of communion, relate to the holons identity as a part. The left and right quadrants respectively conceptualize the subjective and objective dimensions of the holon. The subjective dimension is comprised of consciousness constructs (e.g. thoughts, believes, values, knowledge etc.), the
objective dimension is comprised of perceivable behavior, e.g. directed action, social roles, etc. (Edwards, 2007).

According to Wilber (1996), a truly holistic approach should cover all four facets equally well. Also Van Eijnatten (2004) emphasizes this in explaining that in CST a re-unification of the quadrants is advocated. Thus a balanced development of each of these dimensions is required for a holon to develop further.

2.4 Emergence

Emergence is the process by which holon’s make successful complexity leaps. There are various approaches to explaining emergence, and while these approaches differ to some respect, they also share similarities. Central to the notion of emergence is, the interaction among heterogeneous agents under directional influences, and its fundamental unpredictability. However, consensus is yet to be reached on how and why exactly these interactions lead to emergence.

This insight also serves to explain why bifurcation is conducive to emergence. As bifurcation initiates more dynamism the interaction rate among heterogeneous agents under directional influences increases.

2.4.1 Increasing the likelihood of emergence

While the process of emergence is fundamentally unpredictable, this is not to say that the likelihood of emergence cannot be influenced. In line with Fuller et al. (2008), it is believed that and understanding of the process of emergence will enhance the chances of desirable outcomes through increased management competence. So, how can the chances of emergence be increased?

As emergence results from interaction among heterogeneous agents under directional influences, increasing the interaction rate, among the heterogeneous agents, and the directional influences will increase the likelihood of emergence is increase. How is this achieved?

Recall the concept of holonic capacity (section 2.3.1), which determines the extent to which a holon is able to deal with change and see “the window of opportunities” when arriving at “the edge of Chaos” (Van Eijnatten, 2004).
As the window of opportunities is emergent, it can be inferred that a higher holonic capacity will increase the likelihood of emergence to occur. As covered previously, the holonic capacity is increased through holonic development, made possible by four fundamental capacities (see paragraph 2.5.1).

2.5 Organizational mind
The organizational mind, or orgmind for short, can be considered to hold the holonic capacity of an organization. The orgmind is comprised of the combined beliefs, assumptions, premises, values and conclusions most members of an organization hold as truth. By developing the orgmind, an organization is more likely to see the opportunities at the edge of Chaos and successfully leap to higher levels of complexity (Van Eijnatten, 2004).

2.6 Dialogue vs. Discussion
In considering the organization as a holon, the orgmind refers to the subjective identity quadrants, as viewed by Edwards (2007). Here, the concept of dialogue is introduced as a means to develop the subjective quadrants. Dialogue is a mode of interaction, which can be used to develop the orgmind. It can be understood as a form of learning through communication, which aims to achieve a collective and shared understanding of the combined interiors, involved in the dialogue. Gerard and Ellinor (1999), describe dialogue as being a stream of meaning flowing among and through a group of people. Another way to look at dialogue is as a means of combining and integrating individual minds into a larger collective, more powerful mind, emerging as a result of the deep relationships and interactions among a set of individual minds. In dialogue the pace of thought is slowed down which allows it to be scrutinized in more detail. The four stages of thought, (1) data reception, (2) interpretation, (3) assumption, and (4) conclusions, can thus be considered individually, in a more critical fashion (Van Eijnatten, 2004).

In Table 1 the communication mode of discussion, a common practice in contemporary organizations, is compared with that of dialogue to provide more insight into what dialogue entails.
Table 1: Dialogue vs. Discussion

<table>
<thead>
<tr>
<th>Dialogue</th>
<th>Discussion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seeing the whole among the parts,</td>
<td>Breaking issues or problems into parts,</td>
</tr>
<tr>
<td>Seeing the connections,</td>
<td>Making distinctions</td>
</tr>
<tr>
<td>Further inquiring into one’s own assumptions,</td>
<td>Justifying/defending one’s own assumptions,</td>
</tr>
<tr>
<td>Creating shared meaning among many</td>
<td>Gaining agreement on one single meaning,</td>
</tr>
<tr>
<td>Listening deeply together without resistance,</td>
<td>Preparing to pose better arguments,</td>
</tr>
<tr>
<td>A slower pace with silences in between,</td>
<td>Continuous flashing battle of arguments,</td>
</tr>
<tr>
<td>Learning through inquiry and disclosure,</td>
<td>Persuading, selling, telling</td>
</tr>
<tr>
<td>Divergent</td>
<td>Converging</td>
</tr>
</tbody>
</table>

2.7 Intentional bifurcation

The importance of bifurcation and the moment at which it occurs has been covered previously. Intentional bifurcation suggests that a system is purposefully forced to bifurcate. Nonaka & Yamanouchi (1989) refer to intentional bifurcation as the generation of turbulence and consider it to be an essential ingredient to organizational renewal. Through the perception of change in a system, and the organizational goals, a system can be intentionally bifurcated.

2.8 New concept development model

The new concept development (NCD) model, as depicted in Figure 8, is heavily based on the NCD as defined by Koen et al. (2002). The model has been developed in part with the intention to provide an insight into the “Fuzzy Front End” of innovation.
Considering the model itself, Koen et al. (2002) describe the “engine” at the center of the model as the leadership, culture, and business strategy of the organization that drives the six key elements that are controllable by management.

The six elements (opportunity identification, opportunity analysis, experimentation, idea generation and enrichment, idea selection, and concept definition) represent the definable activities of the “Fuzzy Front End”.

The influencing factors, incorporated in the model represent the endogenous and exogenous conditions that influence both the engine and the six elements.

The six elements are referred to as activity elements as opposed to processes. A process would imply a set structure, which would disregard the fundamental complexity and unpredictability of the modeled occurrence.

The circular shape of the model suggests that ideas flow, circulate, and iterate between and among the six elements. Further, as shown by the lines between the elements, such a flow may combine the elements in any order or combination, using the elements more than once if required.

And finally, there is no real separation between the influencing factors, the engine, and the key elements. These continuously interact and determine each other.
2.8.1 Influencing factors
The “Fuzzy Front End” is embedded in a context, comprised of endogenous organizational conditions, exogenous organizational conditions, and its capabilities. Information and knowledge about these conditions and capabilities should be diffused throughout the organization, as these are essential inputs in developing novelty. It is in light of these conditions that novelty is defined.

2.8.2 The engine
Leadership, culture, and business strategy together constitute a climate conducive to innovation (Koen et al., 2001).

2.8.3 Opportunity identification
Opportunity identification establishes the market or technology arena the company may want to participate in. In doing so, just as with establishing the influencing factors, an awareness of limiting and enabling endogenous and exogenous conditions should be present.

2.8.4 Opportunity analysis
In this element, an opportunity is assessed to establish whether or not it is worthwhile pursuing (Koen et al., 2002). However, at this early stage detailed information is often lacking. Thus, expert opinions, gut feelings, and plain common sense will have to be resorted to. However, these become powerful tools in light of a well-developed orgmind.

2.8.5 Idea generation and enrichment
The element of idea generation, refers to the evolution of ideas from birth to maturation. Here, both dialogue and multilogue can be employed as a means of interaction.

2.8.6 Idea selection
Here the lack of information and the fundamentally unknowable future, calls for a reliance on a well-developed orgmind, in making an initial selection of ideas. By
employing dialogue and consensus decision-making, the orgmind may be tapped in reaching a decision.

Further, the selection of ideas should be approach with a positive attitude. Ideas should be challenged on how they can be improved, instead of killing ideas with negative criticism. This is important in avoiding feelings of rejection, which may lead to the suppression of the creative impulse.

2.8.7 Experimentation

Experimentation should play a critical and integral role in the NCD model. This cannot be emphasized enough. Fuller et al. (2008) observed successful applications of experimental behaviors, in situations of high uncertainty. There, the repeated creation of pilot projects lead to the survival of some and the dissipation of others. Those projects that worked were developed further, the ones that did not, were abandoned. Social interactions played a crucial role in searching for and examining project possibilities.

2.8.8 Concept definition

The Fuzzy Front End is concluded with a promising concept. In determining whether the concept is promising or not, often there will be specific criteria involved. These criteria are often based on the organizations’ strategy.

Here again, dialogue and a consensus decision-making approach should be employed as much as possible.

2.8.9 The role of Management

Now that an insight has been gained into activities of the “Fuzzy Front End“, managerial implications can be derived. Considering the now adapted NCD model there is a possible role for to be defined management for each of the key parts. Table 2 provides an overview of the various activity elements and the corresponding management role.
Reflecting on the managerial roles defined in Table 2, it becomes evident that the classical managerial functions of predicting, planning, delegating and controlling do not apply during the developmental leap. Instead the emphasis should be on informing, supporting, stimulating, motivating, encouraging, and facilitating. The
manager becomes a cultivator and influencer of favorable conditions aimed at increasing the likelihood of a successful developmental leap. It is much less about controlling and more about allowing. In their description of a chaordic manager, Fitzgerald and Van Eijnatten (1998) also support this notion. They state that managers should be encouraged to let go for control.

2.9 Integrated framework

The information and knowledge used in addressing the framework is directly derived from previous considerations. Figure 9 shows an overall view of the framework, a 3-phased approach emerges. With phase 1 being “preparing for bifurcation”, phase 2 being “intentional bifurcation”, and phase 3 being the application of the adapted NCD model.

![Figure 9: An integrated framework](image-url)
2.9.1 Phase 1: Preparing for bifurcation

The first phase (Figure 10) is all about preparing for bifurcation. Which essentially entails focusing on holonic development.

2.9.2 Phase 2: Intentional bifurcation

The second phase (Figure 11), is about instigating bifurcation in a small part of the system. Recall that bifurcation should be instigated at the “right” moment, which remains a judgment call. A well-developed orgmind combined with consensus decision-making, drastically increases the quality of this judgment.
2.9.3 Phase 3: Apply adapted NCD model

The third phase (Figure 12) is about actually developing new thinking and doing by applying the adapted NCD model. The manager should focus on cultivating the necessary favorable conditions for this process.

![Apply adapted NCD model](image)

Managerial objectives:
- Allow business unit to engage in the development of new thinking and doing.
- Intensify conditions conducive to emergence.
- Informing, supporting, stimulating, motivating, encouraging, and facilitating.

Figure 12: Phase 3: Apply adapted NCD model

2.10 Adaptive cycle

The Adaptive Cycle model is rooted in the study of ecosystem dynamics and focuses on processes of destruction and reorganization. The cycle shifts between long and slow periods of aggregation and transformation of resources and shorter faster periods that create opportunities for innovation and is applicable in understanding complex systems from cells to ecosystems to societies (Resilience Alliance, 2014).

The Resilience Alliance (2014) explains that for systems that can be represented by this adaptive cycle, four distinct phases can be identified, see also Figure 13:

1. **Growth or exploitation (r):** Characterized by rapid exploitation and reaping of resources by system components.

2. **Conservation (K):** Characterized by the longer accumulation of capital or other system elements or energies and by increasing connectivity and rigidity.
3. **Collapse / Release (Ω):** Characterized by the rapid discharge of the energy accumulated and stored during the k phase.

4. **Reorganization (α):** Characterized by a relatively rapid period of reorganization and assembly of components.

![Figure 13: Adaptive Cycle (Adapted from: Garmestani et al., 2009)](image)

The adaptive cycle contains two loops referred to as the fore- and backloop. The foreloop, from **r** to **K**, is considered to be slow and incremental and is characterized by growth and accumulation, the phase of linear growth. The backloop, from Omega (Ω) to Alpha (α), is considered to be rapid and is characterized by reorganization leading to renewal.

Holons pass through such cycles and given the scalar nature of holons, it becomes clear that such cycles occur at each scale. In the following section, the concept of Panarchy will illustrate how adaptive cycles at various scales interact with each other.
2.10.1 Panarchies

In understanding the interaction between the higher and lower level cycles, the so-called “Revolt” and “Remember” connections are of importance, see Figure 14.

![Diagram of Panarchy connections](image)

**Figure 14: Panarchy connections (Van Eijnatten, 2009)**

If the moment at which a lower-level cycle moves into its Ω-phase coincides with a higher-level cycle being in a vulnerable K-phase, rapid change may be triggered in the higher-level cycle. The “Revolt” connection implies this effect.

The "Remember" connection connects the conserving K-phase of the slower higher-level cycle to the reorganizing/renewal α-phase of the lower-level cycle. This results in the higher-level providing a constraint and organized development of the lower-level. In a sense the accumulated learning in the slower higher-level cycle will serve to protect the integrity of the system.

"The fast levels invent, experiment and test; the slower levels stabilize and conserve accumulated memory of past successful, surviving experiments. The whole panarchy is both creative and conserving." (Gunderson & Holling, 2002: p. 76)
2.11 The Competing Values framework

The competing values framework distinguishes between four major culture types. These are the CLAN, ADHOCRACY, HIERARCHY, and MARKET. Each of these cultures is defined in terms of their respective orientation, leadership type, value drivers, and theory of effectiveness.

CLAN cultures are distinguished by a high degree of shared values and goals, cohesion, participation, individuality, and teamwork. This culture has been compared to an extended family. Thinking of customers as partners and striving for a humane work environment. Management is more focused on empowering employees instead of controlling them (Cameron & Quinn, 2006).

In an ADHOCRACY culture, a reaction to highly turbulent environment, success is believed to depend on innovation and pioneering initiatives. Organizations adopting this culture are typically involved in new product development and anticipating the future. Here managers are focused on promoting entrepreneurship and creativity. Adaptability, flexibility and creativity in conditions of uncertainty are strived for (Cameron & Quinn, 2006).

Organizations adopting a HIERARCHY culture typically strive towards efficient, reliable, smooth-flowing outputs. This culture proved to be most effective in stable and predictable environments. Where authority, standardization, and control and accountability are considered essential to success (Cameron & Quinn, 2006).

Organizations adopting a MARKET culture are primarily oriented on the external environment. Focusing on transactions with external stakeholders such as suppliers, customers, contractors, and licensees. For the MARKET, the internal conditions are dictated by economic market mechanism. Profitability, market share and goal achievement are important measures of success (Cameron & Quinn, 2006).

Figure 15 provides a quadrant overview of the various culture types, their defining characteristics, and their relationship to each other.
Figure 15: Four culture types in the competing values framework (adapted from: Cameron & Quinn, 2006: p. 46)
3. Research content

Reflecting on the defined problem, both on itself and in light of the theoretical background, yields a set of organizational aspects to focus on during the diagnosis and design stages. In this chapter, these organizational aspects are discussed.

3.1 Basic assumption verification

A closer look at the defined problem exposes, an implied assumption, which should not be taken for granted. Referring here to the assumption that the company needs to be more innovative.

As the verification of this assumption provides the required argument to proceed, this is considered at the outset of the research project.

