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THEORIES IN THREES: A comparative analysis of three organisational design theories

Master's Thesis Organizational Design & Development

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Preface

It is a strange feeling, to be writing this preface after (almost) four years at Radboud University. Four years of studying – working towards this moment - coming to an end when I hand in this thesis. I will not pretend that writing this thesis has been easy – quite the opposite, in fact. I have found myself lacking motivation at several points along the way. A literature review means slogging through many pages of academic writing, which does not tend to be light reading. To be entirely fair, I was warned of this beforehand. Despite knowing what I was going into, the support of those around me has been instrumental all throughout this process.

I would like to thank dr. Lekkerkerk and dr. Verelst for their invaluable feedback. Without it, perhaps there would have been no thesis to read at this time.

Similarly, I owe gratitude to my friends, family, fellow students and all others who have had to suffer the displeasure of being around me when this thesis was at the verge of getting the better of me. They have had to endure nigh incessant complaining and for that I applaud their willingness to endure it and thank them for their support.

Abstract

There are many theories that take different approaches to organisational design. Research shows that many implementations fail, and theories are often academically sound at the cost of practical usability. This thesis compares three organisational design theories by way of a framework that includes necessary requirements for any design theory, as well as characteristics that aid the theory's usefulness in practice. I find that not one of the three theories meets all requirements or possesses all characteristics. I conclude that practitioners may benefit from looking beyond just one single theory, instead taking lessons from multiple. Moreover, the organisational design literature could stand to gain from the development of a more comprehensive theoretical framework by which organisational design theories can be analysed. In performing these analyses, academics and practitioners alike may learn from the identification of gaps in existing theories and the compilation of their insights.

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1. Introduction

Organisational design has long been subject of research. And with good reason, for the way an organisation is designed influences whether that organisation can function properly or even exist at all (Achterbergh & Vriens, 2019; Cunha et al., 2022). Burton & Obel (2018, p. 3) define organisational design as a "systematic approach to aligning structures, processes, leadership, culture, people, practices and metrics to enable organizations to achieve their mission and strategy". The body of literature on how to go about designing an organisation is vast and has many different approaches. The very existence of such a broad range of theories and approaches reveals that there is no agreement on what exactly is the best way to go about designing an organisation. However, one thing is clear - most simply put, organisational design revolves around two deceivingly simple-sounding requirements - the division of labour into various tasks, and the proper coordination of those tasks to complete the desired activity (Mintzberg, 1983). This was described already by Adam Smith in *The Wealth of Nations* (1776), to increase efficiency. The requirements are equally important, yet not at all easily aligned.

Many researchers have set about solving this problem, and their attempts have yielded many different approaches. Examples include Mintzberg's own configurational approach, Puranam's microstructures approach, Weber's classical theory, the contingency approach by Burton and Obel, and the sociotechnical systems approach, which was first discussed in 1951 by Trist and Bamforth. None of those theories provide a be-all, end-all solution to the problem of designing an organisation - such a definitive 'solution' to this problem does not exist (Joseph et al., 2018). Yet all of them contribute, in one way or another, to our understanding of potential ways in which to do so and provide guidelines or suggestions to that end. Three organisational design theories are selected - De Sitter's Modern Sociotechnical approach, Mintzberg's Configurational approach, and Puranam's Microstructural approach. The reasoning for these three choices will be elaborated upon later in this chapter.

1.1 Research Purpose

Thus, we are faced with different approaches, that build on different ideas, that result in different guidelines. While Mintzberg prescribes a set of pre-made configurations, or combinations of them, that explain most of what drives organisations to structure themselves in the way that they do (and in doing so very much takes the organisation as a whole, whose

configuration must above all achieve internal consistency [Mintzberg, 1983]), Puranam's microstructural approach is instead based on the idea that large, complex organisations can be viewed as a collection of smaller, simpler ones (Puranam, 2018). The question that follows logically, then, given the differences between these (and other) theories, is how they compare to one another. Going further, one might ask if (and if so, how) the theories complement each other.

The comparison of different approaches in the field of organisational design is hardly a new idea. Doty et al. (1993) compare Mintzberg's configurational approach to Miles and Snow's configurational approach. Aouadi (2018) compares De Sitter's Lowlands' sociotechnical systems design to Galbraith's information processing view and Burton & Obel's contingency approach. Christis (2011) shows that Lowlands' sociotechnical systems design can be used as a theoretical basis for lean production. Through thorough comparison, we may gain insights into how exactly different theories and approaches differ, and, perhaps more importantly, how their respective insights and contributions may be combined to further the field of organisational design.

Similarly, this thesis aims to compare three theories, selecting a new combination: De Sitter's modern sociotechnical approach, Mintzberg's configurational approach, and Puranam's microstructures. Central to the Organizational Design & Development master's programme, De Sitter's Lowlands Sociotechnical System Design (L-STSD) has been described as far more detailed than any other in organisational design (Achterbergh & Vriens, 2010). As the name suggests, this is a development of sociotechnical systems specific to the Lowlands – the Netherlands and Belgium. However, his work is little known outside of Dutch-speaking countries because of it mostly being in Dutch (Lekkerkerk, 2017).

Contrastingly, Mintzberg's work on configuration has gained widespread attention. His work creates broad suggestions for archetypes of organisations based on certain characteristics. Mintzberg's most famous work, *Structures in Fives*, was recently revised. *Understanding Organizations… Finally!* now features 7 forms ('species') of organisation, as well as 7 forces that pervade the forms (Mintzberg, 2023). In it, organisations are seen as a complicated yet ultimately single, unitary entity.

Phanish Puranam takes a different approach. In his 2018 book, he describes the microstructural approach to organisational design. One of its two key tenets reads as follows: "Large, complex organizations can be understood as collections of smaller, simpler, and recurring patterns of "micro"-organizations." (Puranam, 2018, p. 4). These micro-organizations form recurring patterns known as microstructures. A key part of the microstructural approach

is that all organisations face the same problems - regardless of scale. Interestingly, Puranam (2018, p. 21) does not claim that the microstructural approach "will suffice to understand it all". Instead, it is envisioned to be part of a larger theoretical toolkit, to be used in tandem with - and as a complement to - other approaches. There is no further elaboration on the exact contents of this toolkit, other than that it is complementary to, among others, the macrostructural approach.

The contrast between Mintzberg configurational approach, which has been a mainstay of the organisational design field for some time now, the recent development of the microstructural approach, and L-STSD which is little known outside the Netherlands and Belgium makes for an interesting comparison.

Although designing an organisation's infrastructure deals with three aspects (division of labour, human resources, and technology), the division of labour is the most basic and relevant part of the infrastructure (Achterbergh & Vriens, 2010). They view the design of a structure as the starting point, after which technology can be designed and human resources selected (when dealing with a reorganisation this of course involves taking the existing human resources into account). Considering this status of structure as the foundation of organisational design, considerable attention is paid to the structure aspect of organisational design. However, given that such organisational design theories must be able to be used in practice, I also include measures to assess the theories' pragmatic validity.

1.2 Research Objective and Research Question

To summarise, this yields the following research objective, to be accomplished through the theoretical framework that follows in the next chapter:

> *"To critically assess, compare, and contrast the three selected organisational design theories on grounds of quality of the theory itself, as well as their pragmatic validity."*

Given this academic and practical relevance, in this thesis I strive to answer the following research question:

> *"How do the three selected organisational design theories compare to one another and complement each other in terms of quality of theory, as well as pragmatic validity?"*

"Quality of theory" is a term that on the surface is open to a wide range of interpretations. Practicability, while not as ambiguous, also requires more specificity. I will

determine the quality of a theory by means of a set of requirements and characteristics. The former must necessarily be present for an organisational design theory to be a complete theory, while the latter provide added value without being strictly required. Practicability will be assessed through the presence of certain characteristics that help make a scientific theory more usable in practice (or possibly, lack thereof). All requirements and characteristics are grounded in organisational design research. They will be elaborated upon in Chapter 2.

1.3 Relevance

Rynes et al. (2001) report that substantial evidence indicates a lack of cooperation between academics and practitioners concerning management research. Researchers do not turn to executives for inspiration regarding their research, nor do executives turn to researchers to help develop management practices. Similarly, a survey by Shapiro et al. (2007) shows that there is a perceived gap between research and practice. Perhaps not unsurprisingly, then, Beer and Nohria (2000) write that about 70% of change initiatives fail to meet their goals. The importance of including organizational design in management practices is clear: "Organizational design can help managers to better attain higher performance for their organizations by adopting a more effective structure." (Donaldson, 2006, p.38). Yet at the same time, in 36% of EU27 establishments only about 1 in 5 workers can organise their work autonomously. In a larger share (42%), a similarly small amount of work requires problem-solving (Eurofound, n.d.). However, Eurofound reports that autonomy and complexity (requiring problem solving) lead to higher performance and especially workplace wellbeing.

Clearly, there are many advantages to making sure an organisation has the right structure for the job, and there are plenty of organisational design theories. Yet we see that in the EU, very few workers are reaping the benefits of structures. And when organisations do attempt to change, a lot of those initiatives fail to achieve their goals. Academics and managers alike recognise the gap between their respective efforts (Shapiro et al., 2007). They conclude that it is necessary to both improve initial research design and to improve *translations* between management researchers and practitioners. This thesis aims to contribute to the latter part of that advice by showing how theories are and are not strong in pragmatic validity.

1.4 Thesis Outline

The following chapter describes the theoretical framework used to analyse and compare the three organisational design theories. It will start by briefly outlining the basis of the framework and will then provide a detailed account of the expansion of the framework. Chapter 3 contains a description of methodological considerations. Next, Chapter 4 provides an overview of the results of the analysis and follows the order of the theoretical framework. This overview is brief and based on the full analysis provided in Appendices 1 through 3. Chapter 5 contains the conclusion and discussion.

2. Theoretical Framework

2.1 Intervention Cycle

There is no simple answer to the question of when an organisational design theory is a good theory. The differences between theories make it even more difficult to construct a framework that allows for accurate and in-depth comparison between approaches. However, we must remember that the goal of an organisational design approach or theory is to produce a design that allows the organisation to function properly (again). Per Achterbergh and Vriens (2019, p. 40), it is an organisation's overall goal to 'maintain a separate and meaningful existence'.

Therefore, any such approach must be able to describe, in some degree of detail, the process of finding out what is wrong with the organisation (what problem are we trying to solve by applying the organisational design theory), designing a new structure, to applying the newly designed structure in practice, and evaluating its success. This process generally consists of four, five, or six steps, depending on which exact cycle one chooses. There are many variations of what is essentially the same process (Leen & Mertens, 2021): 'DOVE-cyclus' (Diagnose, Ontwerp, Verandering, Evaluatie. In English: *DDIE; Diagnosis, Design, Implementation, Evaluation*), intervention cycle, management problem solving method, or regulative cycle. Undoubtedly there are more; the key here is that many of these cycles cover essentially the same process. The DDIE-cycle is the 'base form' of those variations of cycles (Van de Westelaken & Peters, 2012). The steps of these processes/cycles are goals to be fulfilled, to increase the likelihood that a 'well-designed' structure is implemented in the organisation (Achterbergh & Vriens, 2019). Therefore, the DDIE cycle is a suitable basis for the theoretical framework.