Whether the company is sufficiently innovative or not, depends on the relationship between two aspects. The first being the demand for innovation in the company’s market, and the second being the company’s innovation performance. Thus, first the company’s demand for innovation is established by analyzing the relationship between:

1. The current demand for innovation in the company’s market, and
2. The company’s current innovation performance

3.2 Organizational aspects of interest

Here, the “organizational aspects of interest” refer to those aspects the design will bare upon to bring about the desired conditions. Considering the defined problem here, both in light of the theoretical background and the researcher’s insight, yields the following aspects:

- CGA capabilities and limitations
- Perception of innovation
- HR innovation capacity

In the remainder of this chapter, these aspects are considered more closely in terms of the reasoning behind their selection and their respective objects of analysis.
3.2.1 CGA capabilities and limitations
The lack of focus on innovation in CGA’s curriculum is considered a central cause of the managerial problem (see Figure 3). Bringing about any change at or through CGA requires a general insight into its capabilities and limitation. These capabilities and limitation are largely determined by available facilities and personnel skills. Thus, for this aspect of interest, the objects of analysis are:

*The educational facilities and skills at CGA’s disposal.*

3.2.2 Perception of innovation
The current perception of innovation at the company, will affect any attempt to increase the innovation capacity through HR. Thus, it should be taken into consideration. The current perception, in terms of the perceived relevance and value of innovation, is based on the understanding of it. In other words, the thoughts, knowledge and believes held with regard to innovation determine the perception of innovation. Thus, with this aspect of interest, the objects of analysis will be:

*The employee’s thoughts, knowledge and believes on innovation in general, on its relevance, and on its value.*

3.2.3 HR innovation capacity
To increase the likelihood of innovation, the theory prescribes a strategy for the development of the organizations holonic capacity. The theoretical background covers the issue of holonic development in terms of the development of the four quadrants used by Edwards (2007) within a strategic framework. For each quadrant, one or more guidelines are proposed. These guidelines provide a frame of reference in light of which the current condition at the company can be assessed. In Figure 16, the guidelines per quadrant can be seen and are additionally aggregated into a list of guidelines.
Here the list of guidelines and the presence of a specific approach to innovation together form the organizational aspects of interest.

3.3 On Global vs. local change

Two important implications provided by the concept of panarchies are central in the diagnosis and design approach. Because of this, these will be explicitly addressed in this chapter. The implications are (see Figure 17):

1. A demand for innovation in the company’s market translates into a demand on the Sector’s innovation capacity, which in turn translates into a demand on the company’s innovation capacity, and further down, into a demand on the innovation capacity of the company’s individual employees.

2. And the other way around, increasing the innovation capacity of the company employees individually increases the company’s innovation capacity as a whole, which may result in meeting the demand for innovation in the company’s sector.
Thus holonic development on the individual level will result, through the dynamics explained by panarchies, in the holonic development of the company as a whole.

3.3.1 Objects and units of analysis

The unit of analysis, refers to the level at which the research is conducted (Blumberg et al., 2011). In this research project, properties at the company level are being researched. Thus, the unit of analysis is the company.

Based on the preceding considerations an aggregated overview is provided in Table 3 relating the organizational aspects of interest to their respective objects of analysis.

Table 3: Organizational aspect vs. objects of analysis

<table>
<thead>
<tr>
<th>Organizational aspects of interest</th>
<th>Objects of analysis</th>
</tr>
</thead>
</table>
| The company’s demand for innovation | • The current demand for innovation in The company’s market  
• The company’s current innovation performance |
| The educational facilities and skills at CGA’s disposal. | • The educational facilities and resources at CGA’s disposal |
| Employee perception of innovation | • The employee’s thoughts, knowledge and believes on innovation in general, its relevance and its value. |
| HR innovation capacity | • Individual learning & development  
• Collective and shared understanding of combined interiors  
• Work skill development  
• Networking  
• Leadership skills  
• Inclusive decision-making  
• Approach to innovation |
4. Method of research

In this chapter the research methodology is addressed. In doing so, the research method for both the diagnosis and the design stage will be covered.

4.1 Diagnosis

The diagnosis focuses on establishing and understanding the current state of the organizational aspects of interest, identified in the previous chapter. In order to do so, the objects of analysis for the organizational aspects will be enquired into. This will provide the required insight to determine the design effort.

4.1.1 Data collection method

In this section, the data collection methods for each of the organizational aspects will be elaborated upon.

4.1.1.1 The company’s demand for innovation

As covered previously, the company’s demand for innovation will be determined by establishing:

1. The current demand for innovation in the company’s market
2. The company’s current innovation performance

This will be done using three methods of data collection. The first being semi structured interviews (see appendix 1.1) among the company’s marketing and sales directors and a sample of approx. 8 operational managers.

The second and third are the annual financial reports and organizational data of the past 5 years. Here the following information is sought:

<table>
<thead>
<tr>
<th>Demand for innovation data</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Overall revenue in the last 5 years.</td>
</tr>
<tr>
<td>• Market share development in the last 5 years.</td>
</tr>
<tr>
<td>Innovation performance data</td>
</tr>
<tr>
<td>• Number of new products introductions over last 5 years.</td>
</tr>
<tr>
<td>• Number of successful product introduction over last 5 years.</td>
</tr>
</tbody>
</table>
4.1.1.2 CGA capabilities and limitations

To establish the capabilities and limitations of CGA, its management will be interviewed using a short questionnaire (see appendix 1.2). Management can be expected to have this information, as it would be required to fulfill the management role.

4.1.1.3 Perception of innovation

Here the employee’s thoughts, knowledge and believes on innovation in general, its relevance and its value will be considered. In doing so, two methods of data collection will be used. The first method will be an semi structured interview (see appendix 1.3) with a sample of approx. 8 managers among the ranks of operational, tactical and strategic management. As frequent interaction with coworkers is inherent to the role of management, it can be expected that managers will be able to voice the prevailing perceptions to a significant extent.

The second method will be the use of documentation. A sample of 15 the company magazines, published in the last 5 years, will be considered. Here references to innovation will be sought in order to establish how the concept of innovation is employed, and the implied relevance for the different departments/ employees. The company magazines are expected to highlight the most important issues and topics on a company level.

4.1.1.4 HR innovation capacity

The organizational aspects considered in assessing the HR innovation capacity, as identified in the previous chapter, are:

1. Individual learning & development
2. Collective and shared understanding of combined interiors
3. Work skill development
4. Networking
5. Leadership skills
6. Inclusive decision-making
7. Approach to innovation

The diagnosis focuses on establishing the degree to which these aspects are present, and on related bottlenecks. In doing so, two methods will be used. The first of which will be an interview (see appendix 1.4), which will also be conducted among
the previously mentioned sample of approx. 8 managers among the operational, tactical and strategic ranks. The questions in the interview cover all of the above-mentioned organizational aspects. The second method is the use of organizational documentation. Here managerial reports, over the past 5 years, will be considered to obtain information on the amount of employees that have been involved in knowledge and skill development programs (aspects 1, 3 & 5).

4.1.2 Data analysis method
Here the method of data analysis will be covered. In doing so, the method of data analysis will be defined for the various methods of data collection.

4.1.2.1 The company’s demand for innovation

**Interviews**

The responses of the interviews will be considered in light of the theoretical background and the researcher’s insight.

**Organizational data**

The information derived from the organizational data concerning the demand for innovation and innovation performance, will be used, if possible, to generate graphs. These graphs will also be subjected to analysis, in light of the theoretical background, on the basis of which conclusions will be drawn.

4.1.2.2 CGA capabilities and limitations

The data collected on this aspect is only comprised of interview responses. A SWOT-analysis will be used on these responses. This SWOT-analysis will be considered in the selection of a promising solution direction.

4.1.2.3 Perception of innovation

**Interviews**

CST provides concepts with which uncontrollability, uncertainty and complexity in an organization can be dealt with (Eijnatten, 2003). In doing so, it prescribes a certain way of thinking which is supportive of innovation. In particular, it provides insights into innovation in general, its relevance and its value.
Thus, for purposes of analyses, the aspects checked for in the responses to the various questions were formulated, from a CST perspective. Table 4 shows the aspects checked for per guiding question.

Table 4: Aspects checked for in inquiry into perception of innovation

<table>
<thead>
<tr>
<th>Guiding Question</th>
<th>Aspect(s) checked for in responses</th>
</tr>
</thead>
</table>
| Definition of innovation? | • Mentions/imply new thinking  
| | • Mentions/imply new doing  
| | • Broad scope (Products, Processes, Culture, Org. design)  
| | • Reference to organizational performance/survival/sustainability  |
| When to innovate? | • If internal and/or external opportunities arise to contribute to organizational sustainability  
| | • When organizational conditions start decreasing in their ability to achieve organizational goals  |
| How does innovation come about? | • Interaction among heterogeneous information, knowledge, ideas and perspectives  
| | • Interaction under directional influence  |
| Relevance of innovation for company? | • Innovation is crucial for organizational sustainability  |
| Relevance of innovation for your department? | • As a department innovation, contributes to departmental sustainability.  
| | • Departmental sustainability contributes to overall sustainability.  |
| Attitude towards innovation? | • Proactive  |

The frequency each aspect has been mentioned, considered for the responses of all respondents together, will be used to generate frequency charts. These charts will then be subjected to analysis employing descriptive statistics and the theoretical background.

**Company magazine**

The references to innovation in the selection of the company’s magazines will be categorized under either addressing the definition of innovation, the relevance of innovation, or the value of innovation. Per sub category for each year, the amount of references will be counted. For each year, if applicable graphs will be generated from which conclusions will be drawn.
4.1.2.4 HR innovation capacity

**Interviews**

The method of data analysis for the interviews entails two steps:

1. Bottleneck analysis
2. Finding consensus

Bottleneck analysis involves the consideration of statements in light of the theoretical background and the desired situation. In doing so, statements indicating organizational issues are identified. These organizational issues are classified qualitatively in terms of their deviation from the desired condition.

Consensus is based on a majority or consensus criterion. Here statements concerning the same issues are aggregated. Then a selection is made among the issues perceived by the majority. In other words, only the issues identified by a majority will be considered. This ensures the validation of the organizational issues.

The aggregated bottlenecks meeting the consensus criterion will then be incorporated in a causal diagram, distinguishing between root causes, mediating causes and symptoms.

The resulting causal diagram will in turn be considered in light of the competing values framework in order to establish the dominant organizational culture.

**Organizational documentation**

The organizational documents will be considered to establish the extent to which employees have been or are participating in training and development programs. In this case, the relationship between the total participants and non-participants is of interest.

**4.2 Design**

In the design stage, a solution will be designed for the root causes established in the diagnosis. As mentioned previously, the aim is to optimize the impact of the designed solution by resolving the biggest causes allowable within available resources.

The design stage consists of data collection, analysis and the actual design.
4.2.1 Data collection

The data collection in the design stage aims to gather design suggestions and requirements, which may contribute to the solution of the selected root causes of the managerial problem.

Three sources of information are of value here. These are:

1. Literature
2. Best practice examples
3. Experts

4.2.1.1 Literature

The preceding literature study will be an important source of data here. However, it is to be expected that the issues to be dealt with are not all covered in the preceding literature study. As many business problems are not unique and have been previously researched, literature on such research will be a valuable source for potential solution directions.

4.2.1.2 Best practice

Best practice examples also provide insights to successful approaches in dealing with specific problems. If examples can be found of instances where successful approaches have been developed for similar problems, these can also provide valuable input for the design.

4.2.1.3 Experts

Depending on the nature of the issues to be dealt with, certain experts may also provide valuable insights, especially with regard to the actual implementation of specific solution directions.

The data collection stage is divergent and results in a set of context independent theoretical and practical design statements aimed at resolving the root causes under consideration. These will be considered further in the analysis stage.

4.2.2 Data analysis

In the data analysis stage, the gathered design suggestions will be considered in light of the established design requirements. In doing so, design suggestions will be
scored on the extent to which they adhere to the design requirements. The scoring will be based on the researcher’s insight and intuition, while employing the classification scheme presented in Table 5.

Furthermore, suggestions will be discarded if:

- The total score for the suggestion is equal to or less than 0.
- A score of -2 occurs for at least one of the boundary conditions.
- A score of -1 occurs for at least one of the design restrictions.

<table>
<thead>
<tr>
<th>Classification</th>
<th>Definition</th>
<th>Symbol</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>High adherence</td>
<td>Either a high adherence to a design requirement or contributes highly to another design suggestion.</td>
<td>++</td>
<td>2</td>
</tr>
<tr>
<td>Adhering</td>
<td>Either an adherence to a design requirement or contributes to another design suggestion.</td>
<td>+</td>
<td>1</td>
</tr>
<tr>
<td>Neutral</td>
<td>No substantial effect expected on either a design requirement or another design suggestion.</td>
<td>N</td>
<td>0</td>
</tr>
<tr>
<td>Conflicting</td>
<td>Either a conflict with a design requirement or a high conflict with another design suggestion.</td>
<td>-</td>
<td>-1</td>
</tr>
<tr>
<td>High conflict</td>
<td>Either a high conflict with a design requirement or a high conflict with another design suggestion.</td>
<td>--</td>
<td>-2</td>
</tr>
</tbody>
</table>

For the suggestions sufficiently adhering to the design requirements, the inter compatibility will be considered. In doing so, the researcher intuitively considers the implications of the potential combinations among the various design suggestions. Each combination will be scored, also using the scheme presented in Table 5. The aim is to make a promising selection among the gathered design suggestions that fit both the context best.

4.2.3 Design

Using the most promising design suggestions for improving the innovation capacity of the company, a solution implementable at CGA will be designed. The design process is not a linear process and involves creative leaps.

To optimize the organization of the design, the stakeholders will be, as much as possible, recurrently involved in the development of the design. The design outcome will most likely be an educational module, which can be provided by CGA to The company employees.
The deliverable of this final stage will be the actual design accompanied by an advisory report for its implementation.

4.3 Validity and Reliability

Important aspects of the research quality are the research validity (internal and external) and reliability. These will be covered in this section.

4.3.1 Internal and external Validity

The internal validity concerns the extent that the research instrument, in this case the methods employed in the research, measure what it aims to measure.

In this case, the absence of validated questionnaires for measuring the organizational conditions under consideration, may pose some threat to the internal validity. However, the formulated guiding questions do follow logically from the insights provided by the theoretical background.

The external validity refers to the extent that the research results can be generalized and applied to other situations. As this research aims to provide a design solution, specifically for a managerial problem at the company, the final research result will be most relevant for there. The generalizability may thus be considered as limited.

4.3.2 Reliability

In considering the reliability, one is concerned with the extent to which the research approach will consistently produce the same result. This research consists of two main stages, being the diagnosis and the design stage. The design stage consists of non-linear and emergent processes, which make more than a single solution possible. Thus there is no guarantee that replication of this approach will consistently result in the same design solution. The approach to the diagnosis, ideally, would have to yield consistent results. But specifically, the semi-structured nature of the interviews may be a point of concern. These interviews allow room for the exploration emergent avenues. This may result in slightly different results. However, these results are not expected to be fundamentally different.
5. Results
In this chapter the results of both the diagnosis and design stages will be addressed. For both stages this includes the data collection and data analyses results. In addition, for the design stage, the design results will also be addressed.

5.1 Diagnosis
In addressing the data collection and analysis results of the diagnosis, the general outline of the research method section will be followed. This diagnosis section will be concluded with the formulation of the design direction.

5.1.1 Data collection results
5.1.1.1 The company’s demand for innovation
As covered in the research method chapter, the relationship between the current demand for innovation in the company’s market and the company’s current innovation capacity will be considered in establishing the demand for innovation.