Clearly, taking these four steps as is will not be sufficient. The *design* step will need further specification. Aouadi (2018), having also taken the DDIE cycle as the basis for his theoretical framework, uses five assessment criteria from previous reviews of organisational design theories. Additionally, Aouadi extracts three more from organisational design literature. These eight, together with the *diagnosis* and *implementation* steps taken as a whole, form the ten 'necessary requirements' framework for his analysis. They are the following, as displayed in Table 1:

Table 1

Overview of necessary requirements as per Aouadi (2018)

Necessary Requirements	
Diagnosis	
Design	Essential Variables (EV)
	Adaptivity
	Structural Parameters that influence EV
	Regulation by design
	Hierarchy
	Relationship between EV and Structural Parameters
	Design Principles
	Precedence Rules
Implementation	

Note: table adapted from Aouadi (2018), showing the (sub)division of necessary requirements for an organisational design theory based on the DDIE-cycle and other literature.

As detailed as the analysis of the design stage of the DDIE cycle is, the Diagnosis and Implementation steps are lacking in specificity. Other than that a theory must incorporate at least some description of Diagnosis and Implementation, they are not elaborated on in the same way Design is. This is because while they are without a doubt important to the eventual success of an organisational (re)design, they are not as important to the core of a design theory. That is to say, a design theory *can* be appropriate without a specified Diagnostic or Implementation process. However, the success of a design ultimately depends on its implementation (Secchi & Camuffo, 2019). Similarly, without a proper diagnosis, a design might not solve a problem at all. For example, Appelbaum (1997) suggests a set of 31 questions intended to identify interactions in a system, to facilitate and assess a sociotechnical intervention.

Aouadi's framework can prove useful in comparing and contrasting design theories. The framework encompasses most of the DDIE cycle, with the exception being Evaluation. This step logically shares much of its process with Diagnosis - after all, both steps involve determining criteria, choosing 'acceptable' (norm) values for those criteria, and finally determining whether there is a problematic difference between the two (Achterbergh & Vriens, 2019). The final part of Evaluation, assessing the (lack of) problematic differences, follows logically from the first three parts and does not require separate mention. As the framework covers most of the DDIE cycle, it is well-suited to assess design theories. The more detailed a theory is, the better it is going to do in the Aouadi framework. However, we are thus faced with something of a paradox - while complexity and detail are useful for scientific uses, it is generally detrimental to applicability by practitioners (see Section 2.4). The two sides are often not aligned. That raises the question "when is an organisational design theory useful to practitioners?". Section 2.4 deals with that issue.

Not only that, but a theory's implementation depends on more than just its structural design contents. 70% of change initiatives fail (Beer & Nohria, 2000). As such, without a structured approach to implementing it in an organisation, a theory is as much use in practice as if it were a poor organisational design theory - that is to say, none. That statistic implies that even 'good' organisational design theories might fall victim to poor implementation. "The reason for most of those failures is that in their rush to change their organization, managers end up immersing themselves in an alphabet soup of initiatives.", Beer and Nohria (2000, p. 133) write. Clearly, these implementations stand to benefit from following a structured approach.

2.2 Episodic Interventions

With the importance of the DDIE cycle established, I revisit the Implementation step. To successfully implement a new design, it is not sufficient to merely design a proper structure. There is more to it: the implementation requires a careful approach. Achterbergh & Vriens (2019) introduce the 3-D Model for episodic interventions, which encompasses the DDIE cycle and adds two more dimensions to it. Episodic interventions are a way to fix the structure in organisations that have lost the ability to perform 'normal' structural development. In such cases, an episodic intervention might be required for the organisation to 'regain the capacity to perform normal structural development' (Achterbergh & Vriens, 2019, p. 5). The model consists of three dimensions; Functional, Social, and Infrastructural. The functional dimension deals with the DDIE-cycle and as such is similar to Aouadi's framework. However, the social

and infrastructural dimensions are not yet accounted for. They deal with changing the interaction premises and interactions, and the design of the intervention organisation, respectively.

Healthy organisations can deal with structural deficits in an organic manner through continuous structural development. De Sitter (1998) describes the importance of communication with others in dealing with disturbances: *externe regelcapaciteit* (external regulatory capacity) is the ability of a worker to change those aspects of their work that interact with other parts of the process - the input- and output sides. This external regulatory capacity is called *the social dimension of labour* (De Sitter, 1998, p. 19). Members of the organisation can change the structure of their work to deal with problems, and, even if these changes are local, can contribute to the development of the overall organisational structure if tasks are sufficiently connected, communication embedded in tasks, and members have a sufficient overview of the entire process (Achterbergh & Vriens, 2019). This demonstrates the importance of the social aspect of organisations and, more specifically, the importance of the social aspect of episodic interventions. After all, given the importance of the organisational members in the fulfilment of organisational goals, they must necessarily be on board with any change in structure if that change is to be successful. The social dimension outlines goals for the episodic intervention that, if completed, integrate the new design into the organisation.

Simultaneously, it implies that a lack of ability to self-regulate can be very problematic. Indeed, when monitoring and changing the structure is no formal part of the smaller organisational jobs, the organisation is at risk of losing the ability to change its structure when it needs to. Not only that, but changing the structure has become very difficult or even impossible *because* of its structure - such a structure is 'self-inhibiting' (Achterbergh & Vriens, 2019). This is because the members that know the problems are unable to effect change, and those able to create change are not (sufficiently) aware of the problems. To circumvent that lack of continuous structural change (and inability to create it), organisations that suffer from self-inhibiting structures require a separate intervention organisation to perform an episodic intervention. Since the structure itself is unable to change itself, a separate entity that is outside of the regular activities is required to change the structure. This intervention organisation is the subject of the infrastructural dimension. It describes the requirements for the intervention organisation to be successful. In essence, an organisation that wishes to design and implement a new and proper structure must first design an entirely new organisation. Much like how an organisation's structure can be problematic to the degree that it becomes self-inhibiting, an intervention organisation will not be able to successfully implement a sound new structural

design (or, more formally, 'realize the functional and social goals of the intervention') without a proper infrastructure of its own (Achterbergh & Vriens, 2019, p. 9).

The above shows the usefulness of the social dimension of implementing a new structure, and the value of the infrastructural dimension as a prerequisite to implementation of a proper structure in an organisation. For that reason, those two dimensions will also be included in the framework - they are integral to the success of a new structural design. Both dimensions will be outlined below. However, they are not included in the framework in all their detail for two reasons. Firstly, it would make for an unwieldy framework, and secondly, it would make little sense to judge an organisational design theory by the full extent of an intervention approach. After all, they are two separate things. An organisational design theory can benefit from outlining at least part of the two dimensions described below - that way, practitioners are not entirely left to fend for themselves. For that reason, in section 2.3 I outline what has been distilled from the social and infrastructural dimension described below.

Finally, the introduction of aspects of the 3-D Model to the theoretical framework seems a good opportunity to discuss terminology. Previously, the Aouadi framework referred to 'necessary requirements'. That term (if not somewhat tautological) is adequate for that part of the framework. However, the following aspects of the 3-D Model are not strictly necessary for an organisational design theory, nor is the section on pragmatic validity. A theory can still design a perfectly adequate organisational structure without dealing with the social or infrastructural dimension, or with poor pragmatic validity. It will certainly make the implementation a lot harder (if lacking social and intervention-infrastructural elements) and possibly the process of design (if lacking pragmatic validity), but that does not automatically make it a bad organisational design theory per se. As such, calling those aspects necessary or required seems inappropriate. I will refer to them as 'characteristics' - "a typical or noticeable quality of someone or something" (Cambridge Dictionary, n.d.), to denote their added value to an organisational design theory without suggesting that they are strictly necessary for the theory's functioning.

2.2.1 Social Dimension

Organisations are inherently social systems. They can only deliver their societal contribution through extensive social interactions (Achterbergh & Vriens, 2010). That means that designing a new structure is not enough: the new structure must also be accepted by the organisational members and made to be the new reality within the organisation. If this does not happen, even

the most well-designed organisational structure remains but a plan (Achterbergh & Vriens, 2019; Hugman & Hadley, 1993; Von Tiele Schwarz et al., 2020).

The social dimension in Achterbergh & Vriens (2019) is aimed at realising this acceptance. It does so through changing the interaction premises within the organisation, and, as a result, the interactions based upon them. The process of changing interaction premises consists of three main goals: motivation, adoption, and integration. Each of these goals covers a different part of getting organisational members involved in some way or another with the episodic intervention.

2.2.1.1 Motivation

Motivation is the first prerequisite in the social dimension. Without motivation, any project is doomed to fail. Achterbergh and Vriens detail two sub-goals: *sense of urgency* and *shared vision*. The former is required so that organisational members are prepared to let go of old interaction premises. A shared vision is necessary in order to instil in the organisational members a perspective that the upcoming organisational change is both feasible and desirable. The goal of motivation does not only apply to recognising current problems and the need to change - it also relates to accepting an episodic intervention as the way to create that change. Note that this is relevant not only when an organisation is facing a *re*organisation, but also when building a new organisation from the ground up. For example, the conscious choice of a specific structure when the organisation is conceived requires that prospective employees subscribe to the underlying ideas of this structure in order to make the most of it. The same principles of sense of urgency and shared vision apply, but instead of relating to upcoming change they now apply to the existing structure that new employees will enter into.

2.2.1.2 Adoption

The second goal of the social dimension, adoption, is concerned with two things: first, the willing commitment to new interaction premises, and second, that this commitment is based on justifiable confidence in the new premises and their underlying concepts, theories, and values. To those ends, there are two sub-goals: *inventing* and *testing*. Inventing involves "the search for and creation of new interaction premises and interaction patterns that improve the organization’s structure relative to the goal of the intervention" (Achterbergh & Vriens, 2019, p. 223). It is initially driven by the sense of urgency and shared vision that was created in the motivation goal. Testing simply refers to the processes used to test how effective the previously invented premises and interactions are.

2.2.1.3 Integration

Integration is meant here in the sense of 'synthesis' not only are the new interaction premises and interactions integrated into the organisation, but organisational members have experienced how it is to perform their tasks adequately in the new structure, and have given those tasks both organisational and personal content. That is to say, not only have the interaction premises and the resulting interaction been adopted, organisational members have also actively used those premises and interactions to perform their tasks and learned how to interact in the new structure with coworkers, clients, bosses, etcetera. They have also experienced any difficulties resulting from the new structure and its associated premises and interactions, and - most importantly - regained the task-autonomy required to overcome these difficulties by means of continuous interventions (Achterbergh & Vriens, 2019). Again, there are two subgoals: *exercising* and *reinforcing/adjusting*. Exercising has a twofold meaning: doing and training.

2.2.2 Infrastructural Dimension

How, then, to best go about implementing a new structure in such a way that it stands the best chance of completing all the goals and subgoals listed above? Since the organisation has lost the ability to perform continuous interventions by itself, implementing this new structure requires a separate intervention organisation. The infrastructural dimension deals with how to organise the infrastructure (HR, technology, and structure) of this intervention organisation.

2.2.2.1 Intervention Structure

A structure is the division of work in an organisation resulting from the definition and allocation of tasks and responsibilities (Achterbergh & Vriens, 2011). The intervention structure, then, is the division and allocation of intervention-related tasks and responsibilities. There are two categories of intervention-related tasks to be distinguished (Achterbergh & Vriens, 2019): operational intervention activities and regulatory intervention activities. The former are directly aimed at fulfilling the social or functional goals of an intervention. Regulatory intervention activities regulate (as the name suggests) the operational intervention activities when disturbances occur.

2.2.2.2 Intervention Technology

Intervention Technology is the "tools and techniques that can be selected to support the performance of intervention activities by the human resources that are involved in the intervention" (Achterbergh & Vriens, 2019). These technologies are used to pursue social or

functional goals (or both simultaneously), or in support of activities that pursue those goals (this is called enabling technology). To aid in selecting the right tools and techniques for the job, Achterbergh & Vriens list 4 heuristic principles, which I will not repeat here word for word as they are not fully relevant for the analysis of an organisational design theory. However, they may be roughly summarised as follows: technology should always follow from set goals, may be cross-functional, and it is always better to change the technology or its users (through education and/or training) than to change the goal that was set out to be achieved. It is clear that the goals of the intervention take precedence over the technology and the skills of its users.

2.2.2.3 Human Resources

Finally, Human Resources concerns the people in the intervention organisation that are involved with intervention tasks, possibly using intervention technology. Similar to the selection of intervention technology, the selection of human resources for the intervention organisation is guided by a set of heuristic principles. Again, they are not listed - the exact heuristics aren't as important as is what underlies them. Achterbergh & Vriens (2019) identify two bases for selection of human resources: goal-based and job-based. Where the former selection is done because it is thought relevant to include certain human resources in order to accomplish functional or social goals, job-based selection occurs based on knowledge, skills, and motivation required to do a certain job.

2.3 3-D Model Derived Characteristics

For the purposes of this thesis, I derive additional 'characteristics' from the abovementioned dimensions. The overall goal of these additional characteristics is to provide context about how a theory situates itself in the intrinsically interrelated processes of designing and changing an organisation. Without an organisational design there is little to change about the organisation, and without a way of changing the organisation the design theory is severely hamstrung by its dependence on outside change approaches.

2.3.1 Characteristic: Social Dimension

For the social dimension, the question could be "does the organisational design theory incorporate elements of employee involvement in any part of the process?". There are multiple facets to this question, in increasing order of specificity.

- First, whether employees are involved at all or not.

- Second, at which point(s) in the process they are involved.
- Third, to what degree they are involved.

These three items give an indication of how much (or little!) employees are involved in the entire process of organisational design and organisational change. So, we can formulate the first characteristic: *"Employee involvement"*, with three sub-questions: Yes/ No, Where, and How Much.

2.3.2 Characteristic: Infrastructure

Since the intervention infrastructure dimension is even further removed from the core of an organisational design theory (it is, after all, very much part of the change/intervention process and not inherently part of a design theory), few if any organisational design theories would pass the test of strictly adhering to the heuristics. Yet, without a proper intervention infrastructure, the intervention is far more likely to fail (Achterberg & Vriens, 2019; Hugman & Hadley, 1993). For that reason, the characteristic will simply be called 'Infrastructure', and its sub-characteristics named for its constituent parts.

Table 2

Employee Involvement Characteristics

Characteristic	
Employee Involvement	Yes or no?
	Where?
	How much?

Table 3

Employee Involvement Characteristics

Characteristic	
Infrastructure	Intervention Structure
	Intervention Technology
	Human Resources

2.4 Pragmatic Validity

Thus far the framework captures design elements, and implementation through an intervention organisation. However, when it comes to applying a design theory in practice, scientific rigour and practical validity clash. Argyris (1996) provides examples of theories and models that, although scientifically sound, are difficult to use in practice (I hesitate to use the word 'impossible', but it is certainly implied). That raises a question. What use is an organisational design theory, if it cannot be effectively used to actually design an organisation? There is a view that achieving scientific validity does not in and of itself guarantee usefulness in everyday situations. Thomas & Tymon (1982, p. 346), for example, write: "the hegemony of these notions of rigour [...] in many cases has encouraged research that is of questionable practical utility". The sentiment in Rynes et al. (2001), nearly 20 years later, is still similarly negative concerning the practical utility of organisational research - there is a clear gap between research and practice in organisational science. With those criticisms of the real-life usefulness of organisational research in mind, combined with the supposed relevance of organisational design theories for not only academics but also practitioners, I add on to Aouadi's framework a section for pragmatic validity. For this purpose, I use Worren et al.'s 2002 framework (see Table 4) that describes three different ways to represent theory as a tool for practitioners, and also provides requirements for achieving pragmatic validity for each of the three modes of representation.

Each of the three organisational design approaches will be tested with respect to their pragmatic validity (or possibly, lack thereof). As characterising a design theory into possessing just one mode of representation could overlook strengths or weakness in another mode, each theory's performance on each of the three modes will be taken into account. Theories are often strong in one mode, while overlooking the implications of not including the other modes (Worren et al., 2002, p. 1243). A brief description of each mode and its requirements follows.

Table 4

Worren et al. (2002)'s perspectives on representing theory as tools for practitioners.

Mode of Representation	*Description*	*Requirements for achieving pragmatic validity*
Propositional	Prescriptive statements about potential managerial actions and outcomes	Testability through explicit, causal propositions
		Operational definitions of constructs
		Description of how implementation is to proceed to achieve desired outcomes
Narrative	Stories and anecdotes that illustrate a particular concept or suggest a course of action	Vivid imagery and persuasiveness
		Ambiguity - flexibility in interpretation and application
		Plausibility through logical consistency in the ordering of the underlying plot
Visual	Diagrams and other visual depictions of conceptual models	Appropriate symbolic and iconic representation of concepts and relationships
		Simplification or aggregation of complex information into meaningful patterns

2.4.1 Propositional Representation

A propositional theory provides the reader with prescriptive statements about what to do and when to do it. That means "if this occurs, under these circumstances, then that is likely to happen"-style statements and guidelines. Pragmatic validity in this mode of representation is achieved through fulfilling the following three requirements:

1. **Testability** through explicit and causal propositions.

   This refers to the nature of the propositions themselves, as briefly described above. The theory must contain propositions that are sufficiently detailed and contain such causal relations that they can be tested.

2. **Operational definitions** of constructs.

   The propositions must be adequately operationalised, so that the causal relationships as described within them can be tested by observing the effects of a certain change on predetermined indicators of the predicted and desired outcome.

3. **Description of how implementation is to proceed** to achieve desired outcomes.

   A pragmatic theory in the propositional mode must explicitly state a course of action. It is not sufficient to state that changes must be made - the theory must make clear the exact nature of the required changes.

2.4.2 Narrative Representation

A theory in the narrative mode can enhance interest, involvement and credibility of a theory and/or concept (Worren et al., 2002). It does so by providing drama or imagery in order to arouse interest. That it is lacking in strict propositional elements does not absolve it of having to conform to certain requirements for pragmatic validity. They are:

1. **Vivid imagery** and **persuasiveness**.

   Elucidating vivid images in the reader's mind is critical to the success of the narrative mode. As mentioned, drama and imagery arouse interest which in turn helps drive the point of the theory in question home. Additionally, it allows the reader to more easily recall information by connecting the information to a story and/or image. It gains persuasiveness by being "mediators between the general and the particular" (Worren et al., 2002).

2. **Ambiguity** - flexibility in interpretation and application.

   Ambiguity can be critical in the organisational context, where environments are rapidly changing (especially in the modern day and age), and strictly defined theories might exclude viable options based on specific technicalities. Contrastingly, more ambiguous theories avoid premature commitment to any particular decision and might gain broader stakeholder support.

3. **Plausibility** through logical consistency in the ordering of the underlying plot.

   Finally, such a theory must be logically consistent in the way it connects different parts of the story. If the storytelling is not believable, neither will the underlying concepts, relationships and implications. As such, the success of a narrative theory hinges on the ability to cover the subject matter in a consistent and believable storyline.

2.4.3 Visual Representation

The third mode of representation, visual, translates complex textual information into visual aids such as pictures, graphs, tables or diagrams. As mentioned by Worren et al., there is evidence that certain universals exist in the use of visuals to represent physical as well as abstract concepts. In order to accurately do so, a theory with strong visual elements must fulfil two requirements:

1. **Appropriate symbolic** and **iconic representation** of concepts and relationships.
   Different shapes, symbols and icons can be used to represent certain relationships and characteristics. For example, the use of arrows - more formally called vectors - generally represents an action verb ('cause', 'transmit', 'influence', etc. are examples of such action verbs that can be visually represented by arrows). Moreover, specific choices regarding the same shape can implicitly indicate differences. Two concepts represented by identical shapes of different sizes imply, for example, that the concept displayed in a larger shape is more important than one represented in a smaller shape.
2. **Simplification or aggregation of complex information** into meaningful patterns.
   When using theories in real-life settings, managers are confronted with sub-optimal situations such as time pressure and discontinuity, as well as the limited capacity of the human short-term working memory (Worren et al., 2002). Visual models can capture concepts and relationships that in textual form would be complicated to understand and communicate, and make them far easier to grasp.

The expansion of Aouadi (2018)'s framework with Worren et al. (2002)'s measures for pragmatic validity provides a framework that allows organisational design theories to be tested not only for scientific value, but also for usability in practical applications by practitioners. As a result, Aouadi's framework has been expanded to account for the need of practical usage by practitioners. Section 2.5 provides an overview of the new framework.

2.5 Final Framework

The final framework encompasses most of the 3-D Model to capture organisational (re)design from the first diagnosis of structural problems to the introduction of a new structure and its evaluation. To those ends, it consists of an existing framework that has been supplemented with additions based on the 3-D Model (which was introduced after the Aouadi framework was

created, hence the need to add to it later on). Additionally, the framework includes a section on pragmatic validity - as described previously, there is a mismatch between scientific research and the needs of practitioners. The two groups are generally not aligned, and as such it is common for practitioners to be unable to use organisational design theories. Scientific rigour is necessary, but not sufficient to be a good theory.

Table 5 on the next page contains an overview of all necessary requirements and characteristics.

Table 5

Overview of all Necessary Requirements and Characteristics

Necessary Requirements		*Characteristics*	
Diagnosis		Employee Involvement	Yes or no?
Design	Essential Variables (EV)		Where?
	Adaptivity		How much?
	Structural Parameters (SP)	Infrastructure	Intervention Structure
	Regulation by Design		Intervention Technology
	Hierarchy		Intervention Human Resources
	Relation between EV and SP	Propositional Representation	Testability
	Design Principles		Operational Definitions
	Precedence Rules		Description of Implementation
Implementation		Narrative Representation	Vivid Imagery and Persuasiveness
			Ambiguity
			Plausibility
		Visual Representation	Appropriate Symbolic and Iconic Representation
			Simplification or Aggregation of Complex Information

3. Methodology

3.1 Literature Review

In this thesis, a literature review is used to analyse, compare, and contrast three different organisational design theories. A theoretical framework has been constructed that provides the backdrop for this analysis. This way, all three theories can be measured against the same standards, in turn allowing for easy and meaningful comparison of the three. The use of a literature review is the ‘purest’ way to compare the three - an evaluation of real-life use in a case study of any such approach might provide valuable insights into specific situations, but the differences inherent in any setting might obscure the actual effects of a design choice. Such a comparative case study that not only analyses different design theories in practice, while it would undoubtedly yield valuable insights, is beyond the scope and feasibility of a thesis project. Controlling for other influences that might conflict with the effects of organisational design for different organisations, in different settings, for different designs while still maintaining comparability of findings would be far too time-consuming.