Data on current demand for innovation from the company’s market
In order to acquire data on the current demand for innovation, semi-structured interviews, annual reports and organizational data were employed.
For this subject, sub-theme 1 of interview checklist #1, provided in appendix 1.1, was employed. In the end, three managers were interviewed with regard to this subject. Of these three managers, two were from the strategic management level and one from the tactical management level. To preserve anonymity, each manager will be referred to as “manager”, regardless of the respective level.
According to a manager, detailed data on the company’s target market is extremely hard to come by. The manager attributes this to a lack of developed market research firms within the company’s operating regions. The manager goes on to say that market behavior predictions are mainly based on macro trends within its and comparable markets.
Furthermore, that same manager claims to observe a trend displaying a growth in the share of Western clothing within the company’s clothing market, reducing the share of the company’s target market.
Another manager states that “market demand changes” are in part responsible for a volume slowdown in the last half of 2012 and in 2013. On the relationship between the current growth ambitions and the current product portfolio, this manager states: “Innovation is necessary”. Going on to explain that, future accelerated growth will have to come from new product launches/innovations and retail expansion.

A third manager, suspects that the current growth ambitions may be feasible with the current product portfolio. However, this manager also expects that growth beyond current ambitions will require product innovation.

From annual reports net turnover data were obtained for 2008 up until 2013. This data provided the net turnover development trend depicted in Figure 18.

Organizational documentation showed that in 2006, under previous management, a contracted consultancy firm established that the company’s target market is comprised of less than 2% of its total potential market (See appendix 2.1).

**Data on the current innovation capacity**

For this subject, a combination of semi-structured interviews and organizational data were considered.

During the interviews, using the guidelines formulated in the sub-themes 2 & 3, in the interview checklist #1 (appendix 1.1), the respondents provided insights into the company’s innovativeness.
A total of 87.5% of the respondents (See Table 16), indicate that the company is not very innovative and is much more focused on optimization when it comes to improvement initiatives.

From the organizational data, the number of new product introductions and the success of these products, over the last 5 years, would have been considered. However, this data as such could not be obtained. An alternative source of organizational data was proposed, namely an overview of the ideas submitted to the idea box (“ideeënbus” in Dutch).

Every employee can submit an idea to this idea box, which will then be taken into consideration. If the idea proves to measurably contribute to the organizational goals, the submitter will be compensated accordingly. Otherwise, the idea will be rejected. The innovativeness of the ideas submitted to the idea box, provides some insights into the company’s potential innovativeness. Table 6 shows the relationship between the rewarded ideas, which are focused on optimization, and those that can be considered innovative.

Table 6: Idea box data

<table>
<thead>
<tr>
<th>Submitted ideas: Optimization vs. Innovation</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total rewarded ideas proposing innovation:</td>
<td>1</td>
</tr>
<tr>
<td>Total rewarded ideas proposing optimization:</td>
<td>221</td>
</tr>
<tr>
<td>Total rewarded ideas (2009-2013):</td>
<td>222</td>
</tr>
</tbody>
</table>

5.1.1.2 CGA capabilities and limitations

Using the checklist provided in appendix 1.2 as a guideline, a semi-structured interview was conducted with CGA management. During the interview, the emphasis was on the content of the current curriculum, on the CGA’s personnel, its knowledge base, and on factors influencing curriculum implementation. The gathered data are provided in Table 7.
Table 7: CGA capabilities and limitations

<table>
<thead>
<tr>
<th>Data on company academy capabilities and limitations</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Current Curriculum</strong></td>
<td></td>
</tr>
<tr>
<td>• Primarily focused on production personnel</td>
<td></td>
</tr>
<tr>
<td>• Primarily focused on production processes</td>
<td></td>
</tr>
<tr>
<td>• No focus on developing innovation capacity</td>
<td></td>
</tr>
<tr>
<td><strong>HR</strong></td>
<td></td>
</tr>
<tr>
<td>1. 1 Manager (Production background)*</td>
<td></td>
</tr>
<tr>
<td>2. 1 Coordinator (Production background)*</td>
<td></td>
</tr>
<tr>
<td>3. 2 Instructors (Production background)*</td>
<td></td>
</tr>
<tr>
<td>4. 1 Secretary</td>
<td></td>
</tr>
<tr>
<td>5. 3 Education material developers</td>
<td></td>
</tr>
<tr>
<td><strong>Knowledge on innovation</strong></td>
<td></td>
</tr>
<tr>
<td>1. No in-house specialized theoretical knowledge on innovation available</td>
<td></td>
</tr>
<tr>
<td>2. No in-house experiential knowledge on innovation available</td>
<td></td>
</tr>
<tr>
<td>3. Low to no familiarity with innovation literature</td>
<td></td>
</tr>
<tr>
<td><strong>Factors influencing curriculum implementation</strong></td>
<td></td>
</tr>
<tr>
<td>1. High planning demand for production personnel (due to shiftwork)</td>
<td></td>
</tr>
<tr>
<td>2. Predefined annual budget</td>
<td></td>
</tr>
<tr>
<td>3. CGA projects/initiatives are highly dependent on organizational support</td>
<td></td>
</tr>
</tbody>
</table>

*: Involved in teaching

5.1.1.3 Employee perception of innovation

For the inquiry into the perception of innovation, a combination of semi-structured interviews and organizational documentation has been employed.

**Interviews**

As intended, the checklist provided in Appendix 1.3 was employed during the interviews. They were conducted among a sample of 8 managers among the operational, tactical and strategic ranks.

The answers to the various questions were recorded using an audio recording device and processed afterwards. In doing so, the interviewer was able to give the respondents and their responses undivided attention, which proved to be crucial in identifying instances warranting follow-up questions. Furthermore, the recordings allow for future referencing and more detailed notes in processing the responses.
Organizational documentation

In addition to the interviews, a sample of 15 company-magazines from 2009 up until 2013 (3 editions per year), have been scanned for references to innovation. Table 8 shows the resulting data.

Table 8: References to innovation in company magazine

<table>
<thead>
<tr>
<th>Year</th>
<th>References</th>
<th>Context</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>2011</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>
| 2012 | 14         | 1: No elaboration on what innovation is.  
2: Innovation is mentioned as being of strategic importance. However, it is not elaborated upon.  
3: The term innovation is used loosely and not elaborated upon.  
4-7: The importance of innovation is emphasized  
8-11: The individual responsibility of every one in innovation is highlighted.  
12: The term innovation is used loosely and not elaborated upon.  
13: The term innovation is used loosely and not elaborated upon.  
14: The term innovation is used loosely and not elaborated upon. |
| 2013 | 6          | 1-4: The term innovation is used loosely and not elaborated upon.  
5: CEO includes innovation as one of the key elements of success.  
6: The term innovation is used loosely and not elaborated upon. Innovation is related to products. |

5.1.1.4 HR innovation capacity

In collecting data to establish the HR innovation capacity, a combination of semi-structured interviews and organizational documentation were employed. A sample of 8 managers among the operational, tactical and strategic ranks was interviewed. The organizational data consulted, regarded the involvement of personnel in knowledge development at the CGA.

Interviews

For the interviews, the “sub-theme 3” section of the interview checklist, provided in appendix 1.1, and the complete checklist provided in appendix 1.4, were employed. These checklists covered those aspects formulated in section 3.2.3.
During these interviews, the responses were also recorded using an audio recording device.

**Organizational data**

Initially, managerial reports, over the past 5 years, would have been considered to obtain information on the amount of employees that have been involved in knowledge and skill development programs. When considering the available data on personnel actively involved in knowledge development endeavors, it turned out that there were little to no records kept of this data. The only available data were CGA’s records on the percentage of production personnel who have followed their relevant courses and who still have to follow them (see Table 9).

**Table 9: CGA data on personnel education status**

<table>
<thead>
<tr>
<th>Department</th>
<th>Enough knowledge (%)</th>
<th>No knowledge (%)</th>
<th>Currently doing courses (%)</th>
<th>Knowledge level Unregistered (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DVB</td>
<td>57</td>
<td>35</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>Lijmrol</td>
<td>68</td>
<td>26</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>FBH</td>
<td>48</td>
<td>29</td>
<td>22</td>
<td>1</td>
</tr>
<tr>
<td>Graveerderij</td>
<td>28</td>
<td>64</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>HTA EB</td>
<td>57</td>
<td>32</td>
<td>11</td>
<td>0</td>
</tr>
<tr>
<td>Inpas</td>
<td>79</td>
<td>16</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Kleurhuis</td>
<td>56</td>
<td>32</td>
<td>12</td>
<td>0</td>
</tr>
<tr>
<td>RAK</td>
<td>55</td>
<td>41</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>OHS</td>
<td>48</td>
<td>40</td>
<td>12</td>
<td>0</td>
</tr>
<tr>
<td>Finishing</td>
<td>72</td>
<td>24</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Opmakerij</td>
<td>67</td>
<td>17</td>
<td>2</td>
<td>14</td>
</tr>
<tr>
<td>Roldrukkerij</td>
<td>50</td>
<td>50</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

The data provided in Table 9, is obtained from CGA’s documentation. Here the first column titled “enough knowledge” represents the percentage of employees of the concerned department whom have done or do not need to do the instruction courses relevant to them (due to extensive experience). The next column titled “No knowledge” represents the percentage of employees of the concerned department whom still have to do the instruction courses relevant to them. The third column “Currently following courses” represents, of course, the percentage of employees of the concerned department whom are currently doing the courses relevant to them.
And the final column represents the percentage of employees for which their status has not been communicated to CGA. These could either have “enough knowledge” or “no knowledge”. Note that CGA records on knowledge development only go back until 2011.

5.1.2 Data analysis results

5.1.2.1 The company’s demand for innovation

As previously stated, the inquiry into the company’s demand for innovation is aimed at providing support for the basic assumption underlying the research project. Namely, that the company’s innovation capacity is insufficient.

*The current demand for innovation from the company’s market*

When considering the sample of interview responses on this particular subject, it becomes clear that the majority of managers expect a shift in market demand in the future. Furthermore, there is a shared belief that current shifts in market demand will eventually lead to reduced product portfolio performance.

When considering the company’s revenue development, depicted in Figure 18, stagnation in the revenue growth rate can be observed. In light of the sigmoid curve (see Figure 19), this decrease can be interpreted as the company reaching its “limits of growth limit” (indicated by the red segment of the curve).

![Figure 19: Limits of growth in sigmoid curve](image)

In light of the shared believe among managers that current market shifts will eventually lead to a decline in product portfolio performance, supported by the
diminishing revenue growth rate, and the already relatively small market share, it may be concluded that innovation at the company is warranted.

The company’s current innovation capacity

The majority of respondents indicated that the company is predominantly focused on optimization, which essentially equates to doing the same thing more efficient and or effective. This focus on optimization is also supported from the idea box data, which shows that, by far, most submitted ideas concern optimization suggestions. It should be noted though that the idea box does not capture all ideas within the company and as such does not allow for the consideration of the full range of company ideas. Furthermore, a predominant focus on optimization, does not necessarily equate to insufficient innovation capacity.

It can be concluded however, based on the collected data, that there is an expected demand for innovation from the company’s market while there is a predominant focus on optimization. Suggesting that there is still much to be gained by increasing the overall focus on innovation.

While this does not conclusively support the basic underlying assumption of insufficient innovation capacity, it does support the notion that the company may benefit from increasing the company’s focus on innovation and the development of its capacity to innovate. Which still provides support for the research project.

5.1.2.2 CGA capabilities and limitations

The objective of the inquiry into CGA’s capabilities and limitations, is aimed at establishing capabilities and or limitations at CGA, in being able to offer education in innovation.

In considering the data acquired during the interview with the academy’s management, the following can be noted.

Besides the fact that CGA’s current curriculum does not include any focus on innovation, its main focus is on production processes and personnel. Which is not
surprising, as initiatives and projects at CGA highly depend on organizational support, whilst the predominant focus at the company is on optimization. Furthermore, whilst the backgrounds of CGA’s teaching personnel fit the current curriculum, they are lacking in expertise required to be able to include a focus on innovation.

A SWOT-analysis, preformed in light of the desire to increase the company’s innovation capacity, is provided in Table 10.

<table>
<thead>
<tr>
<th>SWOT-analysis CGA</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strengths</strong></td>
<td><strong>Weakness</strong></td>
</tr>
<tr>
<td>Dedicated educational resources</td>
<td>The teaching personnel all have production backgrounds.</td>
</tr>
<tr>
<td>High familiarity with company culture</td>
<td>No previous experience with teaching innovation</td>
</tr>
<tr>
<td>Company wide reach</td>
<td>Lacking knowledge on innovation</td>
</tr>
<tr>
<td></td>
<td>High focus on current production processes</td>
</tr>
<tr>
<td><strong>Opportunities</strong></td>
<td><strong>Threats</strong></td>
</tr>
<tr>
<td>Demand for innovation</td>
<td>Projects depended on organizational support</td>
</tr>
<tr>
<td></td>
<td>Constrained budget</td>
</tr>
<tr>
<td></td>
<td>Production personnel work in shifts</td>
</tr>
</tbody>
</table>

Here, having dedicated educational resources is considered to be a strength, as this provides the ability to invest full-time resources in developing deficient areas of knowledge and expertise. Also having a high familiarity with the company’s culture and a company wide reach are strengths, as these facilitate the ability to connect with and reach colleagues.

The production backgrounds, and lack of knowledge of and experience with innovation, pose barriers to the inclusion of innovation in the curriculum. These are thus considered as weaknesses. This also goes for the high focus on current production processes, which will further drive the focus of colleagues on optimization.

Threats are those factors which may possibly hinder the inclusion of innovation into the curriculum, and that are not directly within CGA’s sphere of control. Whilst opportunities are factors that may facilitate the inclusion of innovation into the curriculum, and that are not directly within CGA’s sphere of control.
Thus, while there are some factors, which may form barriers to CGA’s ability to provide education in innovation, there are also factors, which can be employed to overcome those barriers.

However, currently CGA, responsible for the training and development of the company’s HR, cannot be said to contribute to the development of its innovation capacity.

5.1.2.3 Employee perception of innovation

Employee perception of innovation is an important determinant in their relationship with and approach to innovation. Here the aim is to establish the extent to which the current perception of innovation is supportive of it. In doing so, the employee’s general understanding of innovation, of its relevance and of its value will be enquired into.

CST provides concepts with which uncontrollability, uncertainty and complexity in an organization can be dealt with (Eijnatten, 2003). In doing so, it prescribes a certain way of thinking which is supportive of innovation. In particular, it provides insights into innovation in general, its relevance and its value.

Thus, for purposes of analyses, the aspects checked for in the answers to the various questions were formulated, from a CST perspective.

Table 11 provides the resulting overview from the comparison between the provided answers and the aspects checked for in the answers.

In this overview, the first column (left) indicates the question asked, the second column indicates the aspects checked for in the answers. The remaining columns indicate whether or not the respective respondent covered the concerned aspect in answering the question, where “0” stands for “no” and “1” stands for “yes”. This first step in the analysis allowed for further consideration of the extent to which the respondents understand innovation in general, its relevance and its value.