For those practical reasons, a literature review is most appropriate for this thesis. I use a theoretical framework against which to measure the three selected approaches. These approaches will be analysed by way of a set of requirements and characteristics as listed in the framework in Chapter 2.

Having explained the choice of (or rather, necessity for) a literature review as opposed to empirical research to compare three organizational design approaches in the master’s thesis setting, I now discuss in more detail what that means for this thesis. The term 'literature review' is not yet specific enough, as there are many different types of literature reviews. Looking at the different kinds of literature reviews that exist, there are some that stand out. Radboud University defines a systematic literature review as "a literature review that uses a structured method to answer a specific research question" (Radboud University, n.d.). The structured method, in this case, would be the framework by which the works of De Sitter, Mintzberg and Puranam are analysed. However, in Snyder (2019, p. 334), a systematic literature review is defined more narrowly as one whose aim is to "identify all empirical evidence that fits the pre-specified inclusion criteria to answer a particular research question or hypothesis". Their purpose is to gather *all* knowledge on a topic area - that is not the goal of this thesis. Rather, this thesis takes the approach of the so-called *framework synthesis*, which uses an a priori

framework to analyse and synthesise findings (Booth et al., 2016). It deviates slightly from the standard framework synthesis-process in that it does not present the resulting synthesis in a chart, instead narratively describing the findings and contrasting them.

A key part of any literature review is the research synthesis - it communicates "the strength of the available evidence and the quality of included studies, thereby indicating how much confidence practitioners, [...] managers [...] should have in the results" (Booth et al., 2016, p. 11). This allows the thesis to fulfil the comparative part of the research question.

Research can be of an exploratory, descriptive, or explanatory nature (Makri & Neely, 2021). This thesis is exploratory in nature, which means it seeks to gain new insights in an area where previously there were little. In this case, a comparison of three organisational design theories by way of a relatively broad framework.

3.2 Construction of Theoretical Framework

The purpose of this thesis can be split roughly in two: to assess the quality of theory of the selected design approaches, and to assess their practicability by assessing their pragmatic validity and content on implementation. For the first part, I use Aouadi's 2018 framework which is grounded in previous research and was added onto by relevant literature. However, based on for example Thomas & Tymon (1982) and Rynes et al. (2001), it appears that purely scientific quality of theory is not enough to completely and accurately assess the quality of a theory in management sciences. Since management is inherently a practical science (it is, in broad terms, aimed at understanding and then improving organisations and their contexts), for a theory to be truly useful in more than just a purely academic sense, it must also be usable by practitioners. For various reasons explained previously (see section 2.4), practitioners might not be able to accurately and effectively use complex theories in everyday work. To that end, I add on to the framework a set of characteristics that assess a theory's practical usability. This allows assessment of not only a theory's quality, but also the ability of practitioners to capture that quality for the furtherment of their organisation.

Furthermore, an organisational design theory is only as useful as its implementation (Secchi & Camuffo, 2019). For that reason, it seems prudent to include criteria on the implementation of a theory. To that end, I have chosen part of Achterbergh & Vriens' (2019) 3-D Model. All in all, this has yielded a framework that consists of two parts: a set of necessary requirements that deal mostly with the actual organisational design content of the theory, and a set of more peripheral characteristics that serve to provide an indication of a theory's

pragmatic validity and its positioning in the change process (that is to say, whether it provides guidelines towards its implementation).

3.3 A Note on the Characteristics

Some of the above characteristics are somewhat subjective, especially those pertaining to pragmatic validity. For example, there is no concrete measure by which to judge the degree of ambiguity in a statement. Similarly, no set of rules exists for the aggregation of complex information into visual aids. The subjective nature of the criteria is particularly present in the part of the framework that deals with pragmatic validity. For that reason, those characteristics should be viewed as an indication of the degree of pragmatic validity and not as a final judgement on the matter. Rather, they should serve to provide the reader with a broad idea of a theory's pragmatic validity. Any conclusions drawn on that part of the framework will provide an indication of their usability in practice - a theory will not be dismissed based on a lack of propositional pragmatic validity, but rather that practitioners that prefer strongly propositional works might be less able to effectively use the theory if it is found that a particular theory is somewhat lacking in propositional pragmatic validity.

I recognise the shortcomings in using these relatively subjective measures. However, I do believe, based on reasoning explained previously in Chapter 2, that they add sufficient value to the analysis of a given theory to warrant inclusion in the framework. Subjective criteria suffer from the fact that two separate readers of the same text are likely to arrive at differing conclusions. In the relevant sections of this thesis, I detail my conclusions so that the interested reader may compare them to the authors' original works, and thus arrive at their own conclusions.

3.4 Selected Literature for Each Approach

The review will be centred around the main works of each author. Additional sources will be used when required, for additional insights, information, context, or otherwise. They have been selected for roughly one of two reasons: the additional work has either added to the existing theory in a substantial way (e.g.: Steinberger & Jung (2019)), or it is valuable because it helps view the original theory more clearly. This list is not exhaustive, and if need be, I will not restrict myself to sources that have been listed here. In short, this is subject to change as circumstances require.

DE SITTER:

De Sitter, L. U. (1998). *Synergetisch produceren: Human resources mobilisation in de produktie: een inleiding in structuurbouw* (2nd ed.). Van Gorcum.

De Sitter, L. U., Den Hertog, J. F., & Dankbaar, B. (1997). From complex organizations with simple jobs to simple organizations with complex jobs. *Human Relations, 50*(5), 497-534. https://dx.doi.org/10.1023/A:1016987702271

Achterbergh, J., & Vriens, D. (2010). *Organizations: Social systems conducting experiments* (2nd ed.). Springer. https://doi.org/10.1007/978-3-642-14316-8

Achterbergh, J., & Vriens, D. (2019). *Organizational development. Designing episodic interventions.* Routledge.

Kuipers, H., Van Amelsvoort, P. J. L. M., & Kramer, E.-H. (2018). *Het nieuwe organiseren: alternatieven voor de bureaucratie.* Acco.

MINTZBERG:

Mintzberg, H. (1983). *Structure in fives: Designing effective organizations.* Prentice Hall.

Mintzberg, H. (2023). *Understanding organizations… finally!: Structuring in sevens.* Berrett-Koehler Publishers.

PURANAM:

Puranam, P. (2018). *The microstructure of organizations.* Oxford University. https://doi.org/10.1093/oso/9780199672363.001.0001

Steinberger, T., & Jung, J. Y. (2019). Designing the microstructure of routines. *Journal of Organization Design, 8*(18), 1-18. https://doi.org/10.1186/s41469-019-0058-5%0A

4. Results

This chapter summarises the results of the analysis as found in appendices 1 through 3, which contain a detailed description of each part of the theoretical framework for each of the three theories. Here, I discuss them by following the structure of the theoretical framework and providing a summary of the findings for each theory.

Each section follows the same order: L-STSD first, then Mintzberg's configurational approach, and finally the microstructural approach.

Diagnosis

Of the three authors, De Sitter (1998) is the only one to explicitly mention the process of diagnosis in his work. His structural parameters can be used to this end. Additionally, an analysis of the primary process (De Sitter, 1998; Kuipers et al., 2018) and group design is important (given their central roles in L-STSD) as the foundation for (re)design. Mintzberg's (2023) elements of design can be used in a somewhat roundabout way to achieve a similar effect, although Mintzberg himself does not outline this in his work. The elements of design taken together result in a certain configuration (or possibly a blend of multiple), which can then be analysed for internal and external fit. Puranam (2018) provides no tools for diagnosis.

Design

Essential Variables

De Sitter's Functional Requirements serve as essential variables, whose values must meet the norm values set by the organisation itself. Their ideal values are not specified further than that they should be as low as possible given the organisation's circumstances. Kuipers et al. (2018)'s expansion broadens the functional requirements for the modern organisation. Mintzberg's theory also contains a set of requirements that must be met for the organisation to be successful. They are the internal fit of the elements of design, and the external fit of the entire configuration with the environment. Puranam's Microstructural approach is less specific in this area, but given the centrality of individual behaviour in microstructures, the three components of behaviour (goals, representations, and choice processes) can be seen as essential variables in the sense that the organisation must find a way to get them to align with system-level goals.

Adaptivity

De Sitter achieves adaptivity through the fulfilment of the Quality of Organisation functional requirements, which pertain to the organisation's ability to be flexible and adaptive. Mintzberg outlines four environmental factors that can force an organisation to be adaptive, and describes how proper organisational design can help the organisation navigate those factors (even if those factors might demand conflicting characteristics of an organisation!). In the microstructural approach, hierarchies are important in being flexible - in particular, assigning decision-making power to the correct individuals so that decisions may be taken swiftly and effectively. Additionally, control loss due to delegation of authority can inspire bottom-up strategy exploration.

Structural Parameters that Influence EV

Seven structural parameters are presented as part of L-STSD. They are dials that a designer can turn so that they end up with a desirable structure. In Mintzberg's configurational approach, there is a set of eight 'elements of design' that also serve to build the structure, ultimately resulting in a configuration (or blend). The microstructural approach seeks to influence individual behaviour through a set of three levers and the choice for its division of labour.

Regulation by Design

Regulation by design encompasses decreasing the infrastructure's probability of producing disturbances, and/or increasing the infrastructure's regulatory potential. De Sitter identifies four types of regulation of which two (internal and external non-routine regulation) can change the organisation's infrastructure so as to perform regulation by design. The ability to perform those regulatory activities must, of course, be designed into the organisation from the start. Mintzberg is less explicit regarding the ability to change the organisations structure through regulatory activities, but does recognise that job enlargement leads to more decision-making power for employees (and thus more regulatory potential, which may include those types of regulatory activities that allow for regulation by design). Additionally, he discusses project teams, the temporary change in structure to resolve a disturbance - in this case a project that cannot be completed by the existing ('standard') structure. Puranam hardly deals with regulation by design, other than mentioning the possibility of authority to design being delegated away from the hierarchical apex.

Hierarchy

In L-STSD, hierarchies are a source of disturbances. They produce more interfaces that result in disturbances and their existence implies relatively small regulatory capacity for those in production jobs, which leads to poorer working conditions. Contrarily, Mintzberg considers

hierarchies to be inherent to certain configurations, and one of the potential downsides that needs to be weighed against the advantages. The microstructural approach contains detailed descriptions of how exactly hierarchies come to be as a result of task division and span of control issues, as well as their associated (dis)advantages.

Relationship between EVs and Structural Parameters

Structural Parameters build towards achieving the functional requirements. Low values on structural parameters always lead to being better able to fulfil the functional requirements. The relationship in Mintzberg (2023) is quite similar, yet the elements of design need not necessarily have a 'lower value' in order to contribute to internal or external fit. In Puranam (2018), sorting and framing both influence individual behaviour by reducing diversity of goals and triggering the right goals and representations, while structuring further reinforces all three parts of behaviour in different ways.

Design Principles

L-STSD comes with a set of very explicit design principles that prescribe the scope, object, and several key goals and ground rules for organisational design. Moreover, De Sitter's first precedence rule can be seen as a design principle too: start designing the ideal outcome. Mintzberg first stipulates that there is no single best way to structure an organisation. Additionally, a successful structure must achieve internal and external fit. Puranam takes a similar stance, stating that a design is a *specific* solution to the universal problems of organising. He also states that division of labour and integration of effort are interrelated problems and cannot be solved independent of each other.

Precedence Rules

De Sitter describes the order in which the design process should occur in five steps, starting with the ideal situation through to the technical aspects of the production process. Kuipers et al. (2018)'s *Integral Design Chain* encompasses De Sitter's precedence rules and expands on them.

Implementation

De Sitter stipulates at the start of *Synergetisch Produceren* that the choice not to include anything resembling an approach to implementation was very deliberate. In his view, the implementation should be based on the choice of design approach. De Sitter et al. (1997) do describe part of the redesign process, starting at the preparatory steps of gaining support within the organisation up to and including the design process, but no mention of actually

implementing the new design is made. Kuipers et al. do provide a set of six principles that are central to ensuring a proper implementation, but still no actual approach to implementation.

Similarly, Mintzberg does not explicitly describe the implementation process. Mintzberg does describe the natural development of an organisation as they cycle through certain configurations in a somewhat predictable pattern, but provides no insight into implementing a new configuration. The microstructural approach is equally lacking in advice regarding implementation.

Employee Involvement

As already briefly mentioned above (and more elaborately at various points in Appendix 1), employee involvement is a central theme of L-STSD. Employees and representatives of the workforce are, or at least should be, included in every step of the process, starting at the very beginning with garnering support for the redesign. Mintzberg's configurational approach does not mention any kind of employee involvement. Similarly, Puranam (2018) is also lacking in recommending employee involvement despite research showing that involvement is beneficial (Eurofund, 2020). Given the benefit of the doubt, it could be argued that the experimental stages of organisational redesign do include the employees, but taking part in an already redesigned structure being tested is a far cry from true involvement in the design process.

Infrastructure

It stands to reason that an intervention organisation should follow the same L-STSD design rules a 'normal' organisation does. However, this is not explicitly mentioned. The only hint towards an intervention infrastructure are the five steps outlined in De Sitter et al. (1997). Although with some logical reasoning it is possible to select one of Mintzberg's configurations for an intervention organisation, the theory itself makes no mention of it. Puranam's microstructural approach is similarly lacking, but moreover provides no indication if one might even be required for implementation or not.

Propositional Representation

De Sitter's work is fairly strong with regards to propositional representation, especially its testability and operational definitions. However, as established previously, it is lacking in specificity about implementation. Mintzberg (2023) is similarly lacking regarding implementation, and also does not contain a lot of testable propositions. The book has a fair

amount of definitions, but especially in Mintzberg (2023) these are fairly general and serve more to give the reader a sense of what it means than to provide an actual airtight definition. Like the other two theories, Puranam's microstructural approach also lacks a description of implementation. However, it is perhaps the strongest of the three concerning definitions.

Narrative Representation

Although De Sitter's storytelling is not particularly vivid, recurring examples do sometimes help bridge the gap between abstract sociotechnical concepts and the reality of an organisation. Plausibility is hardly a factor given the lack of storytelling. In his 2023 book, Mintzberg leans into a more narrative telling of his configurational approach compared to (1983). Examples using everyday settings such as sports teams and cow analogies increase persuasiveness. There is also plenty of ambiguity: there are no predetermined sizes for parts of organisations in different configurations, nor is the development of the organisation as it transitions through different configurations set in stone. Contrastingly, Puranam makes little to no use of storytelling, bar a few fairly shallow examples with no background or continuity. The theory is also ambiguous in the sense that it contains no prescriptive statements regarding characteristics of the organisation.

Visual Representation

De Sitter makes liberal use of images, tables, and graphs to supplement the textual explanations of L-STSD. They often help visualise how structures look given certain characteristics and as such demonstrate the effects of low or high parameter values. The visual aids are also successful in simplifying complex matter without sacrificing too much content - see Appendix 1.2.5.

Mintzberg is similarly successful, often using clear and easily readable figures to supplement the text. The different configurations benefit from having diagrams to visualise them, not only providing clarity but also serving as easily identifiable 'logos' for each. Puranam uses visual aids rather sparingly, but when used they are simple, easy to read, and help quickly and easily visualise concepts and relationships.

5. Conclusion

This chapter first provides an answer to the research question based on the findings as discussed in the previous chapter, primarily focussing on their individual strengths and showing where they complement each other. The next section contains recommendations for future research. Finally, I reflect on choices made during the research process and some limitations of this project.

Conclusion

The goal of this thesis was to analyse and compare three different organisational design theories to determine their 'quality of theory' and pragmatic validity. I have done so using a theoretical framework that encompasses those two aspects and contains a set of necessary requirements and characteristics by which to analyse the theories. This analysis by way of a framework allowed for comparison between the three theories.

I find that in terms of the necessary requirements De Sitter's Lowlands Sociotechnical Systems Design is the most comprehensive of the three, showing more detail especially with regards to the diagnosis and design phases of the intervention cycle. Mintzberg and Puranam are markedly less explicit in that area. De Sitter's structural parameters are also very well-suited to the diagnosis phase, as compared to Mintzberg and Puranam who do not have such explicit criteria by which to judge an existing structure. All three theories are quite lacking when it comes to the implementation phase. De Sitter deliberately does not include this phase in his work (although Kuipers et al. (2018) do provide a set of principles for changing a bureaucracy), and Mintzberg and Puranam similarly do not provide any implementation-related insights. Although this does not make them poorer theories per se, it does complicate matters when it comes to actually applying them to an organisation in need of (re)design.

The characteristics pertaining to the social and infrastructural dimensions of the intervention process, and those pertaining to pragmatic validity tell a slightly more varied story. Given that all three theories are inherently design theories and not intervention theories, it should come of little surprise that none of the three are particularly detailed regarding the social and infrastructural aspects of interventions. Here, De Sitter's and Mintzberg's descriptions of what an organisation might look like (configurations and their characteristics) or how it is desirable that they attain low values on structural parameters, prove advantageous. This allows for a line of reasoning based on their existing logic and underlying principles to design an

intervention organisation. However, the fact remains that in and of themselves these aspects are not mentioned in the theories. Puranam's microstructural approach provides very little in the way of a basis for this type of reasoning, and as such is the weakest of the three in this area.

Finally, I have found that each theory is strongest in one particular mode of representation. This is in line with Worren et al. (2002), who write that often one mode is often promoted with little regard for the implications of leaving other modes out. Mintzberg's 2023 *Understanding Organizations* is written in a notably more relaxed tone than the work it is based on, *Structure in Fives*, released in 1983. It is more of a narrative telling of the configurational approach than previous works, which makes it more easily readable, although it should be noted that it certainly loses some level of detail compared to *Structure in Fives*. Mintzberg warns of this (2023, p. ix-x), but it does make for the strongest narrative theory of the three. Visually, all three theories are strong. Where Mintzberg and De Sitter are quite liberal with graphical displays of various concepts and relationships, Puranam uses them more sparingly but still ensures that those used are easily understandable. All three theories use visual aids to support textual explanations and often are successful in ensuring they actually add to the text.

Propositional representation in all three theories suffers because of little to no concrete recommendations for implementation. Here, Mintzberg's arguably more casual style also results in less testable propositions and definitions that serve more as reminders of what is roughly meant than concrete definitions. De Sitter and Puranam are markedly strong in those two areas, with both theories containing specific definitions and relatively high testability. Puranam's reasoning in support of some definitions ensures that not only the meaning is clear, but also the underlying reasoning for a specific definition.

In summary, L-STSD is the strongest of the three in the diagnosis and design phase, with Kuipers et al. providing basic principles for implementing a new design in a highly bureaucratic organisation. None of the three are particularly detailed with regards to the social and infrastructural dimensions of intervention, but L-STSD and Mintzberg's configurational approach have an edge because they allow users to extend their reasoning to the intervention organisation. The microstructural approach is strongest in propositional representations, whereas L-STSD and the configurational approach have strong visual representation.

Common among the three theories is the concept of complexity, with De Sitter strictly aiming to reduce it and Mintzberg and Puranam considering it a trait inherent in certain configurations or the logical result of an organisation's hierarchy expanding. Hierarchies, too, are treated differently across the three theories. De Sitter considers strongly hierarchical

structures to be bad for the organisation, whereas Puranam outlines several advantages that are associated with them. Mintzberg again considers them inherent in certain configurations and not necessarily bad per se.

Thus, I also conclude that despite their differences in level of detail, approach, and other factors, these three organisational design theories are complementary in the sense that they can cover areas that might not be so well-covered by others. Their insights taken together may prove useful for academics and practitioners alike by covering more ground and including more considerations in the process of organisational design.

Finally, I recognise the shortcomings of this thesis that are the result of my own lack of experience in the field of organisational design. Being a master's student, I lack practical experience that may have allowed me to identify non-explicit content within each of the theories. For now, I am limited by the extent of my knowledge and experience in designing organisations. That is to say, the complete lack of experience in that regard.

Discussion

This thesis consists of a literature review that used a theoretical framework to analyse three different organisational design theories. The theoretical framework was based partially on an already existing framework by Aouadi (2018), which was supplemented with additional elements based in the organisational design literature as well as some rooted in research into the pragmatic validity of theories. The Aouadi framework was constructed as part of another master's thesis, and as such was not a peer-reviewed academic work. However, a master's thesis is subject to scrutiny by a supervisor and second examiner who are both well-versed in the subject matter and capable of assessing the quality of the thesis. As such, I consider it to be sufficiently robust for use at the master's thesis-level.

Additionally, it remains up for debate whether such a framework is ever truly complete. Aouadi made this observation in 2018, and I have added to it since. If the organisational design literature is to go down the comparative analysis path, it would stand to benefit from a more comprehensive framework based on extensive literature review, which was not possible for the purposes of this thesis due to time constraints.

Using the framework described in Chapter 2, I have shown that even prominent works do not fulfil all requirements nor possess all characteristics that ensure pragmatic validity. As a result, practitioners stand to benefit from looking beyond just one theory and might find that the best course of action is to take lessons from a selection of theories instead. To that end,

future research might aim to compare more works in the field of organisational design. That is not to say that ultimately these comparisons will yield one superior theory, but rather that combined insights might prove useful.

Reflection

No research project is, I imagine, without its issues, and this thesis was no exception. I had initially planned to use only Aouadi's framework to analyse two different theories and compare them to De Sitter's work. However, I quickly came to realise two things: firstly, that this would make the actual theoretical contribution of this thesis rather limited. I would need to add to the framework to increase the depth of analysis and provide an addition of my own. Secondly, in reviewing the existing literature, I noticed a theme across several papers (most are discussed in section 2.4) that dealt with the balance between scientific rigour and practical utility. This was the basis for the addition of sections 2.2 and 2.4.

Those additions came with their own set of challenges, however. Although the framework had now been expanded with new contributions, it meant even more work in the analysis process. Despite planning the analysis process beforehand this proved challenging. Remaining concise has also proven exceptionally difficult - even by providing only a very succinct summary of the analysis in the main body of this thesis, the 13.000-word limit is a little too close for comfort.