Where the extent to which the various aspects were covered in the responses, is indicative of a better understanding of the concerned.
Table 11: Perception of innovation data

<table>
<thead>
<tr>
<th>Guiding Question</th>
<th>Aspect(s) checked for</th>
<th>Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1 2 3 4 5 6 7 8</td>
</tr>
<tr>
<td>Definition of innovation?</td>
<td>Mentions/implies new thinking</td>
<td>1 1 1 1 1 1 1 1</td>
</tr>
<tr>
<td></td>
<td>Mentions/implies new doing</td>
<td>1 1 1 1 1 1 1 1</td>
</tr>
<tr>
<td></td>
<td>Broad scope (Products, Processes, Culture, Org. design)</td>
<td>1 0 0 1 1 1 0 1</td>
</tr>
<tr>
<td></td>
<td>Reference to organizational performance/survival/sustainability</td>
<td>1 0 0 1 1 0 0 0</td>
</tr>
<tr>
<td>When to innovate?</td>
<td>If internal and/or external opportunities arise to contribute to organizational sustainability</td>
<td>0 0 0 0 0 1 1 0</td>
</tr>
<tr>
<td></td>
<td>When organizational conditions start decreasing in their ability to achieve organizational goals</td>
<td>0 1 0 0 0 0 0 1</td>
</tr>
<tr>
<td>How does innovation come about?</td>
<td>Interaction among heterogeneous information, knowledge, ideas and perspectives</td>
<td>1 1 0 1 1 0 0 1</td>
</tr>
<tr>
<td></td>
<td>Interaction under directional influence</td>
<td>0 0 0 1 0 1 0 1</td>
</tr>
<tr>
<td>Relevance of innovation for company?</td>
<td>Innovation is crucial for organizational sustainability</td>
<td>1 1 1 1 1 1 1 1</td>
</tr>
<tr>
<td>Relevance of innovation for your department?</td>
<td>As a department innovation, contributes to departmental sustainability.</td>
<td>1 1 1 1 1 1 0 1</td>
</tr>
<tr>
<td></td>
<td>Departmental sustainability contributes to overall sustainability</td>
<td>1 1 0 1 0 0 0 0</td>
</tr>
<tr>
<td>Attitude towards innovation?</td>
<td>Proactive</td>
<td>0 0 0 1 0 1 0 1</td>
</tr>
</tbody>
</table>

Using the data from Table 11, frequency histograms were generated indicating the relationship between the number of respondents and the number of aspects covered per question. The resulting histograms and their respective descriptive statistics are provided in Table 12 to Table 14.
Table 12: Frequency histograms (1)

<table>
<thead>
<tr>
<th># of checked for aspects in answer</th>
<th># of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>0</td>
</tr>
</tbody>
</table>

- **Definition of innovation**
  - Median: 3
  - Mode: 2 & 4
  - # of respondents: 8
  - Respondents covering all aspects: 37.5%
  - Respondents covering ≥ 50% of aspects: 100%
  - Respondents covering zero aspects: 0%

- **When to innovate**
  - Median: 0.5
  - Mode: 0 & 1
  - Total # of respondents: 8
  - Respondents covering all aspects: 0
  - Respondents covering ≥ 50% of aspects: 50%
  - Respondents covering zero aspects: 50%

Table 13: Frequency histograms (2)

<table>
<thead>
<tr>
<th># of checked for aspects in answer</th>
<th># of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

- **How innovation comes about**
  - Median: 1 (50%)
  - Mode: 1
  - Total # of respondents: 8
  - Respondents covering all aspects: 25%
  - Respondents covering ≥ 50% of aspects: 75%
  - Respondents covering zero aspects: 25%

- **Relevance of innovation to the company**
  - Median: 1
  - Mode: 1
  - Total # of respondents: 8
  - Respondents covering all aspects: 100%
  - Respondents covering ≥ 50% of aspects: 100%
  - Respondents covering zero aspects: 0%

Table 14: Frequency histograms (3)

<table>
<thead>
<tr>
<th># of checked for aspects in answer</th>
<th># of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

- **Relevance of innovation to department**
  - Median: 1
  - Mode: 1
  - Total # of respondents: 8
  - Respondents covering all aspects: 37.5%
  - Respondents covering ≥ 50% of aspects: 87.5%
  - Respondents covering zero aspects: 12.5%

- **Attitude towards innovation**
  - Median: 0
  - Mode: 0
  - Total # of respondents: 8
  - Respondents covering all aspects: 37.5%
  - Respondents covering ≥ 50% of aspects: 37.5%
  - Respondents covering zero aspects: 62.5%
To aid in the interpretation of the histograms, the mode and median for each have been established. Percentages were also derived, per question, on the share of respondents covering 100% of the aspects, covering at least 50% of the aspects, and finally covering 0% of the aspects.

At first glance, the histograms show that for most questions, there were some respondents whom covered all checked for aspects. The exception here is the question on when to innovate, where none of the respondent covered all aspects. Furthermore, it can also be noted, that for most questions, less then 50% of the respondents covered all aspects. The exception here is the question on the relevance of innovation to the company. Here all respondents covered all (100%) aspects checked. It can also be noted, that for most of the questions, most respondents covered at least 50% of the aspects, with exception of the question on the attitude towards innovation.

So to what extent do employees understand innovation in general, its relevance, and its value?

The questions going into the definition of innovation, the coming about of it, and the moment at which to innovate, provide an insight into the general understanding of innovation. While for none of these questions, more than 50% of respondents covered all aspects, it can be noted that for all of these questions, at least 50% covered half of the checked for aspects. This indicates that there is a general understanding of what innovation is, albeit limited to a considerable extent.

The questions going into the relevance of innovation on both the company and the department level provide, of course, an insight into the understanding of the relevance of innovation. In particular the relevance of innovation on the company level is understood, while the relevance on the department level is less completely understood. Which may indicate that employees fail to understand the potential role of their individual department in the innovation process.

The last question going into the attitude towards innovation is aimed at providing an insight in how innovation is valued. Here, most of the respondents failed to cover the aspect checked for. Which indicates at least a passive attitude towards innovation.
Organizational data

Now, in considering the data on the references to innovation in the company’s magazines, a distinction is made between three types of references based on the content and context. The first type concerns references touching upon the definition of innovation, the second and third types respectively concern, the relevance and the value of innovation. Some references could be categorized under more than one type. Table 15 provides the resulting overview.

Table 15: References to innovation categorized

<table>
<thead>
<tr>
<th>Year</th>
<th>Definition</th>
<th>Relevance</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2010</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2011</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2012</td>
<td>0</td>
<td>9</td>
<td>14</td>
</tr>
<tr>
<td>2013</td>
<td>0</td>
<td>1</td>
<td>6</td>
</tr>
</tbody>
</table>

It can be seen that only in the last two years under consideration, innovation has been referred to. Furthermore, it can be noted that in referring to innovation only the value and relevance are touched upon whilst its definition is not covered.

As a company wide magazine, the references to innovation are associated with the company level, which communicates the relevance and value for the company as a whole. Thus, the references fail to highlight the potential contributing role of the individual departments in the innovation process.

This is also supported by the previous interview findings on the perception of innovation. Where the relevance of innovation for the company is clear. But the value of innovation on an individual level is less clear. Resulting in a passive attitude towards innovation.

And while topic of innovation does seem to make it into the company magazine, the term is often used loosely without providing any practicable insight into innovation.
All in all, a perception of innovation, formed by a limited understanding of the concept, and a limited inactivating understanding of the individual responsibility, is not particularly supportive of innovation.

5.1.2.4 HR innovation capacity

As covered previously, considering the extent that current conditions are supportive of holonic development, crucial to the company’s innovation capacity, assesses the HR innovation capacity.

**Interviews**

The interviews were analyzed using a consensus analysis. In doing so, the responses of the respondents, were thoroughly canvased for any mention and or implication of bottlenecks. The aim here was to identify unique bottlenecks mentioned by at least more than 50% of the respondents. This was achieved through an iterative process of bottleneck identification, clustering and when warranted, for purposes of clarity, reformulation.

The first iteration yielded in total 170 bottlenecks. These also included bottlenecks repeated by single respondents. After correcting for these, this was brought back to 142 bottlenecks. Corresponding to an average of approximately 18 bottlenecks per respondent. After going through various iteration cycles, the process converged onto 11 bottlenecks meeting the consensus criterion (see Appendix 2.2).

Table 16 provides an overview of these bottlenecks. In addition to the 11 unique bottlenecks meeting the criterion, the two bottlenecks just barely falling short of it, are also provided in the Table 16. As these serve to substantiate what can be gleaned from the overall consideration of those 11 bottlenecks.
As part of the consensus analysis, the resulting bottlenecks were integrated in causal diagram, establishing cause and effect relationships among them.

A draft version of the causal diagram was then send to all the respondents, whom participated in the interviews. This gave the respondents a chance to comment on the relationships, which also serves to validate the final causal diagram.

As more than 50% of the respondents agreed on the established relationships among the bottlenecks, a final version could be generated. This resulted in the diagram depicted in Figure 20.

The arrows in the causal diagram represent the relationship between the bottlenecks. Outgoing arrows imply causal relationships, while incoming arrows imply effect relationships. Bottlenecks that only have outgoing arrows, and are thus only causes, are considered to be root causes. In the diagram, in the first dark gray shaded column on the left, root causes are arranged. Bottlenecks with both incoming and outgoing arrows are both causes as effects, referred to as “mediating bottlenecks”. These are arranged in the middle gray shaded area. And finally, bottlenecks with only incoming arrows are considered to be symptoms, arranged in

<table>
<thead>
<tr>
<th>Consensus analysis results</th>
<th>Percentage of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Innovation culture too low</td>
<td>100%</td>
</tr>
<tr>
<td>No innovation strategy</td>
<td>100%</td>
</tr>
<tr>
<td>Insufficient sharing of information, knowledge and experience</td>
<td>100%</td>
</tr>
<tr>
<td>Too much focus on optimization</td>
<td>87.5%</td>
</tr>
<tr>
<td>Insufficient access to market information</td>
<td>75%</td>
</tr>
<tr>
<td>Too much development of task related knowledge</td>
<td>75%</td>
</tr>
<tr>
<td>Insufficient room for emergent leadership</td>
<td>75%</td>
</tr>
<tr>
<td>Insufficient effort in reconciling differing views and opinions</td>
<td>75%</td>
</tr>
<tr>
<td>Too much centralized decision making</td>
<td>62.5%</td>
</tr>
<tr>
<td>Insufficient sharing of common mission, vision and goal</td>
<td>62.5%</td>
</tr>
<tr>
<td>Too much resource constraints limiting the sharing of information</td>
<td>62.5%</td>
</tr>
<tr>
<td>Innovation implementation takes too long*</td>
<td>50%</td>
</tr>
<tr>
<td>Organizational design, insufficiently supports sharing of information*</td>
<td>50%</td>
</tr>
</tbody>
</table>

*: Will not be included in the causal diagram as these do not meet the consensus criterion >50%
the final light grey area. The dark dashed line demarcates the design scope and the lighter dashed line, demarcates the scope of influence. These will be elaborated upon later.

**Figure 20: Causal diagram & Design scope**

From the overall relationships among the bottlenecks, a more comprehensive insight of the company’s current condition emerges. To interpret the causal diagram, the Competing Values Framework is drawn upon here.

In considering the causal diagram, the various bottlenecks were analyzed in light of each of the four cultures (Clan, Adhocracy, Hierarchy, and Market) defined by the framework. In doing so, it was established whether or not a bottleneck could be attributed to one of the cultures. The resulting analysis is provided in Table 17.

It can be seen that all bottlenecks can be attributed to the Hierarchy culture, while some could also be attributed to the Market culture.
Table 17: Bottleneck analysis through competing values framework

<table>
<thead>
<tr>
<th>Bottlenecks</th>
<th>Clan</th>
<th>Adhocracy</th>
<th>Hierarchy</th>
<th>Market</th>
</tr>
</thead>
<tbody>
<tr>
<td>Innovation culture too low</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-/+</td>
</tr>
<tr>
<td>No innovation strategy</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-/+</td>
</tr>
<tr>
<td>Insufficient sharing of information, knowledge and experience</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Too much focus on optimization</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Insufficient access to market information</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Too much development of task related knowledge</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Insufficient room for emergent leadership</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Insufficient effort in reconciling differing views and opinions</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-/+</td>
</tr>
<tr>
<td>Too much centralized decision making</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Insufficient sharing of common mission, vision and goal</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Too much resource constraints limiting the sharing of information</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Total (where &quot;-&quot;=0, &quot;-/+&quot;=0,5, &quot;+&quot;=1)</td>
<td>0</td>
<td>0</td>
<td>11</td>
<td>3,5</td>
</tr>
</tbody>
</table>

Thus, considering the causal diagram through the Competing Values Framework, leads to the conclusion that the company’s established conditions predominantly reflect a Hierarchy culture with some aspects of a Market culture. Both cultures focus on stability and control, whilst the predominant Hierarchy culture equates to an emphasis on an internal focus and integration.

A culture, which is not adapted to the dynamics facing the markets it operates in. And as such cannot be considered to contribute the company’s innovation capacity.

**Organizational data**

As addressed previously, the data obtained on the extent to which employees are actively involved in knowledge and skill development, only concerns data on participation in courses at the CGA. While, an important part of this development occurs on the job, during interactions with colleagues and even outside of work. Thus the available data is not representative enough to draw significant conclusions from. For this reason, the data will not be considered.
5.1.3 Design direction

Before proceeding to formulate the design direction, the forgoing conclusions will be briefly revisited.

It has been established, that the anticipated shifts in market demand, and the company’s current focus on optimization, warrant a focus on innovation and the development of the company’s capacity to innovate. Furthermore, CGA, the company’s internal educational institute, responsible for the training and development (T&D) of the HR, is currently incapable of providing such T&D in innovation. This inability, results primarily from a lack of the required knowledge base. Also the employee perception of innovation, formed by a limited understanding of the concept, and a limited understanding of the individual responsibility, is not particularly supportive of innovation. In hindsight, those conclusions fell into place when the hierarchy culture was established, based on the interviews among the 8 managers, as being predominant at the company. As those conclusions not only provide additional support but would also be logically expected in a Hierarchy culture.

A more appropriate culture, which is more suited for facing the anticipated market shifts, and associated uncertainty and unpredictability, would be a more flexible one, with more focus on the external conditions.

In the Competing Values Framework, this would equate to a culture shift towards the clan and adhocracy cultures, with more emphasis on the innovation oriented adhocracy culture.

Thus the focus in the design will be on the development of a culture more focused on innovation, which is also the basis for the chosen design scope demarcated in the causal diagram (see Figure 20). While this scope may seem limited in terms of the share of included bottlenecks, developing an innovation culture will have an influence on all other bottlenecks, as the Hierarchy culture, giving rise those bottlenecks shifts more to an Adhocracy culture.

As these cultures are essentially each others opposites, bridging the gap between the two will not only require a significantly different way of thinking and doing, but
also substantial adoption within the company of this different way of thinking and doing.

Here the concept of panarchies is drawn upon. Recall that the dynamics of panarchies explain how change on the individual level can result in change on the company level. Simply stated, change enough individuals and the company changes. This insight supports an individual approach, warranted in light of the extent of required change in thinking and doing, while having an impact on the company as a whole.

Furthermore, in proposing a new way of thinking and doing, the old ways will be challenged, which will expectedly give rise to resistance, requiring information, explanation and convincing to overcome. An interactive setting will not only serve to identify such resistance, but will also facilitate the informing, explaining and convincing when required.

Another issue, which should be taken into account, is that of the learning and development environment. If employees are to adopt a new way of thinking and doing, they are required to venture into the unknown, which may give rise to feelings of uncertainty and vulnerability. Essential to the learning process is the feeling that mistakes can be made. A psychologically safe environment will be required for employees to open up, ask questions, and express their doubts and opinions. An environment outside of the daily, performance demanding, work environment, would be beneficial.