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Appendices

Appendix 1: De Sitter's Lowlands Sociotechnical Systems Design

1.1 Necessary Requirements

1.1.1 Diagnosis

A central part of De Sitter's work are the so-called structural parameters. Eight in total, they are used to determine how operational and regulatory tasks are divided. These structural parameters can be used in three distinct ways, according to De Sitter (1998, p. 114): as a framework of insights gained in theory and practice to predict synergetic effects given certain parameter values, as a tool for analysing or 'deconstructing' an existing structure, or finally as a design tool.

The second application is of particular interest for this section. The structural parameters can be used to assess an organisation's current structure, so as to determine areas for improvement. Each parameter can be given a value based on the current structure that ranges from 'low' to 'high'. Lower values are desirable, with high parameter value structures being a source of disturbances in and of themselves. Moreover, they do not have the required regulatory potential to deal with disturbances (Achterbergh & Vriens, 2019). Therefore, knowing that high parameters cause problems for the organisation, the parameters can be used to assess the current structure. It should be noted, however, that there are no baseline values for these parameters, nor an exact description of what is considered a 'good' value, other than that they should be as low as possible (and reasonable, given the organisation's circumstances). Each organisation must determine for itself, for its particular situation, a set of parameter values that it finds acceptable or desirable.

In their addition to L-STSD, Kuipers et al. (2018, p. 242) outline specifications for group design. They consider independent groups of at most 20 members to be the building block of an organisation, and the level of success of those groups is determined by those specifications. As the level of success of the fundamental building blocks depends on these specifications, it makes sense to include them in the diagnosis process. The specifications, are the following:

- The group task should be an independent, complete whole.
- Physical task barriers should preferably be defined clearly.

- The group should be big enough to be able to complete the task with appropriate redundancy
- The group should have internal, complementary 'required task interdependence'
- It should also have the freedom and ability to self-regulate, self-organise, and question its own strategies.
- Suitable means of production, control, managing, and information should be available to the group.
- External rewards should be related to measurable input-output ratios of the group.
- Internal rewards and status should be related to the relative importance of an individual's contribution to the group, with the caveat that status differences within the group should not hinder internal mobility.
- Internal and external leadership are part of the group itself.

As with De Sitter's structural parameters, these specifications do not come with an ironclad set of predetermined values. They should also be viewed within the context of the organisation, and the group's specific possibilities and constraints.

Furthermore, it makes sense to characterise the primary process as an order flow. The reason being that when building a structure, the first step is to analyse the order flow with respect to potential for parallelisation and homogenisation as this can lead to a great reduction in complexity (De Sitter, 1998; Kuipers et al., 2018), and thus to fewer sources of disturbances. In fact, a redesign is outright impossible if the organisations is unable to clearly define its primary process (De Sitter, 1998, p. 203). Therefore, a thorough analysis of the primary process is in order for diagnostic purposes.

1.1.2 Design

1.1.2.1 Essential Variables

Organisations must measure their performance in some way. Certain performance measurements are related to a system's (in this case, an organisation's) ability to perform its function. In cybernetics, these are called Essential Variables. De Sitter specifies functional requirements that must be met in order for the organisation to secure its viability (Achterbergh & Vriens, 2010, p. 241). More specifically, he lists three groupings of external functional requirements that can be further divided into at least one internal functional requirement each. When the organisation meets the internal functional requirements, it automatically means the

fulfilment of the external requirements, and thus that the organisation's viability has been secured. For an overview of those internal and external functional requirements, see Figure 1.

Figure 1

External and internal functional requirements as adapted from De Sitter (Achterbergh & Vriens, 2010, p. 242)

External functional requirements		Internal functional requirements
Quality of organization	order flexibility	Short production-cycle time Sufficient product variations Variable mix of products
	control over order realization	Reliable production and production time Effective control of quality
	potential for innovation	Strategic product development Short innovation time
Quality of work	low levels of absenteeism	Controllable stress-conditions;
	low levels of personnel turnover	Opportunities to (1) be involved, (2) learn, and (3) develop
Quality of working relations	Effective communication	Shared responsibility participation in communication

Quality of Organisation is related to the organisation's ability to "effectively and efficiently adapt and realise its goals" (Achterbergh & Vriens, 2010, p. 241). Quality of Work entails how meaningful the jobs are, the existence of work-related stress and the ability to deal with it. Finally, Quality of Working Relations pertains to the effectiveness of communication within the organisations. Breaking down those three groups of external requirements into the more specific internal requirements provides us with a set of variables that directly relate to the organisation's ability to perform and succeed in its intended purpose.

Furthermore, De Sitter describes for each of the internal requirements how high parameter value structures (in his 1998 book, an organisation with high functional concentration) cause problems. This shows that each of the internal requirements can be used as measurements that pertain to an organisation's ability to function properly. In doing so, he demonstrates that these functional requirements are suitable as essential variables.

Kuipers et al. (2018, p. 138) expand upon Quality of Organisation by using five functional requirements, relevant to the modern organisation. Their *logistical control over the process* and *quality control* are reminiscent of (aspects of) Control over Order Realisation and Order Flexibility, particularly the cycle time, effective control of quality, and reliable

production and production time internal requirements. *Flexibility* is now expanded to the entire organisation as opposed to just order flexibility, but consists of internal requirements that were already present in De Sitter (1998): short innovation time (the ability to meet customer demands), sufficient product variations, and the new requirement to be able to relatively easily adjust to required volumes of production. *Potential for innovation* is also roughly similar to De Sitter's.

New to the list of functional requirements, however, is *Control over Efficiency*. This consists of two parts: control over costs and reduction of costs. This new requirement also places a caveat on the others, which is that they must be achieved within the constraints of control over efficiency.

1.1.2.2 Adaptivity

Of the above functional requirements, some pertain to the organisation's ability to anticipate and adapt to customer demands. As per De Sitter (1998, p. 49): 'The market changes and you must keep up with that change, preferably being one step ahead of it'. Customer demands are always changing due to changes in their social-economic situation - as such, an organisation must be able to at least somewhat accurately predict these changes in order to stay relevant in the market. It must consider the customers' needs in the greater context of all their needs and wants, as they are interrelated and never isolated. We do not know what the future will bring, and thus an organisation must improve its ability to deal with unforeseen circumstances and adapt to changing situations (De Sitter et al., 1997).

De Sitter's Quality of Organisation requirement deals with a variety of ways in which an organisation can (and must) be flexible and adaptive. The associated internal requirements deal with aspects of the production process ranging from short cycle times to adequate innovation strategies and processes in order to stay relevant to consumers. Overall, these requirements speak to the concept of controllability. The key here is that they do not aim towards a specific goal with a prescribed set of criteria, but rather that fulfilling these requirements improves the organisations ability to achieve a *range* of objectives, some of which might be unclear now but become apparent in the future (De Sitter et al., 1997).

1.1.2.3 Structural Parameters That Influence EV

Simply knowing which variables can be used to measure performance is not enough. Designers need a way of actually designing an organisation in such a way that the structure is likely to achieve desirable results on the essential variables. After all, the essential variables themselves

do not provide any hint as to how they can be effectively achieved - they are a goal, not a means by which to achieve it. Thus, an organisational design theory must include a set of elements that can be tweaked/manipulated in order to achieve the desired values for the essential variables. De Sitter uses the so-called Structural Parameters for this purpose.

De Sitter's structural parameters, as mentioned previously, can be used in three distinct ways. One of those applications is as a design tool - in this role, the structural parameters can be seen as dials for a designer to turn in order for the organisation to yield the desired results. Confusingly, the structural parameters are 7 (Achterbergh & Vriens, 2019; De Sitter et al., 1997; Vriens & Achterbergh, 2011) or 8 (De Sitter, 1998) in number, and often reported in differing orders. Moreover, what is called 'specialisatie' in the original Dutch is not called 'specialisation' in English works. For the purposes of this thesis, I will use the structural parameters as listed in De Sitter et al. (1997). The reason for choosing that specific work is quite simple - it is an English paper by De Sitter, Den Hertog and Dankbaar, and as such is an English list by the original author. It will not require translation from Dutch, avoiding the possibility of nuances getting lost in translation.

The structural parameters deal with the separation and specialisation of performance and control tasks. Low values for these parameters are desirable, high values are detrimental to the organisation's ability to function. A high value for any one of these will result in a decreased ability to fulfil the functional requirements. As listed in De Sitter et al. (1997), the structural parameters are:

1. Functional Concentration: the degree to which performance functions are related to all order types. When a specific job is performed across all order types, functional concentration is high. When it is performed specifically for one single order type, it is low.
2. Performance Differentiation: this parameter refers to the separation of *preparing, making,* and *supporting* across different subsystems. When they are entirely separate, the degree of performance differentiation is high. According to De Sitter, it is desirable for all three to be contained in the same subsystem.
3. Performance Specialisation: there is high performance specialisation if the order flow is split up into many, highly specific, subtasks. An example as mentioned by Achterbergh & Vriens (2019) is a furniture factory: low specialisation occurs when an employee is involved with the production of a table from start to finish; it is high when that employee's only task is to screw the legs into place.

4. Specialisation of Performance and Control Functions: separation of these two functions occurs when the task of producing and the tasks of controlling that production are spread across two different elements in the system (humans or machines) or two different subsystems.
5. Control Specialisation: the act of controlling functional activities is split up into different parts (quality, logistics, etc.) - much like performance specialisation.
6. Control Differentiation: the degree to which Regulation by Design, Regulation by Control, and Operational Regulation are spread across different tasks.
7. Division of Control Functions: per De Sitter et al. (1997, p. 508), a control cycle "always contains a "sensing" or "perceiving" function, a "judging" function, and an "action selection" function". Division of control, then, refers to how these three functions are spread across different jobs.

1.1.2.4 Regulation by Design

Briefly mentioned in structural parameter 6, regulation by design is one of three regulatory domains to reduce disturbances or their influence on the organisation. The other two are operational regulation (dealing with disturbances as they occur in the process without changing the process itself) and regulation by control (changing norm values and/or setting different goals). Regulation by design has two parts (Achterbergh & Vriens, 2019) - on the one hand, the infrastructure can be (re)designed in such a way that it reduces the probability of disturbances occurring in the first place. The second part is designing the infrastructure in such a way that its regulatory potential is increased - the infrastructure is made more capable of dealing with disturbances when they do occur. How operational regulation occurs is a result of design choices made previously, and as such is a direct result of regulation by design.

De Sitter identifies two kinds of regulation - internal and external. Both of these can be routine or non-routine (see below for an overview). Routine regulation happens exclusively when operational regulation occurs: using the already available tools at one's disposal to deal with disturbances. Thus, non-routine regulation must change something in the task or the infrastructure. Non-routine regulation is spread across strategic regulation and regulation by design. Of those, internal non-routine can only occur as part regulation by design. After all, it concerns only a specific task but does require a change in that task's infrastructure and/or an addition to regulatory potential. Additionally, regulation by design can happen through external non-routine regulation: it may change the infrastructure of the task's environment. The four

distinct types of regulatory activities as listed in Achterbergh & Vriens (2010) are displayed below.

1. Internal routine regulation (the regulatory activity does not involve other tasks and does not change the task or network of tasks)
2. External routine regulation (the regulatory activity involves other tasks but does not change the task itself or the network of tasks)
3. Internal non-routine regulation (the regulatory activity does not involve other tasks but changes the task's infrastructure and/or adds routine regulatory potential)
4. External non-routine regulation (the regulatory activity either changes the task's essential variables and norms or changes the infrastructure of the task's environment [p. 237])

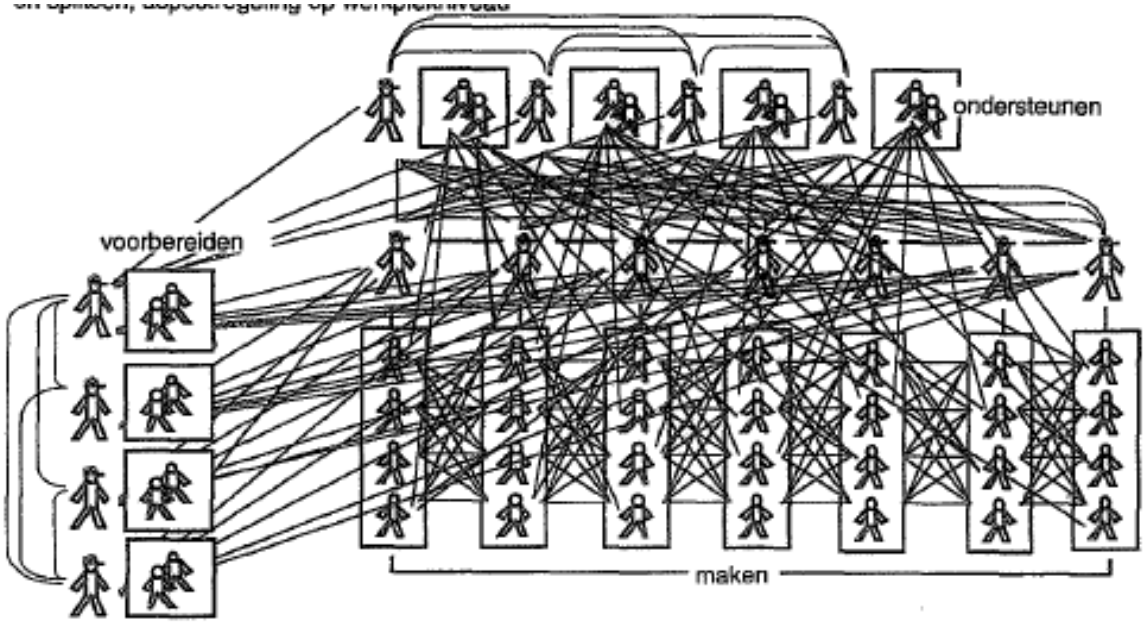
Clearly, De Sitter's work describes methods of regulation by design - internal non-routine and some external non-routine regulation changes the infrastructure so that the tasks may experience reduced disturbances or increased capacity to deal with them.

1.1.2.5 Hierarchy

De Sitter extensively describes the two main sources of stress in the workforce: pressure and regulatory potential. The combination of pressure and regulatory potential is a fairly accurate predictor of absenteeism (De Sitter, 1998). Those two factors can be traced back to a structure with high parameter values. For example, a functional structure is problematic because of two reasons: lots of interactions with other parts of the system (the more specific the tasks within a process, the more interactions the entire system has - a lot of tiny pieces must fit together) and lack of regulatory capacity. Figure 2, taken from De Sitter (1998, p. 138), shows a structure with high parameter values.

Figure 2

A highly problematic structure



Note: shown is a structure with high values on all structural parameters (a "high parameter value structure"). The number of interactions within the system is very high - this causes problems for the essential variables, such as stress in workers. Note also the strong hierarchical nature of the structure, as shown by the number of bosses/managers/chiefs (represented by figures wearing a hat, next to the box that they lead).

Per De Sitter (1998): this is a bad drawing, because it is extremely unclear. For those in the organisation, the situation is equally unclear. The combination of poor structure and highly hierarchical organisations leads to poorer working conditions. It is also in this context that De Sitter most frequently mentions hierarchy. However, De Sitter really only elaborates on why a lot of hierarchy is bad. Relatively little attention is given to the alternative - flat hierarchies - other than generally recommending them. Of course, it stands to reason that the reverse of what makes high degrees of hierarchy bad is what makes flatter organisation desirable. Chapter 6 of *Synergetisch produceren* contains the most detailed passage regarding flat hierarchies: it briefly describes the associated benefits, and that in order to achieve it one should aim for internal autonomous regulation in the segments, and that potent external regulation through cooperation and discussion with previous and subsequent segments must be possible.

Thus, we see that although De Sitter (1998, p. 371-2) recognises the importance of hierarchy in organisational design (mainly the downsides of having too much of it), relatively little time is spent discussing how to achieve the opposite, desirable hierarchical design - one

with little hierarchy. He describes how parallelisation and segmentation reduces hierarchy, even going so far as removing an entire layer from the organisation's hierarchy. This is because many problems are now handled by teams internally, and the teams can deal with disturbances between teams relatively independently. However, no further specifics are offered.

1.1.2.6 Relationship Between EV and Structural Parameters

At the very core of Lowlands Socio-Technical Systems Design is the idea of 'dealing with disturbances'. To put it simply: "production control = regulation = dealing with change" (De Sitter, 1998, p. 10). All of it builds, in one way or another, towards the organisation's ability to deal with complexity and in that way its ability to ensure its continued existence. There are two ways for an organisation to disruption by disturbances: it can aim to prevent them from occurring in the first place, which is called attenuation, and the ability for the infrastructure to deal with problems that do occur, which is called amplification (Achterbergh & Vriens, 2019).

We have seen that De Sitter's functional requirements determine the organisation's viability. The process of going from structural parameters to functional requirements is, in fact, quite straightforward. The structural parameters determine the organisation's ability to deal with complexity. Less complexity is better, because it allows the organisation to operate more efficiently. When the organisation operates more efficiently, it can better fulfil the functional requirement. The underlying idea is as follows: structures that have low values on structural parameters are better able to attenuate and have better regulatory potential to deal with disturbances. An organisation that is better able to deal with disturbances is better able to achieve their functional requirements.

1.1.2.7 Design Principles

De Sitter explicitly mentions a set of nice (re)design principles. Fully describing and exploring them here would take more time and space than is reasonable, but a short summary will suffice to show how De Sitter (1998) prescribes these guiding principles.

1. An integral approach to design

The alternative to an integral approach is a *partial* approach. However, such a partial approach considers only a small part of the system (a subsystem). That implies that the problem is located entirely within that subsystem, and by focussing only on that subsystem any possible solutions that involve other parts of the overall system are automatically excluded from possibility. It also means that all interactions between subsystems are taken for granted and considered as unproblematic. The goal of integral design is to achieve and maintain an optimal balance

between a set of diverse functional requirements. The fact that different parts of a system are related means that changing one likely has an influence on another, possibly upsetting the balance. Therefore, the integral approach is key.

2. The importance of the primary process

Central to the integral approach is the primary process. That is because the primary process by definition limits the choices for system-specific functions. De Sitter defines the primary process as 'The process for which a system is specifically arranged for the production of one or more specific goods or services' (De Sitter, 1998, p. 202). An organisation must be able to accurately define its primary process if it is to even attempt a successful reorganisation. After all, if the organisation does not know what exactly it is redesigning, how can it possibly hope to do so with any degree of success?

3. Controllability as a goal of integral design

Control over the organisational goals is not the goal of a design. Rather, a design aims to achieve controllability of the system that produces those organisational goals and seeks to achieve them. This controllability is a composition of four parts: flexibility, control, innovative capacity, and quality of work and working relations. Notice the large overlap with the essential variables mentioned previously - this makes sense, because if controllability of the system is the goal, and that controllability consists of the above four parts, then the degree to which those four parts have been achieved are a good measure to determine the performance of an organisation in the design context.

4. Controllability as a design principle

Ashby's law of requisite variety states that a system's variety must be proportional to external variety. However, in the field of business administration, that is not yet restrictive enough. A system must not only strive to contain enough variety to deal with external variety, but must also be able to do so with as little variety as possible. Being effective is not enough, a system must also be efficient. In this context, De Sitter calls integral design 'lean': not after the concept of lean manufacturing, but in the pure meaning of the word - simplification of interfaces in a structure. As such, controllability as a design principle entails two critical parts: reduce incoming variety, and develop the minimum amount of internal variety to deal with it.

5. The object of design

The object of design is, of course, the structure of an organisation. This structure is a configuration of the structural parameters. However, a distinction must be made. It makes sense to split the structure into two aspects: production and control. Thus, the object of design consists of two parts:

- Design of production structure: the grouping and linking of executive tasks with regards to orders.
- Design of control structure: the allocation, selection, and linking of regulatory tasks.

6. Applying controllability to the production- and control structure

This principle effectively takes principles 3 and 4, and applies them to the two distinct structures described in principle 5. That gives the following two, somewhat more specific, design principles:

a. Design of production structure:
    i. Increase possibility of process variation
    ii. Reduce need for process variation
b. Design of control structure:
    i. Increase availability of effective information
    ii. Reduce need for information

Notice here how both reflect the points made in principle 4: to be able to deal with disturbances, but to be able to do so with *just enough* variety of your own.

7. Design strategy for flexibility

A design *strategy* can be seen as a guideline to make design *principles* more concrete. De Sitter summarises the question of design for flexibility as a question of to what degree the need for control can be reduced and which possibilities for process variation can be achieved through a reorganisation of capacities with regards to orders. To this end, there are three general pieces of advice.

On the macro level, parallelisation of order flows. This groups tasks that are related based on order-types. This reduces external variety and increases homogeneity of preparation, supporting, and making. On the meso level, segmentation of order flows so that preparation and support for a task are integrated as much as possible. Segments should ideally be able to perform external regulation autonomously. Finally, on the micro level, task groups should be created. These groups should be as self-sustaining as possible, with high degrees of autonomy and flexibility in terms of both personnel and machinery. Here, De Sitter somewhat contradicts his own principles. Why should one immediately start segmenting on the meso level? As mentioned by Kuipers et al. (2018), it is best to continue parallelisation as much as possible.

8. Design strategy for control: control structure

De Sitter describes the controllability of the control structure as a function of available information regarding process variation and required info regarding process variation. The latter has, through effective redesign of the production structure, already been reduced

significantly (by as much as 80%, even! [De Sitter, 1998, p. 208]). This reduction of required information satisfies the need for efficiency mentioned earlier. That just leaves the need for effective control, which can be achieved through the control structure. The focus now lies on the quality of available information in terms of *reliability*, *completeness*, *timeliness*, and *relevance*. The design of the control structure thus relies on insights into how the structural parameters influence the aforementioned quality aspects of available information.

9. Design for quality of work

Directly related to the above is the ninth and final design principle: designing for quality of work. In essence, quality of work is dependent on two things: the regulatory capacity within a task, and the need for regulation. As such, there are also two principles for quality of work:

- Decrease need for regulation (Attenuation).
- Increase regulatory capacity (Amplification).

Finally, the first precedence rule can be viewed as a design principle too. It states that the (re)design must start with the ideal outcome, regardless of the current situation.