When taking the above into consideration, CGA seems to be an ideal place from which to provide the required T&D. CGA has a company wide reach; groups of employees can be accommodated in classroom settings facilitating interaction and open discussions, while also having the option of providing personal attention. And finally, it can provide that psychologically safe environment essential to the learning process.

Thus, in short, the direction in the design will be to formulate a T&D program, to be implemented at CGA, aimed at teaching employees a mode of think and doing which will lead to a more innovation oriented culture.
5.2 Design

The remainder of this chapter will cover the results of the design phase. In doing so, the results of the data collection will first be considered (paragraph 5.2.1). Then, the analysis of the collected data will be covered (paragraph 5.2.2). In the final part of this chapter the design results will be addressed.

5.2.1 Results of data collection

As indicated in the methodology chapter (see 4.2.1), a combination of data sources was considered, namely, literature, best practice examples and experts. However, in addition to the, in section 4.2.1, indicated sources of data, CGA management was also consulted.

The data collection efforts in the design stage consisted of the establishment of the design requirements and the gathering of potentially relevant design suggestions. The results are addressed in respective order.

5.2.1.1 Design requirements

The main data source yielding the design requirements was CGA management. The design requirements were formulated following an iterative, alternatingly divergent and convergent, process spanning multiple informal meetings with CGA management.

In addition to CGA management, meetings with the University project supervisor, and researcher insights, also provided input for the design requirements.

In formulating the requirements, the four categories of design specification, as identified by Roozenburg and Eekels (1995) were adhered to. Here the categories are referred to as (1) functional design requirements, (2) user requirements, (3) boundary conditions, and (4) design restrictions.

Functional design requirements define the desired conditions the design should bring about. The user requirements define the requirements from the user perspective. Boundary conditions define the space within which functional and user requirements may be realized.
Design restrictions set limitation to the design, in the sense that the design must take these into account if it is to be accepted. Following these categories, the design requirements are presented in Table 18.

Table 18: Design requirements

<table>
<thead>
<tr>
<th></th>
<th>Functional design requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>The design should lead to a general increase in the understanding of the relevance of innovation.</td>
</tr>
<tr>
<td>A2</td>
<td>The design should increase the overall awareness of the necessity to innovate.</td>
</tr>
<tr>
<td>A3</td>
<td>The design should promote a shift in the company culture, aimed at increasing its innovation capacity.</td>
</tr>
<tr>
<td>A4</td>
<td>The design should provide innovation-promoting guidelines to inform decisions about the setup and evaluation of projects.</td>
</tr>
<tr>
<td>B1</td>
<td>The design should distinguish between each level in the organization i.e. level specific solutions should be developed.</td>
</tr>
<tr>
<td>B2</td>
<td>The approach to facilitating the required awareness and understanding should be appropriate to each level in the organization.</td>
</tr>
<tr>
<td>B3</td>
<td>The relevance of design should be clear for each level in the organization.</td>
</tr>
<tr>
<td>B4</td>
<td>The design should be user friendly.</td>
</tr>
</tbody>
</table>

A1: Functional design requirements

<table>
<thead>
<tr>
<th></th>
<th>User requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1</td>
<td>The design should distinguish between each level in the organization i.e. level specific solutions should be developed.</td>
</tr>
<tr>
<td>B2</td>
<td>The approach to facilitating the required awareness and understanding should be appropriate to each level in the organization.</td>
</tr>
<tr>
<td>B3</td>
<td>The relevance of design should be clear for each level in the organization.</td>
</tr>
<tr>
<td>B4</td>
<td>The design should be user friendly.</td>
</tr>
</tbody>
</table>

B1: User requirements

<table>
<thead>
<tr>
<th></th>
<th>Boundary conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>The design should be implementable at CGA.</td>
</tr>
<tr>
<td>C2</td>
<td>The design should take the company strategy into account.</td>
</tr>
<tr>
<td>C3</td>
<td>The design should be testable prior to full implementation.</td>
</tr>
<tr>
<td>C4</td>
<td>The design should be implementable with minimal disruption of current business processes.</td>
</tr>
</tbody>
</table>

C1: Boundary conditions

<table>
<thead>
<tr>
<th></th>
<th>Design restrictions</th>
</tr>
</thead>
<tbody>
<tr>
<td>D1</td>
<td>The design should not exceed time and financial resources.</td>
</tr>
<tr>
<td>D2</td>
<td>A comprehensive pilot test should precede full implementation of the design.</td>
</tr>
</tbody>
</table>

D1: Design restrictions

<table>
<thead>
<tr>
<th></th>
<th>Design suggestions</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.2.1.2 Design suggestions</td>
<td>The search for design suggestions was guided by the previously formulated design direction, namely, the formulation of a T&amp;D program, implementable at CGA, aimed at moving the company towards a more innovative mode of being. The main design direction can be broken-down into various aspects, being, General organizational change (see Table 19), Culture change (see Table 20), and Training and development (see Table 21). For each those aspects, design suggestions have been formulated based on acquired data. Here, research publications formed the main source of data. In addition, to those publications, expert input was also provided. The design suggestions are presented in tables 18, 19 and 20. Note that for each derived</td>
</tr>
</tbody>
</table>
suggestion, background information is provided in the form of the data and source from which the suggestion has been derived.

In the next section, the suggestions will be considered in light of the design requirements.

**Table 19: General Organizational change design suggestions**

<table>
<thead>
<tr>
<th>#</th>
<th>Suggestion</th>
<th>Background</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>Use disconfirming data to unfreeze the current situation</td>
<td>According to Watson &amp; D’Annunzio-Green (1996), in managing the resistance to change, the first step would be to unfreeze the current habits and behaviors. And according to Schein (1996), learning and change start with some form of dissatisfaction or frustration generated by data that disconfirm our expectations or hopes.</td>
</tr>
<tr>
<td>1.2</td>
<td>Introduce desired change after unfreezing</td>
<td>According to Watson &amp; D’Annunzio-Green (1996), the second step in the process of change, involves making the actual changes that might move the organization to another level of response. New goals and milestones may be created.</td>
</tr>
<tr>
<td>1.3</td>
<td>Establish systems to retain introduced change</td>
<td>According to Watson &amp; D’Annunzio-Green (1996), the third step in the process of change, involves stabilizing or institutionalizing changes, which could be done by implementing systems that make those behavioral patterns more robust.</td>
</tr>
</tbody>
</table>

**Table 20: Cultural change design suggestions**

<table>
<thead>
<tr>
<th>#</th>
<th>Suggestion</th>
<th>Background</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>Formulate new behavior per organizational level</td>
<td>According to Essawi (2012), the internalization of declared organizational values by employees can be realized through performance of the tasks inciting behavior conforming to desired organizational values.</td>
</tr>
<tr>
<td>2.2</td>
<td>Start culture change with the organizational leaders</td>
<td>Organizational culture is shaped by leadership behavior (Schein, 2004). The mentor or big brother figure within an organization often serves as a role model to facilitate cognitive redefinition (Schein, 1968; Van Maanen &amp; Schein, 1979). Schein (1996) states that disconfirming data may create motivation to learn, but does not necessarily control or predict the direction of learning. If new information available is only available from role models, learning will occur in that direction (Schein, 1996).</td>
</tr>
</tbody>
</table>
## Table 21: Training and Development design suggestions

<table>
<thead>
<tr>
<th>#</th>
<th>Suggestion</th>
<th>Background</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1</td>
<td>Promote holonic development</td>
<td>Holonic development leads to higher complexity, which in turn increases the holon’s ability to deal with change and see “the window of opportunities” when arriving at “the edge of Chaos” (Van Eijnatten, 2004).</td>
</tr>
<tr>
<td>3.2</td>
<td>Provide a psychologically safe environment</td>
<td>According to Schein (1996), learning anxiety is the fundamental restraining force, which can go up in direct proportion to the amount of disconfirming data. Learning anxiety can be reduced by providing a psychologically safe environment.</td>
</tr>
<tr>
<td>3.3</td>
<td>Take the various organizational levels into account</td>
<td>The approach to facilitating an awareness and understanding of systemic and complexity thinking, should be appropriate to each level in the organization (Stevenson, 2012).</td>
</tr>
<tr>
<td>3.4</td>
<td>Make sure to actively involve participants during the T&amp;D</td>
<td>Anderson and Taylor (1994) found that the most effective training or learning occurs when participants take an active role in the learning process. In further support of this Olian et al. (1998), state that most people learn better in an active rather than a passive fashion.</td>
</tr>
<tr>
<td>3.5</td>
<td>Use distributed practice</td>
<td>Dunlosky et al. (2013) explain that distributed practice refers to the finding that distributing learning over time typically benefits long-term retention more than does massing learning opportunities back-to-back or in relatively close succession. Furthermore, their extensive meta study on the effectiveness of distributed practice yielded a high utility assessment because it benefits learners of different ages and abilities and has been shown to boost students’ performance across many tasks and educational contexts.</td>
</tr>
<tr>
<td>3.6</td>
<td>Use practice testing</td>
<td>Dunlosky et al. (2013) explain practice testing as involving (a) testing that is completed as a low-stakes or no-stakes practice or learning activity outside of class, and (b) which student could independently engage in. Furthermore, their extensive meta study on the effectiveness of practice testing yielded a high utility assessment because it benefits learners of different ages and abilities and has been shown to boost students’ performance across many tasks and educational contexts.</td>
</tr>
<tr>
<td>3.7</td>
<td>Reward participants for input T &amp; D program</td>
<td>In a cases study performed by Hyland et al. (1998), almost all trainees involved in developing new patterns of behavior, mentioned that the recognition of and reward for their input was an important motivator (Hyland et al., 1998).</td>
</tr>
<tr>
<td>3.8</td>
<td>Provide follow-up</td>
<td>Olian et al. (1998) explain that an important aspect to include in a training package is follow-up support to the participants and evaluation of the training outcome.</td>
</tr>
</tbody>
</table>
5.2.2 Results of data analysis

In this section, the collected design data will be analyzed. As mentioned previously, this involves the consideration of the derived design suggestions in light of the design requirements. In addition to this consideration, the compatibility among the design requirements satisfying suggestions is also considered. The result of the analysis will yield a set of design suggestions that will be incorporated in the actual design.

5.2.2.1 Design suggestions vs. design requirements

In order to derive a set employable design objectives, it is important to establish the extent to which the suggestions fit the contextual characteristics of the company. As the design requirements, formulated in collaboration with CGA management, capture the contextual characteristics of the company, the suggestions will be considered in light of these.

Employing the scoring scheme formulated in Table 5, each design suggestion was scored on the design requirements (see appendix 3.1). An intuitively determined weighing factor of 2 was introduced for the functional design requirements, to account for and reflect their strategic importance. The total score thus equals:

\[2\Sigma A_i + \Sigma B_i + \Sigma C_i + \Sigma D_i\]

Where \(A_i\) are the suggestion scores on functional design requirements, \(B_i\) the scores on user requirements, \(C_i\) the scores on boundary conditions, and \(D_i\) the scores on design restrictions.

Furthermore, suggestion elimination criteria were formulated in section 4.2.2.

The resulting scores for the various design suggestions are provided in Table 22.

Based on these scores, the graph in Figure 21 was generated.

Note that design suggestions 1.3 (Establish systems to retain introduced change), 3.6 (Use practice testing), and 3.8 (Provide follow-up) highly conflict with one or more boundary conditions. In this case these suggestions all scored -2 for design requirement C1 (see Table 18). Thus, these suggestions will be discarded.
In the following section, the compatibility between the remaining suggestions will be considered.
5.2.2.2 Design suggestion compatibility

For the retained suggestions, the researcher intuitively considered the implications of the potential combinations among the various design suggestions, in a T&D context. Here again, the scoring scheme formulated in Table 5 was adhered to. The results of the analysis are presented in Figure 22. At first glance, many combinations seem to be neutral in terms of their compatibility. Also, no combination seems to give rise to conflicts, the main point of concern here. Furthermore, it can be observed that all retained suggestions, to a greater or lesser extent, contribute positively to suggestion 3.1 (Promote holonic development), arguably the suggestion of most strategic value.

![Design suggestions compatibility analysis](image)

**Key:**
- ++ = High adherence/compatibility
- + = Adhering/compatibility
- N = Neutral
- - = Conflicting
- -- = High conflict

Based on these analysis results, the retained suggestions will all be incorporated in the design, covered in the next section.

5.2.3 Results of design

In this section the design will be covered in more detail. As there are multiple facets to the design, its consideration will be structured accordingly. Recall that the design
direction was to formulate a T&D program, implementable at CGA, aimed at moving the company towards a more innovative mode of being.

The T&D program design can be broken down in three major elements:

1. The T&D objectives per level
2. The program implementation strategy
3. The T&D modules

5.2.3.1 T&D objectives per level

The overall purpose of the T&D program is to provide guidelines, which can be used to inform decisions about the setup and evaluation of projects in such a way, as to move the company towards a more innovative mode of being.

These guidelines do not provide a context specific roadmap for change, as each individual employee and department would have to face different specific challenges at different instances. Instead, they are to be used much like a compass, used to inform decisions about the setup and evaluation of projects. These guidelines will be formulated for various areas relevant to the progression towards a more innovation-oriented culture.

A distinction is made among 4 functional levels, these being that of (1) strategic management, (2) tactical management, (3) operational management, and (4) employees.

The strategic management level is responsible for providing overall direction to the company, which it captures in a company vision and tactical objectives. This level typically has a mid- to long-term orientation.

The tactical management level is responsible for translating the tactical objectives in actual steps to be taken to achieve those and overseeing the execution of those steps. This level typically has a short- to mid-term orientation.

The operational management level is concerned with the coordination of the day-to-day activities relative to schedules, specifications, and costs.

The functional level of the employee refers to the actual work force. In this case, this goes to include all staff without managerial titles, mainly responsible for executing
the day-to-day operations. See Table 23 for an overview of the various functional levels along with their general responsibilities.

**Table 23: General responsibilities per organizational level**

<table>
<thead>
<tr>
<th><strong>Strategic Management:</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Strategic intelligence is future-oriented.</td>
<td></td>
</tr>
<tr>
<td>• Examining where the company is now, determining where it wants to go, and then determining how to get there.</td>
<td></td>
</tr>
<tr>
<td>• Crafting vision statements (For example: Second wave)</td>
<td></td>
</tr>
<tr>
<td>• Sets tactical objectives.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Tactical management:</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Formulate the actual steps needed to achieve the strategic vision.</td>
<td></td>
</tr>
<tr>
<td>• Provides decision makers with the necessary information to watch for changes in the company’s current operating environment and helps them discover new opportunities.</td>
<td></td>
</tr>
<tr>
<td>• Strategy always comes before tactics.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Operational management:</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Overseeing the actual execution of the tactical objectives.</td>
<td></td>
</tr>
<tr>
<td>• Serves to regulate the day-to-day output relative to schedules, specifications, and costs.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Employee</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Responsible for the execution of the day-to-day operations.</td>
<td></td>
</tr>
</tbody>
</table>

As various functional levels within the company vary with respect to their specific responsibilities, the relevant guidelines differ across the various levels.

In Table 24 a complete overview is provided showing the various objectives per organizational level.

It can be noted that while a distinction is made among the various levels, objectives are shared across levels. This is not to say that the means of achieving the objectives are necessarily equal.

In addition to the levels and objectives, a categorization of objectives can also be observed. The two broad categories: (1) “Importance of innovation to the company”, and (2) “familiar with innovation stimulating guidelines”, are based on the theoretical background and the diagnosis. The focus on these categories of objectives ensures the promotion of holonic development, which is inline with design suggestion 3.1.
### Table 24: Training and development program objectives

<table>
<thead>
<tr>
<th>Training and development objectives</th>
<th>Employees</th>
<th>Operational Management</th>
<th>Tactical Management</th>
<th>Strategic Management</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Importance of innovation to the company</strong></td>
<td>• Understand that markets and customer demands are increasingly dynamic.</td>
<td>• Understand that markets and customer demands are increasingly dynamic.</td>
<td>• Understand that markets and customer demands are increasingly dynamic.</td>
<td>• Understand that markets and customer demands are increasingly dynamic.</td>
</tr>
<tr>
<td></td>
<td>• Understand that the company needs to innovate to keep meeting customer demands.</td>
<td>• Understand that the company needs to innovate to keep meeting customer demands.</td>
<td>• Understand that the company needs to innovate to keep meeting customer demands.</td>
<td>• Understand that the company needs to innovate to keep meeting customer demands.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Understand the concept and implications of discontinuous growth.</td>
<td>• Understand the concept and implications of discontinuous growth.</td>
<td>• Get participants thinking about the practical implications of conditions of uncertainty.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Stimulate an interest in what CST has to offer.</td>
</tr>
<tr>
<td><strong>Familiar with innovation stimulating guidelines</strong></td>
<td>• Know the value of sharing perspectives, information, knowledge and experience in innovation (i.e. communication).</td>
<td>• Know the value of sharing perspectives, information, knowledge and experience in innovation (i.e. communication).</td>
<td>• Know the value of sharing perspectives, information, knowledge and experience in innovation (i.e. communication).</td>
<td>• Know the value of sharing perspectives, information, knowledge and experience in innovation (i.e. communication).</td>
</tr>
<tr>
<td></td>
<td>• Understand the value of developing perspectives, information, knowledge and experience (i.e. learning).</td>
<td>• Understand the value of developing perspectives, information, knowledge and experience (i.e. learning).</td>
<td>• Understand the value of developing perspectives, information, knowledge and experience (i.e. learning).</td>
<td>• Understand the value of developing perspectives, information, knowledge and experience (i.e. learning).</td>
</tr>
<tr>
<td></td>
<td>• Understand the value of a shared vision, mission and goals.</td>
<td>• Understand the value of a shared vision, mission and goals.</td>
<td>• Understand the value of a shared vision, mission and goals.</td>
<td>• Understand the value of a shared vision, mission and goals.</td>
</tr>
<tr>
<td></td>
<td>• Recognize the individual and departmental responsibility in the innovation process.</td>
<td>• Recognize the individual and departmental responsibility in the innovation process.</td>
<td>• Understand the importance of facilitating the company wide access to and the sharing of information.</td>
<td>• Understand and be able to engage in a dialogue.</td>
</tr>
<tr>
<td><strong>Approaching Idea generation</strong></td>
<td>• Understanding the role of interaction in generating new ideas.</td>
<td>• Understanding the role of interaction in generating new ideas.</td>
<td>• Understanding the importance of gathering and providing support for new ideas.</td>
<td>• Understand the concept of indeterminacy.</td>
</tr>
<tr>
<td></td>
<td>• Understanding the role of directional influence in generating new ideas.</td>
<td>• Understanding the role of directional influence in generating new ideas.</td>
<td>• Understand the importance of managing new ideas.</td>
<td>• Understand the concept of the orgmind and its value.</td>
</tr>
<tr>
<td></td>
<td>• Understand the importance of and be able to facilitate, stimulate and support idea generation.</td>
<td>• Be familiar with and be able to apply the New Concept Development Model.</td>
<td>• Be familiar with and be able to apply the New Concept Development Model.</td>
<td>• Understand the relationship between indeterminacy, dialogue, orgmind, weak signals, and ide generation.</td>
</tr>
<tr>
<td></td>
<td>• Be familiar with and be able to apply the New Concept Development Model.</td>
<td>• Understand the value of experimentation/probing/path finding.</td>
<td>• Understand the importance of supporting and managing new ideas.</td>
<td>• Understand the value of supporting and managing new ideas.</td>
</tr>
<tr>
<td><strong>Leadership</strong></td>
<td>• Understanding the value of emergent leadership.</td>
<td>• Understanding the value of emergent leadership.</td>
<td>• Understanding the value of emergent leadership.</td>
<td>• Understanding the value of emergent leadership.</td>
</tr>
<tr>
<td></td>
<td>• Understanding the value of consensus decision-making.</td>
<td>• Understanding the value of consensus decision-making.</td>
<td>• Understanding the value of consensus decision-making.</td>
<td>• Understanding the value of consensus decision-making.</td>
</tr>
<tr>
<td></td>
<td>• Understand the value of tactical flexibility (Emergence &amp; Dissipation).</td>
<td>• Understand the value of tactical flexibility (Emergence &amp; Dissipation).</td>
<td>• Understand the value of strategic flexibility (Emergence &amp; Dissipation).</td>
<td>• Understand the value of strategic flexibility (Emergence &amp; Dissipation).</td>
</tr>
</tbody>
</table>
5.2.3.2 Program implementation strategy

Prior to going into the actual content of the T&D program, this section will elaborate on the implementation strategy, which is an important part of the design. The aspects forming part of the strategic considerations will be distinguished and addressed separately.

### Module sequencing

In line with suggestions 1.1 (“Use disconfirming data to unfreeze the current situation”) and 1.2 (“Introduce desired change after unfreezing”), the modules are sequenced in such a way that the introduction modules, for all levels, aim to instigate a need for change. As will become evident when the modules are addressed in section 5.2.3.3. In doing so, the introductory modules present the participant with disconfirming data. The subsequent modules are focused on developing the required understanding and conveying the guidelines which would constitute the desired change.

### Distributed practice

In line with suggestion 3.5 (“Use distributed practice”), the modules will not be provided on the same day or the same week. A frequency of a single module per week will be opted for in this case. As a lower frequency may lower the degree of retention of previously covered lessons below effective levels.

### Top down implementation

In line with suggestion 2.2, which states that culture change should start with organizational leaders, the program start with strategic management, then tactical management, then operational management, and lastly the employees. This ensures that each level, after being exposed to disconfirming data, has leadership to turn to as examples or if questions arise.
This approach additionally takes the current hierarchy culture into consideration, as the potential impact of the design would expectedly have to be explicitly sanctioned by company leadership in this type of culture.

**Outside of regular work hours**

To reduce the potential disruption of current business process, CGA’s current approach to providing T&D could be adopted, namely, to schedule sessions outside of regular work hours.

**Psychological safety**

Two important aspects employed in constituting a psychologically safe environment (suggestion 3.2), are the T&D of participants outside of their regular work environment. By doing so, the associated pressure to perform and the feelings of being judged will be reduced if not neutralized.

Another measure resorted to, in order to decrease feelings of being judged and needing to perform, is to ensure that the participant during each session are from the same organizational level. The aim is to reduce learning impeding tensions, which may arise from the superior-subordinate relationship.

**Reward participants**

In line with suggestion 3.7(“Reward participants for input T & D program”), participant will be provided with a “proof of participation certificate”. This could be combined with an internal announcement in the company magazine. Which would serve as a semi-public appraisal for participant effort.

5.2.3.3 T&D modules

In this section, the various modules that form part of the T&D program will be described. As stated previously, this will be done for each functional organizational level. Table 25 provides an overview of the of the program modules per organizational level. The modules highlighted in orange, are modules shared across
levels. This is not to say, that during the session the levels are mixed within participant groups.

**Table 25: Overview T&D program modules**

<table>
<thead>
<tr>
<th>M. #</th>
<th>Employees</th>
<th>Operational management</th>
<th>Tactical management</th>
<th>Strategic management</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Innovate. Now or later? (translated from Dutch: Innoveren. Nu of later?)</td>
<td>Introduction to discontinuous growth</td>
<td>Business as usual?</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Communication, Learning &amp; Creativity: Building blocks of innovation A</td>
<td>Communication, Learning &amp; Creativity: Building blocks of innovation B</td>
<td>Introduction to dialogue</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Emergent leadership A</td>
<td>Emergent leadership B</td>
<td>Emergent leadership C</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>New Concept development model A</td>
<td>New concept development model B</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Translated from Dutch: Communicatie, Leren & Creativiteit: Bouwstenen van innovatie A
2. Translated from Dutch: Emergent leiderschap
3. Translated from Dutch: Communicatie, Leren & Creativiteit: Bouwstenen van innovatie B
4. Translated from Dutch: Emergent leiderschap
5. Translated from Dutch: Ontwikkelingsmodel nieuwe concepten A

In line with 3.4 (“Make sure to actively involve participants during the T&D”), all modules have been setup in such a way to stimulate participants to be actively involved. As such, each session addressing a module contains discussion sessions and almost all modules include some exercise. Furthermore, each module aims to combine, discussions, exercises, lecturing and video material to introduce variation to make the modules more stimulating and fun to attend.

In describing the modules, a standard template will be employed. An example of the template can be seen below in Table 26.

**Table 26: Example of module description template**

<table>
<thead>
<tr>
<th>Session information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module #:</td>
</tr>
<tr>
<td>Session title:</td>
</tr>
<tr>
<td>Brief session description:</td>
</tr>
<tr>
<td>Session objectives:</td>
</tr>
<tr>
<td>Agency-Subjective</td>
</tr>
<tr>
<td>Communion-Subjective</td>
</tr>
<tr>
<td>Agency-Objective</td>
</tr>
<tr>
<td>Communion-Objective</td>
</tr>
<tr>
<td>Session format/ type:</td>
</tr>
<tr>
<td>Session material:</td>
</tr>
<tr>
<td>Session duration:</td>
</tr>
<tr>
<td>Group size:</td>
</tr>
<tr>
<td>Target audience:</td>
</tr>
<tr>
<td>Group composition:</td>
</tr>
<tr>
<td>Class layout:</td>
</tr>
<tr>
<td>Full session description:</td>
</tr>
<tr>
<td>Power point Presentation:</td>
</tr>
</tbody>
</table>

Intentionally left blank

For distinguishability and readability purposes, the templates have been color coded according to the organizational level being addressed.
As mentioned previously, the introduction sessions, for all levels, are designed to incite a desire to innovate. In line with design suggestion 1.1 (“Use disconfirming data to unfreeze the current situation”), the aim is to convince participants that the current situation and mode of thinking about and doing things cannot be maintained much longer. It is during this first session that much of the motivation to actively participate in the rest of the program should be sparked. Based on this, small more intimate groups are preferred. Here the benefits of small groups are as follows:

- The pressure on participants to pay attention will be increased.
- The lecturer will be able to invest more per participant in dealing with potential resistance to change.
- The lecturer will have increased influence on the atmosphere. (Important in this stage of the program where participants may feel directly challenged in their beliefs and assumption and the need for a psychologically safe environment may be the highest.)

The session durations are tentative and have to be established during piloting. The class layouts are mainly based on the module content. The minimum and or maximum group sizes are either determined by the topic of discussion, exercises to be performed or the capacity the T&D classrooms available at the CGA. With 20 participants per session being a maximum.

Furthermore, recall that Edwards (2007) explains that holons are simultaneously a subject and an object and have agency (self-preservation) and communion. And that holonic development requires a balanced focus on each of the four quadrants as defined by Edwards (2007).

In section 5.2.3.3, it was covered that the formulated design objectives ensure that holonic development is promoted. Thus, for each stated objective, the quadrant it affects will indicated. In doing so, color-coding is also employed. In Figure 23, the colors used per quadrant are provided.
First the modules for employees will be covered, then for operational management, then tactical management, and finally strategic management.
# Employees

Program modules: Employees

<table>
<thead>
<tr>
<th>Module #</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Innovate. Now or later? (translated from Dutch: Innoveren. Nu of later?)</td>
</tr>
<tr>
<td>2</td>
<td>Communication, Learning &amp; Creativity: Building blocks of innovation A (translated from Dutch: Communicatie, Leren &amp; Creativiteit: Bouwstenen van innovatie A)</td>
</tr>
<tr>
<td>3</td>
<td>Emergent leadership A (translated from Dutch: Emergent leiderschap A)</td>
</tr>
</tbody>
</table>

## Session information

<table>
<thead>
<tr>
<th>Module #:</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session title:</td>
<td>Innovate. Now or later? (translated from Dutch: Innoveren. Nu of later?)</td>
</tr>
<tr>
<td>Brief session description:</td>
<td>The session starts with an exercise aimed at developing the insight that businesses need to adapt to change. Then the relationship between connectivity, access to information and the rate of change is covered. It is then emphasized that globalization and technology are increasingly driving change and that this change will affect the company’s market sooner or later. Within this context it is stressed that the company will also have to adapt to survive.</td>
</tr>
<tr>
<td>Session objectives:</td>
<td>- Incite a need for innovation</td>
</tr>
<tr>
<td></td>
<td>Participants should understand that:</td>
</tr>
<tr>
<td></td>
<td>- Markets and customer demands are increasingly dynamic;</td>
</tr>
<tr>
<td></td>
<td>- The company needs to innovate to keep meeting customer demands.</td>
</tr>
<tr>
<td>Session format/type:</td>
<td>Presentation, Discussion, Small group exercise</td>
</tr>
<tr>
<td>Session material:</td>
<td>Beamer, White board, 8 Computers, Audio, Exercise handouts</td>
</tr>
<tr>
<td>Session duration:</td>
<td>1 hour</td>
</tr>
<tr>
<td>Group size:</td>
<td>8 max.</td>
</tr>
<tr>
<td>Target audience:</td>
<td>Employees</td>
</tr>
<tr>
<td>Group composition:</td>
<td>From various departments</td>
</tr>
<tr>
<td>Class layout:</td>
<td>![Class layout diagram]</td>
</tr>
<tr>
<td>Full session description:</td>
<td>Appendix 3.1.1</td>
</tr>
<tr>
<td>Power point Presentation:</td>
<td>Appendix 4.1</td>
</tr>
</tbody>
</table>
**Session information**

<table>
<thead>
<tr>
<th>Module #:</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Session title:</strong></td>
<td>Communication, Learning &amp; Creativity: Building blocks of innovation A (translated from Dutch: Communicatie, Leren &amp; Creativiteit: Bouwstenen van innovatie A)</td>
</tr>
<tr>
<td><strong>Brief session description:</strong></td>
<td>In this session, the relationship between information, knowledge, experience and creativity is addressed. Furthermore, learning, communication, and the sharing of knowledge, information, and experiences are considered as means of enhancing the creative potential. A product idea development exercise will be part of the session. During which the covered theory can be experienced in practice.</td>
</tr>
</tbody>
</table>
| **Session objectives:** | - Know the value of sharing perspectives, information, knowledge and experience in innovation (i.e. communication).  
- Understand the value of developing perspectives, information, knowledge and experience (i.e. learning).  
- Understanding the role of interaction in generating new ideas.  
- Recognize the individual and departmental responsibility in the innovation process. |
| **Session format/type:** | Presentation  
Discussion  
Small group exercise |
| **Session material:** | Beamer  
White board  
1 Computers (for lecturer)  
Audio  
Exercise handouts |
| **Session duration:** | Yet to be determined in pilot (approx. 2x 1hour) |
| **Group size:** | 20 max.  
8 min. |
| **Target audience:** | Employees |
| **Group composition:** | From various departments |
| **Class layout:** | ![Class layout diagram] |
| **Full session description:** | Appendix 3.1.2 |
| **Power point Presentation:** | Appendix 4.2 |
## Session information

<table>
<thead>
<tr>
<th>Module #:</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session title:</td>
<td>Emergent leadership A (translated from Dutch: Emergent leiderschap A)</td>
</tr>
<tr>
<td>Brief session description:</td>
<td>The potential values of consensus decision-making, of sharing in a common vision, mission and goals, and of emergent leadership are covered. Furthermore, the mutually enhancing effects of combining these are also addressed. Guidelines will be covered for implementation in practice. The session will be concluded with a game, the so-called “Helium stick” game. This game will allow participants to experience and test the covered theoretical aspects in practice.</td>
</tr>
</tbody>
</table>
| Session objectives: | - Understanding the value of consensus decision-making.  
- Understand the value of shared vision, mission and goals.  
- Understanding the value of emergent leadership. |
| Session format/type: | Presentation  
Discussion  
Group exercise |
| Session material: | Beamer  
White board  
1 Computers (for lecturer)  
Audio  
Long rod/stick (For helium stick game) |
| Session duration: | Yet to be determined in pilot (approx. 2x 1hour) |
| Group size: | 20 max.  
16 min. |
| Target audience: | Employees |
| Group composition: | From same department/ From multiple departments if minimum amount of participants is unfeasible from a single department. |
| Class layout: | ![Class Layout](image) |
| Full session description: | Appendix 3.1.3 |
| Power point Presentation: | Appendix 4.3 |
## Operational management

Program modules: Operational management

<table>
<thead>
<tr>
<th>Module #</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Innovate. Now or later? (translated from Dutch: Innoveren. Nu of later?)</td>
</tr>
<tr>
<td>2</td>
<td>Communication, Learning &amp; Creativity: Building blocks of innovation B (translated from Dutch: Communicatie, Leren &amp; Creativiteit: Bouwstenen van innovatie B)</td>
</tr>
<tr>
<td>3</td>
<td>Emergent leadership B (translated from Dutch: Emergent leiderschap)</td>
</tr>
<tr>
<td>4</td>
<td>New Concept development model A (translated from Dutch: Ontwikkelingsmodel nieuwe concepten A)</td>
</tr>
</tbody>
</table>

---

### Session information

<table>
<thead>
<tr>
<th>Module #:</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Session title:</strong></td>
<td>Innovate. Now or later? (translated from Dutch: Innoveren. Nu of later?)</td>
</tr>
</tbody>
</table>

**Brief session description:** The session starts with an exercise aimed at developing the insight that businesses need to adapt to change. Then the relationship between connectivity, access to information and the rate of change is covered. It is then emphasized that globalization and technology are increasingly driving change and that this change will affect the company’s market sooner or later. Within this context it is stressed that the company will also have to adapt to survive.

**Session objectives:**

- Incite a need for innovation
- Understand that markets and customer demands are increasingly dynamic;
- Understand that the company needs to innovate to keep meeting customer demands.

**Session format/type:** Presentation, Discussion, Small group exercise

**Session material:** Beamer, White board, 8 Computers, Audio, Exercise handouts

**Session duration:** 1 hour

**Group size:** 8 max.

**Target audience:** Operational management

**Group composition:** From various departments

**Class layout:**

[Diagram of class layout]

---

**Full session description:** Appendix 3.1.1

**Power point Presentation:** Appendix 4.1
## Session information

<table>
<thead>
<tr>
<th>Module #:</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session title:</td>
<td>Communication, Learning &amp; Creativity: Building blocks of innovation B (translated from Dutch: Communicatie, Leren &amp; Creativiteit: Bouwstenen van innovatie B)</td>
</tr>
<tr>
<td>Brief session description:</td>
<td>In this session, the relationship between information, knowledge, experience, directional influence, and creativity is addressed. Furthermore, learning, communication, and the sharing of knowledge, information, and experiences are considered as means of enhancing the creative potential. Also, means of developing creativity in practice among employees is considered. A product idea development exercise will be part of the session. During which the covered theory can be experienced in practice.</td>
</tr>
</tbody>
</table>

### Session objectives:

- Know the value of sharing perspectives, information, knowledge and experience in innovation (i.e. communication).
- Understand the value of developing perspectives, information, knowledge and experience (i.e. learning).
- Understanding the role of interaction in generating new ideas.
- Understanding the role of directional influence in generating new ideas.
- Understand the importance of and be able to facilitate, stimulate and support idea generation.
- Recognize the individual and departmental responsibility in the innovation process.

### Session format/type:

- Presentation
- Discussion
- Small group exercise

### Session material:

- Beamer
- White board
- 1 Computers (for lecturer)
- Audio
- Exercise handouts

### Session duration:

- Yet to be determined in pilot (approx. 2x 1hour)

### Group size:

- 20 max.
- 8 min.

### Target audience:

- Operational management

### Group composition:

- From various departments

### Class layout:

![Class layout](image)

### Full session description:

- Appendix 3.1.4

### Power point Presentation:

- Appendix 4.4
### Session information

<table>
<thead>
<tr>
<th>Module #:</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session title:</td>
<td>Emergent leadership B (translated from Dutch: Emergent leiderschap B)</td>
</tr>
<tr>
<td>Brief session description:</td>
<td>Using a mix of lecturing, and video presentation, the potential values of consensus decision-making, of sharing in a common vision, mission and goals, and of emergent leadership are covered. Here more emphasis is put on the potential disadvantage of not employing consensus decision-making, compared to the same session for employees. Furthermore, the mutually enhancing effects of combining these are also addressed. Guidelines will be covered for implementation in practice. The session will be concluded with a game, the so-called “Helium stick” game. This game will allow participants to experience and test the covered theoretical aspects in practice.</td>
</tr>
</tbody>
</table>

### Session objectives:

- Understanding the value of consensus decision-making.
- Understand the value of shared vision, mission and goals.
- Understanding the value of emergent leadership.

### Session format/type:

- Presentation
- Discussion
- Group exercise

### Session material:

- Beamer
- White board
- 1 Computers (for lecturer)
- Audio
- Long rod/stick (For helium stick game)

### Session duration:

- Yet to be determined in pilot (approx. 2x 1 hour)

### Group size:

- 20 max.
- 16 min.

### Target audience:

- Operational management

### Group composition:

- From same department/ From multiple departments if minimum amount of participants is unfeasible from a single department.

### Class layout:

![Class layout](image)

### Full session description:

- Appendix 3.1.5

### Power point Presentation:

- Appendix 4.5
## Session information

| **Module #:** | 4 |
| **Session title:** | New Concept development model A (translated from Dutch: Ontwikkelingsmodel nieuwe concepten A) |
| **Brief session description:** | In this session the new concept development model will be introduced and explained. Guidelines for the application of the model will be explored. The role of management in the application of the model will be addressed. And finally the potential risks involved in the application of this model will be covered. |
| **Session objectives:** | • Understand the importance of and be able to facilitate, stimulate and support idea generation. • Be familiar with and be able to apply the New Concept Development Model. |
| **Session format/type:** | Presentation, Discussion |
| **Session material:** | Beamer, White board, 1 Computers (for lecturer), Audio |
| **Session duration:** | Yet to be determined in pilot (approx. 2x 1 hour) |
| **Group size:** | 8 max. |
| **Target audience:** | Operational management |
| **Group composition:** | From same or multiple departments |
| **Class layout:** | ![Class layout](image) |
| **Full session description:** | Appendix 3.1.6 |
| **Power point Presentation:** | Appendix 4.6 |
Tactical management

Program modules: Tactical management

<table>
<thead>
<tr>
<th>Module #</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction to discontinuous growth</td>
</tr>
<tr>
<td>2</td>
<td>Introduction to dialogue</td>
</tr>
<tr>
<td>3</td>
<td>Emergent leadership C</td>
</tr>
<tr>
<td>4</td>
<td>New concept development model B</td>
</tr>
</tbody>
</table>

Session information

<table>
<thead>
<tr>
<th>Module #:</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session title:</td>
<td>Introduction to discontinuous growth</td>
</tr>
<tr>
<td>Brief session description:</td>
<td>This session introduces the concept of discontinuous growth. The conditional nature of business performance is explained and addressed. Furthermore, practical and relevant examples are employed to illustrate the fact that conditions are changing ever faster and that business should keep up with these changes to survive. The butterfly effect game is employed here for participants to experience the unexpected behavior arising from change among interdependent conditions.</td>
</tr>
<tr>
<td>Session objectives:</td>
<td>• Understand that markets and customer demand are increasingly dynamic.</td>
</tr>
<tr>
<td></td>
<td>• Understand that the company needs to innovate to keep meeting customer demand.</td>
</tr>
<tr>
<td></td>
<td>• Understand the concept and implications of discontinuous growth.</td>
</tr>
<tr>
<td>Session format/type:</td>
<td>Presentation, Discussion, Group exercise</td>
</tr>
<tr>
<td>Session material:</td>
<td>Beamer, White board, 1 Computers (for lecturer), Audio</td>
</tr>
<tr>
<td>Session duration:</td>
<td>Yet to be determined in pilot (approx. 1 hour)</td>
</tr>
<tr>
<td>Group size:</td>
<td>8 max.</td>
</tr>
<tr>
<td>Target audience:</td>
<td>Tactical management</td>
</tr>
<tr>
<td>Group composition:</td>
<td>Tactical management from multiple departments</td>
</tr>
<tr>
<td>Class layout:</td>
<td>[Diagram]</td>
</tr>
<tr>
<td>Full session description:</td>
<td>Appendix 3.1.7</td>
</tr>
<tr>
<td>Power point Presentation:</td>
<td>Appendix 4.7</td>
</tr>
</tbody>
</table>
### Session information

<table>
<thead>
<tr>
<th>Module #:</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session title:</td>
<td>Introduction to dialogue</td>
</tr>
<tr>
<td>Brief session description:</td>
<td>This session starts off with a game aimed at demonstrating the benefits of dialogue over discussion. Then the relationship between dialogue and weak signals will be addressed. Additionally, the relationship between weak signals and sharing in a common vision, mission and goals is addressed. And finally, within the context of the discussed theory, the concept of the organizational mind is introduced.</td>
</tr>
</tbody>
</table>

### Session objectives:

- Know the value of sharing perspectives, information, knowledge and experience in innovation (i.e. communication).
- Understand the value of developing perspectives, information, knowledge and experience (i.e. learning).
- Understand the value of shared vision, mission and goals.
- Understand the importance of facilitating the company wide access to and the sharing of information.
- Understand and be able to engage in a dialogue.

### Session format/type:

- Presentation
- Discussion
- Group exercise

### Session material:

- Beamer
- White board
- 1 Computers (for lecturer)
- Audio
- Mystery box

### Session duration:

Yet to be determined in pilot (approx. 1 hour)

### Group size:

8 max.

### Target audience:

Tactical management & Strategic management

### Group composition:

Tactical management from multiple departments

### Class layout:

Full session description: Appendix 3.1.8

Power point Presentation: Appendix 4.8
Session information

Module #: 3
Session title: Emergent leadership

Brief session description: This session starts with showing a visual metaphor for an adaptive organization. The benefits of such an organization are covered. Next some aspects are considered in their contribution to either organizational rigidity or flexibility. The session proceeds to ling consensus decision-making and emergent leadership, to the ability to sense and react to weak signals. Which in turn is linked to the ability of adaptive organizations. An exercise is employed to illustrate emergent leadership in practice.

Session objectives:
- Understanding the value of emergent leadership.
- Understanding the value of consensus decision-making.

Session format/type:
- Presentation
- Discussion
- Group exercise

Session material:
- Beamer
- White board
- 1 Computers (for lecturer)
- Audio

Session duration: Yet to be determined in pilot (approx. 1 hour)

Group size: 8 max.

Target audience: Tactical & Strategic management

Group composition: Tactical management from multiple departments

Class layout:

Full session description: Appendix 3.1.9

Power point Presentation: Appendix 4.9
### Session information

<table>
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<tr>
<th><strong>Module #:</strong></th>
<th>4</th>
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</thead>
<tbody>
<tr>
<td><strong>Session title:</strong></td>
<td>New concept development model B</td>
</tr>
<tr>
<td><strong>Brief session description:</strong></td>
<td>In this session the new concept development model will be introduced and explained. Guidelines for the application of the model will be explored. The role of management in the application of the model will be addressed. A greater emphasis is put on the value of experimentation in business development. The potential risks involved in the application of this model will be covered. And finally, the integrated framework is presented incorporating the topics covered in the previous sessions.</td>
</tr>
<tr>
<td><strong>Session objectives:</strong></td>
<td>• Understand the importance of and be able to facilitate, stimulate and support idea generation.</td>
</tr>
<tr>
<td></td>
<td>• Be familiar with and be able to apply the New Concept Development Model.</td>
</tr>
<tr>
<td><strong>Session format/type:</strong></td>
<td>Presentation, Discussion</td>
</tr>
<tr>
<td><strong>Session material:</strong></td>
<td>Beamer, White board, 1 Computers (for lecturer), Audio</td>
</tr>
<tr>
<td><strong>Session duration:</strong></td>
<td>Yet to be determined in pilot (approx. 1 hour)</td>
</tr>
<tr>
<td><strong>Group size:</strong></td>
<td>8 max.</td>
</tr>
<tr>
<td><strong>Target audience:</strong></td>
<td>Tactical management</td>
</tr>
<tr>
<td><strong>Group composition:</strong></td>
<td>Tactical management from multiple departments</td>
</tr>
<tr>
<td><strong>Class layout:</strong></td>
<td>Appendix 3.1.10</td>
</tr>
<tr>
<td><strong>Full session description:</strong></td>
<td>Appendix 4.10</td>
</tr>
<tr>
<td><strong>Power point Presentation:</strong></td>
<td>Appendix 4.10</td>
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</tbody>
</table>
Strategic management

Program modules: Tactical management

<table>
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<tr>
<th>Module #</th>
<th>Title</th>
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<td>1</td>
<td>Business as usual?</td>
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<tr>
<td>2</td>
<td>Introduction to dialogue</td>
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<tr>
<td>3</td>
<td>Emergent leadership</td>
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</tbody>
</table>

Session information

<table>
<thead>
<tr>
<th>Module #:</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session title:</td>
<td>Business as usual?</td>
</tr>
<tr>
<td>Brief session description:</td>
<td>During this session, strategic management will be informed on the diagnosis results from the thesis research. The results will be briefly covered. Then the focus shifts to the sigmoid curve and the notion of discontinuous growth. In the form of an exercise, participants are incited to think about the practical implications derivable from the characteristics of each lifecycle stage. Afterwards, a set of statements will be presented, relating to practical implications derivable from the lifecycle stages. The aim here is to promote a discussion between participants to further fuel the focus on the need to innovate.</td>
</tr>
</tbody>
</table>

Session objectives:

- Understand that markets and customer demand are increasingly dynamic. ☑
- Understand that the company needs to innovate to keep meeting customer demand. ☑
- Understand the concept and implications of discontinuous growth. ☑
- Get participants thinking about the practical implications of conditions of uncertainty. ☑
- Stimulate an interest in what CST has to offer. ☑

Session format/type: Presentation, Discussion

Session material: Beamer, White board, 1 Computers (for lecturer), Audio

Session duration: Yet to be determined in pilot (approx. 1hour)

Group size: 8 max.

Target audience: Strategic management

Group composition: Strategic management

Class layout: [Diagram]

Full session description: Appendix 3.1.11

Power point Presentation: Appendix 4.11
### Session information

| Module #: | 2 |
|--------------------------------|
| **Session title:** | *Introduction to dialogue* |
| **Brief session description:** | This session starts off with a game aimed at demonstrating the benefits of dialogue over discussion. Then the relationship between dialogue and weak signals will be addressed. Additionally, the relationship between weak signals and sharing in a common vision, mission and goals is addressed. And finally, within the context of the discussed theory, the concept of the organizational mind is introduced. |

### Session objectives:

- Know the value of sharing perspectives, information, knowledge and experience in innovation (i.e. communication).
- Understand the value of developing perspectives, information, knowledge and experience (i.e. learning).
- Understand the value of shared vision, mission and goals.
- Understand the importance of facilitating the company wide access to and the sharing of information.
- Understand and be able to engage in a dialogue.

### Session format/type:

- Presentation
- Discussion
- Group exercise

### Session material:

- Beamer
- White board
- 1 Computers (for lecturer)
- Audio
- Mystery box

### Session duration:

- Yet to be determined in pilot (approx. 1 hour)

### Group size:

- 8 max.

### Target audience:

- Tactical management & Strategic management

### Group composition:

- Strategic management

### Class layout:

![Class layout diagram](image)

### Full session description:

*Appendix 3.1.8*

### Power point Presentation:

*Appendix 4.8*
Session information

<table>
<thead>
<tr>
<th>Module #:</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session title:</td>
<td>Emergent leadership C</td>
</tr>
<tr>
<td>Brief session description:</td>
<td>This session starts with showing a visual metaphor, for an adaptive organization. The benefits of such an organization are covered. Next some aspects are considered in their contribution to either organizational rigidity or flexibility. The session proceeds to link consensus decision-making and emergent leadership, to the ability to sense and react to weak signals. Which in turn is linked to the ability of adaptive organizations. An exercise is employed to illustrate emergent leadership in practice.</td>
</tr>
</tbody>
</table>

Session objectives:

- **Agency-Subjective**
  - Understanding the value of emergent leadership.
- **Agency-Objective**
  - Understanding the value of consensus decision-making.
- **Communion-Objective**

Session format/type: Presentation, Discussion, Group exercise

Session material:
- Beamer
- White board
- 1 Computers (for lecturer)
- Audio

Session duration: Yet to be determined in pilot (approx. 1 hour)

Group size: 8 max.

Target audience: Tactical & Strategic management

Group composition: Strategic management

Class layout: 5.2.3.4 Social Island testing

Full session description: Appendix 3.1.9

Power point Presentation: Appendix 4.9

It is important to note that the modules as presented are to be considered concept versions. Before implementing the design, pilot testing would be required to establish the actual impact of the design in terms of the objectives the modules aim to achieve. In addition, pilot testing would also serve to establish additional data.
such as the session duration, the frequency of breaks and the potential complications, which may arise during the execution of the exercises.

This testing could be done in a so-called “social island” situation. A social island refers to a somewhat isolated project group, which could be exposed to influences without affecting the entire organization.

In the following chapter the overall conclusion will be addressed.
6. Conclusions and recommendations

In this chapter the overall conclusion will be formulated. In addition, recommendations will be made for future theory development and company specific recommendations will also be made.

6.1 Conclusion

Recall that this research project started with the desire of CGA’s management to explore CGA’s potential role in increasing the company’s capacity to innovate, in order to more effectively be able to meet current and future challenges, and to align itself with the company’s strategy (see section 1.3.2). Based on this desire, in section 1.4, the research goal was formulated, and was stated to be twofold. First, in the diagnosis stage, the underlying causes of the managerial problem were to be established. Then, based on the established causes for the problem, a design would be formulated aimed at solving the managerial problem.

In this section, the extent to which these research goals have been achieved will be considered.

In the diagnosis stage of the research, CST concepts for dealing with uncertainty were drawn upon to establish a frame of reference for assessing the current conditions at the company. The employed frame of reference yielded bottlenecks, which were incorporated in the empirically based causal diagram. In interpreting the diagram through the Competing Values Framework, it was established that the current organizational culture is a hierarchical one, a culture not supportive of innovation, while the company’s markets demand innovation. The presence of this type of a culture explained the overall lack of innovative incentives and innovation oriented projects. As such it can be said that the underlying cause of the managerial problem has been established, and with that, that the goal of the diagnosis stage has been achieved.

After determining the cause of the managerial problem, the research project proceeded to formulate a design to solve the managerial problem in the design stage. In doing so, CGA’s a potential role in increasing the company’s capacity to
innovate was considered. So, did the research project offer CGA a potential role in increasing the company’s capacity to innovate?

In answering this question, it will be broken down in two aspects. The first aspect concerns the extent to which the design provides a role for CGA, and the second aspect concerns the extent to which the design is successful in formulating a means of achieving the goal of this desired role.

Recall that the direction in the design would be to formulate a T&D program, to be implemented at CGA, aimed at teaching employees a mode of think and doing which will lead to a more innovation oriented culture.

To ensure that the designed T&D program provides a role for CGA, the design took CGA capabilities and limitations into account. More specifically, a boundary condition was included in the design requirements, which stated that the design should be implementable at CGA. To ensure adherence to this boundary condition, the company supervisor, part of CGA’s management, was consulted and involved during multiple stage of the design.

By satisfying this condition the T&D program could be used by the CGA, and thus provided a potential role for it.

The second and more complex aspect, whether or not the T&D program actually leads to increased innovation capacity, is considered next.

In designing the T&D program, design suggestions were employed. Some suggestions informed the implementation strategy and were more general to developing a T&D program, while others were more specifically focused on bringing about organizational change and increasing the innovation capacity.

And while training and development objectives were derived from CST concepts and guidelines focused on increasing the innovation capacity, there is no way to know for sure if the desired result could be achieved before actually testing the design. And unless the design actually increases the company’s innovation capacity, CGA’s role when employing the design cannot be said to be doing so.

Thus, what did the research project provide?
It provided CGA with a designed T&D program, which is expected to provide CGA with a potential role in increasing the company’s innovation capacity. Emphasizing here the need for testing to establish the true impact of the T&D program. As field tests only could establish if the design actually serves to achieve the desired goal, it can currently only be said that the goal of the design stage, has only been achieved in part.

6.2 Recommendations

In this section, some recommendations will be made. These will be company specific, on the one hand, and for theory development on the other.

6.2.1 Company specific recommendations

Recall that the design suggestion 1.3 (“Establish systems to retain introduced change”) was discarded because it conflicted with the boundary condition requiring the design to be implementable at CGA.

A brief consideration of this suggestion leads to the conclusion that it concerns an indispensible element in the endeavor to bring about lasting organizational culture change.

Here the researcher recommends the company to reconsider this particular boundary condition and to explore possibilities to leverage existing systems in implementing the discarded design suggestion.

It is referred here to the HR development project currently being implemented, namely the HAY job appraisal system. As the company is currently redefining and aligning job roles and formulating, together with employees, personal development plans, it could opt to include the guidelines prescribed by the design as mandatory personal goals for each employee. By doing so, it would be leveraging an existing system, which promotes the continuous focus on personal development according to predetermined goals, which would expectedly result in conditions promoting the retention of the proposed change.

Another recommendation regards the suggested pilot testing prior to implementation of the design. It would benefit the organization to be careful in selecting participants for the pilots, as any potential adverse effects should be
containable as much as possible. Participants should for example not divulge and or discuss disconfirming data with colleagues not participating in the pilot. The main message here is for the company to carefully consider what it would entail, in the context of the company, to construct a social island situation (see section 5.2.3.4).

6.2.2 Recommendations for theory development

CST, the main theoretical framework adhered to in this research project, provides concepts with which uncontrollability, uncertainty and complexity in an enterprise can be dealt with. These concepts, as has been done in this research, can be employed in designing complex organizational systems. And while the concepts put forward in CST are very promising in terms of their practical value, there seems to be a limited supporting empirical foundation.

Thus, the main recommendation made here for purposes of theory development is to invest in building a much-needed empirical foundation for CST.

Referring here not only to the testing of the theoretical claims made in CST, but also to equip the domain with, for example, validated research tools which can be employed in diagnosing actual organizational conditions.

Some research questions coming to mind here are:

- How business can objectively identify their current lifecycle stage?
- How can various stages of holonic development be measured?
- How can information technology be leveraged to support a CST informed approach in practice?
- What techniques can be employed to promote connectivity? What determines which technique is appropriate?
- What lessons can be learned from applying CST in practice to further develop the CST framework?

While the list of potential research questions for further research is far from exhaustive, the main idea is clear. It is the development of the practical branch of CST, which is, recommended here.
7. Discussion

In this chapter, the limitations and relevance of the research project will be addressed. The limitations that will be addressed will mainly serve to provide some perspective in the interpretation of the value of the results. The relevance section will aim to define both the practical and academic value of this research project.

7.1.1 Diagnosis limitations

The first limitation to be covered here is the lack of validated questionnaires in conducting the interviews. This may result in construct validity issues. In other words, the lack of validated questionnaires opens the questions, employed during the interviews to assess current conditions, up for discussion. To compensate for this, the researcher opted for the use of semi-structured interviews. This provided the researcher with some added flexibility in phrasing the questions, which enabled increased coverage of conditions inquired into. Also, conducting the interviews with multiple participants provided additional support for findings. However, it should be acknowledged that the use of semi-structured interviews is not to be considered a full alternative to a validated questionnaire.

7.1.2 Design limitations

One limitation of the design stage is that the design suggestions scores on the design requirements were primarily based on the researcher’s insight, while the scores would preferably be based on scores provided by members of the company. However, due to the potentially disruptive nature of the modules, it was decided not to involve stakeholders beyond the project supervisor at the company in this stage. This act, motivated by risk management considerations, meant that additional stakeholder perspectives could not have been included in scoring the design suggestions on the design requirements, which would have increased the value of the retained suggestions.

Another limitation of the design is the fact that it has been informed, to a large extent, by CST, a theoretical framework lacking a mature empirical basis. Thus, the
guidelines derived from CST, and the intended impact these guidelines have, may differ from the actual impact. To compensate for this fact, it has been stressed that pilot testing and further fine-tuning of the design is warranted.

A final limitation regards the generalizability of the research results. Because, the research is design oriented, tackling a specific problem in practice, the results should be considered most applicable to the situation at the company. The generalizability decreases as conditions deviate from the company’s context and conditions.

7.2 Relevance of research

The relevance of this research can be addressed for three distinct domains in particular.

The first, and arguably most obvious relevance is the relevance for the company. By aiming to solve an actual problem at the company, the research project gains its relevance for the company. The project yielded concrete behavioral suggestions for all organizational levels, in sufficient detail to be actionable.

The research is also relevant to the domain of organizational culture development. Olian et al. (1998), for example, have previously proposed strategically focused use of T&D, but not specifically as a means for bring about organizational culture change. In opting for a T&D program as a means to bring about cultural change, the research project explores the possibilities to incorporate lessons learned in bringing about cultural change, in a little explored format, in such a context. Especially the considerations during the design stage serve to illustrate that a T&D program can facilitate a wide range of change strategies in a complementary fashion.

Thus, this research project may serve to draw attention to further consider and explore the potential role T&D can have in bringing about a change in organizational culture. In addition, for the CST domain, the project serves to further add to its empirical base. As this project employed the CST framework as its main theoretical lens, in both the diagnosis and design stages, it provides an example on how CST concept could be employed in dealing with a field problem. Especially the detailed description of each module provides concrete suggestions for using CST in practice.
8. Reflection

In reflecting on the research process and project as a whole, there are numerous aspects of the process that have demanded my attention. While I will not go into all of these in detail here, there are two aspects that stand out most for me. Those aspects will be covered in this final chapter.

The first aspect I’d like to reflect on, regards the impact the diagnosis and design had on the participants involved in the research project. Recall that the diagnosis concluded that the current company culture couldn’t be said to be supportive of innovation. One of the participants, a member of the strategic management level, reacted in disagreement with the diagnosis. Stating that he considers the company’s brand and marketing department very innovative. Another participant, from the operational management level, reacted by stating that the diagnosis was confrontational.

And during the design stage, one participant expressed skepticism towards basic CST concepts. Particularly expressing doubts about the value of including personnel from the employee level in the innovation process. While, during one of the final meetings, another member of the company’s strategic management agreed with the basic philosophy put forward by CST, and encouraged its point of view.

I found the diverse reactions particularly interesting and while reflecting upon these reactions a more cohesive picture emerged.

I realized, that in the performing of the research itself, prior to actually proposing any change, the company was already being affected.

While I did not go so far as to determine the underlying issues giving rise to these reactions, they did serve to highlight the fact that there is much more required for change to come about. More than merely an established need for change and a potential solution, even if conclusions are based in research.

If even the prospect of potential change, almost regardless of the desired change, may gave rise to resistance, suggests to me that there are additional factors at play when change is considered. These factors, varying in nature, may include the political landscape, resource allocation considerations, personal agenda’s, a lack of
knowledge and or experience, fear for the unknown, loyalties, and that is just to name a few. Further realizing that it would serve to assume the presence of such factors and to take them into account as much as possible in any change introducing initiative.

Next I would like to touch upon the convergence towards the chosen design direction. As I am now aware that from an academic perspective, the convergence towards this design direction, the T&D program, could be considered hastily. Would a more elaborate consideration of alternatives yield a more promising result? I feel that the answer to this question can only be known, if such an elaborate consideration of alternatives would be performed.

In reflecting on this issue, I canvased my own thinking and reasoning to establish why I was so inclined to converge onto this design direction. In doing so, I realized that from the outset, I approached the project from a frame of mind developed during the Architecture, Building and Planning bachelor program I did previously. Here one often works backwards from a desired client solution to establish how this can be realized given the possibilities provided by construction technology. I, being extensively rehearsed in such thinking, almost automatically engaged in this mode of thinking. Thus when CGA management stated its desire for the solution to be implementable at CGA, habitual thinking kicked in and I proceeded to consider if this requirement could be met while adhering to academic requirements. Which meant for me, being able to base the desired solution in academic research. The preceding literature study, almost immediately, provided me with inspiration on how CST guidelines could be introduced by means of a T&D program. It would be fair to say that this resulted in some researcher bias towards this particular design direction. And while in hindsight it did prove possible to meet this CGA requirement while adhering to academic standards, I do realize that other avenues may have potentially been disregarded prematurely.

All in all, beyond the academic and research skills developed, I have particularly learned that the marriage between theory and practice is a challenging one. A fact I may have previously underestimated. However, I am glad to have experienced this during my studies.
References


Confidential Appendices

Due to the sensitive nature of the information contained in the appendices, they have been made confidential.

Depending on the version of this report, a digital storage medium may be included containing the appendices. The content of the medium is password protected. If no password has been provided, or is unavailable for any other reason, while one is authorized to view the appendices, one can be obtained by sending a request to: ianwilliamve@gmail.com