1.1.2.8 Precedence Rules

De Sitter (1998, p. 217-21) describes five precedence rules for (re)design of an organisation. They prescribe in what order specific parts of an organisation should be designed, and in what internal order. The five rules are the following:

1. Start (re)designing based on an *ideal outcome* (De Sitter refers to this as a 'luchtkasteel', or air castle, to describe a highly unlikely ideal situation). Test for feasibility later. This is based on the idea that holding on to pre-existing parts of the organisation leads to less options for the redesign. After all, the true difference between 'what is' and 'what should be' can never be accurately determined when the former is taken as the basis for the latter.
2. Design the production structure first. This follows from the simple fact that it is impossible to design a proper control structure when it is unknown what exactly needs to be controlled.
3. Design the production structure top-down. De Sitter states that by designing from the top down, choices made at the macro and then meso level are what creates the options for designing task groups at the micro level. Moreover, he stresses that all functional requirements are to be considered at all three levels.

4. Design the control structure bottom-up. After all, regulatory capacity should - as much as possible - be in the hands of those performing the tasks. That means that starting at the bottom allows a designer to let regulation take place locally. Only if that is not possible should it take place at a higher level.
5. Technical aspects (selection of machinery, etc.) of the production process should be determined as late as possible. Preferably, all design considerations should be taken into account before machinery is selected. Put simply: select a machine to fit the organisation, not the other way around. This comes with the benefit of being able to select one that fits the characteristics of the order flow: a machine with just the right amount of flexibility and capacity as required by the order flow. The demands for production technology thus follow from design choices at the meso level. However, the final decision and technical specifications are a result of designing the task groups at the micro level.

Kuipers et al. (2018) also describe five steps, but they differ from De Sitter's. L-STSD's steps 2 through 4 are combined into one, and several others are added. This creates the so-called *Integrale Ontwerpketen*, or *Integral Design Chain*. Its steps are the following:

1. First, the scope of the organisation subject to redesign is to be set.
2. Then, the organisation's mission and the goals, strategy, and primary process that can be derived from it must be determined.
3. Subsequently, the design specifications based on the following characteristics of the order flow are determined:
    a. Variety
    b. Complexity of the 'making' part of the primary process
    c. Demands that must be met when processing orders
4. Step 4 includes De Sitter's steps 2, 3, and 4: the actual structuring of the organisation. Thus, the production structure is designed first, top-down, and the control structure is then designed bottom-up.
5. Finally, technical systems are selected in a specific order: systems for production first, then control systems, followed by those for HR, quality control, maintenance and finances, and lastly the information system.

1.1.3 Implementation

De Sitter et al. (1997) describe IOR as a participative change strategy (IOR meaning Integral Organizational Renewal, another term for Dutch Sociotechnical Systems Design). That means that employees are heavily involved with the process from start to finish, in contrast to expert approaches that generally create a solution which is then 'forced upon' the existing organisation. De Sitter et al. list 5 steps to the change process, of which only one actually involves designing. Before any design steps can be undertaken, there must be enough awareness, support, and involvement for change to be able to occur.

Unsurprisingly, then, Step 1 involves raising awareness of the need to change. This phase is described as 'often painstaking' and characterised by the phrase "readying the unready" (De Sitter et al., 1997, p. 516-7). Top management is especially important here, as an active role in promoting the new norms and values, as well as ensuring sufficient resources are available to complete the change project are required of them.

Once completed, the organisation can move on to Step 2. This step is called Strategic Orientation and involves a SWOT-analysis conducted by a group of 20-or-so people including top management, a representative of the workforce and 'people from the various functions and sectors needed to attain an overview of the problems and possibilities'. When firms have already done such an analysis with a (usually) small elite group from the firm, they stand to gain from repeating the process with more people and more openness. This benefits not only the quality of the analysis, but also the involvement with the entire change program. This step yields as its result a list of external functional requirements, and discrepancies between them and the current situation.

Given the differences between actual and required performance as discovered in Step 2, the organisation now moves on with Step 3: Structural Exploration. The goal of this step is to identify current problems in terms of disturbances. These problems must be mapped in terms of the current production and control structure, which requires training. Once this inventory of disturbances is completed, they are divided into structural and non-structural problems, and are assigned priorities based on the external functional requirements designated previously. Those that are non-structural and as such do not require redesign to be solved can be dealt with immediately. Structural problems move on in the process and are part of this step's output: a list of internal performance criteria. These criteria are critical input for Step 4.

This penultimate step is aimed at allowing members of the organisation to be in charge of the redesign. More concretely, given that they are a source of invaluable experience and

knowledge regarding the organisation's processes (after all, they have a lot of firsthand experience), they can play an important part. However, this experience is not sufficient - members must become familiar with methods of analysing one's own workplace and its related workplaces and subsystems, as well as the proper design methods required to effectively redesign them. Although the primary goal is cognitive transfer, De Sitter et al. recognise other benefits of this training, especially when done in multidisciplinary groups. For example, members learn to take each other's point of view when looking at a problem.

Finally, Step 5 is the actual design process in the order of precedence described previously.

Kuipers et al. (2018, p. 367-71) do provide a set of basic principles for transforming an entrenched bureaucracy. Firstly, one should strictly adhere to the design approach but be flexible in executing it. The air castle provides a medium- to long-term goal while allowing a realistic approach to any roadblocks that may occur. Second, participation is once again mentioned as a key part of L-STSD: the organisation should redesign itself, once given the knowledge and tools to properly design a new structure. Third, Kuipers et al. stress that there should be ample space for participation and criticism, but within the boundaries of what has already been decided in strategy and design. At some point in the process, previously made decisions will no longer be up for debate and must be taken as is. The fourth principle concerns the balance between the 'hard' (financial, structural, and planning) side of organisational change, and the 'soft' (cultural) side. A too strong focus on either one will lead to poor long-term results.

Finally, two more principles regarding employee participation. Principle five states that it is no use trying to convince staunch critics. It is better to focus one's efforts on those already willing to commit to the cause and help change the organisation for the better. Finally, the last principle is concerned with (one part of) ensuring cooperation - job security. "You cannot expect people to cooperate with their own redundancy" (Kuipers et al., 2018, p. 371).

1.2 Characteristics

1.2.1 Employee Involvement

Yes / No?

As seen in the above 5 steps, employee participation plays a central role in the implementation process of L-STSD. From the very beginning, employees are involved in the process. More

accurately, they are involved even before the design process well and truly starts. It is their support that is perhaps most essential in the success of a change effort. This is all described in no uncertain terms in De Sitter et al. (1997).

Where?

In all parts of the process as described by De Sitter et al. (1997), employee involvement plays an important part. Starting in the very first step, De Sitter et al. urge organisations to first commit to gaining support amongst employees before even attempting a change initiative. Second, a representative of the workforce takes part in the SWOT-analysis, and in Step 3 they are asked to help create an inventory of disturbances. Then, employees are trained in design methods so that they may effectively support the design process. Finally, the actual act of designing occurs and the resulting proposals are discussed within the organisation, work consultation group, and works council.

How Much?

The exact degree to which employees should be involved is difficult to estimate. De Sitter and colleagues do not mention any specific numbers or percentages (such as 'X% of an organisation's workforce should be included in discussions about redesign', or similar). However, there are some indications as to how involved employees are. In steps 1 through 3, direct employee involvement is rather limited. Here, they are represented by a member of the works council (a body elected by the workforce), but the core group still consists mostly of upper management. It is not until Step 4, when employees are specifically trained to be effective at design, that they are fully involved.

Although it might be assumed that the representative of the works council will represent their best interests, one might also argue that their limited involvement in the earlier steps of the process hinders the range of views that serve as input for the design process. A fairly direct comparison to De Sitter's first design principle - integral design - can be made here. The partial approach to design implies that the problem is located entirely within the subsystem that is subject of the approach. Similarly, involving only the representative of the works council implies that this representative is actually capable of capturing the interests and knowledge of the entire workforce. It stands to reason that including a broader part of the workforce (within reason, of course - it is hardly realistic to shut down production to involve *all* employees) would lead to a better view of the design problem at hand. Moreover, research suggests that increased

employee involvement comes with benefits ranging from increased engagement to faster skill development (Eurofound, 2020).

To summarise, in IOR, employee participation is valued very highly and taken into account at every step of the process. In fact, reaching consensus regarding the design project is the single most important step of that project: 'Essential in the IOR approach is the consensus within the organisation about the tasks, roles, and responsibilities in the redesign process itself. Reaching this consensus is in fact the most critical step in each project.' (De Sitter et al., 1997, p. 525).

1.2.2 Infrastructure

Achterbergh & Vriens (2019) argue that when an organisation has lost the ability to perform continuous intervention by itself, the creation of a new intervention infrastructure is required in order to effect an episodic intervention. De Sitter et al. (1997, p. 519) allude to the creation of such a separate structure: 'in a number of cases, a separate and temporary project structure is established'.

Intervention Structure

De Sitter does not make any mention of specifics regarding the infrastructure of a *separate* project structure. However, it stands to reason that De Sitter's design principles and precedence rules also hold for such a structure. It is, after all, in essence just an organisation that has a goal to achieve and that therefore must be organised in such a way that it can do so effectively and efficiently.

Intervention Technology

Again we can turn to IOR's existing rules of precedence. More specifically, Rule 5: that technology must follow from decisions made at the meso level, while the final decision remains based on choices at the micro level. The intervention technology must be selected with the intervention goal in mind, after the structure has been decided upon - as such it can be selected so that it fits the intervention organisation's exact needs so that it may achieve its goals.

Intervention Human Resources

The value of employee involvement and its role in IOR/ L-STSD should be more than clear by now. This aspect of the separate intervention organisation is perhaps dealt with in most detail

by De Sitter et al. Steps 1 through 5 as described by De Sitter et al. (1997) regarding the design process from start to finish clearly deal with employee participation in the design process. The value of involvement is outlined, and some key players in the process are mentioned: the management team, and the chairperson of the works council. Additionally, people from 'the various functions and sectors needed to obtain an overview of the problems and possibilities' are required. Other than that, there are no specifics.

However, Step 4 betrays an important consideration when dealing with redesigns, specifically. The key is that when *re*-organising, one does not simply select HR. There are existing employees that must be taken into account. Not only are they taken into consideration, providing them with training and education is an important part of the IOR process.

1.2.3 Propositional Representation

Pragmatic validity in the Propositional mode of representation, as per Worren et al. (2002), can be achieved by fulfilling three requirements: testability through explicit and causal propositions, operational definitions of constructs, and description of how implementation is to proceed to achieve desired outcomes.

1. Testability:

Propositions must be both explicit enough and contain a causal relationship to be testable. An example is this: 'functional separation of preparatory and supporting tasks leads to aspect-wise process regulation.' (De Sitter, 1998, p. 143). 'Leads to' confers a clear causal relation; and for anyone with a decent understanding of L-STSD, all the individual parts of the sentence are clear too. For those who are not, *Synergetisch produceren* explains them all.

2. Operational Definitions:

De Sitter's work contains many explicit operational definitions for ambiguous terms, or concepts that go by many different names. Take for example, quite early on in *Synergetisch produceren*, when introducing the concept of dealing with change, the following quote (translated from Dutch by author): 'we thus agree upon using the concept 'regulation' for this, and define regulation simply as 'dealing with change'' (De Sitter, 1998, p. 13). Structural Parameters and Essential Variables, as discussed in their respective sections, have been assigned clear definitions that should allow a designer to accurately measure them. The fact that they have not been given a set of norm values is a strength - it means they are more easily applied to specific situations.

3. Description of Implementation:

Design principles and rules of precedence provide a solid basis for implementation. De Sitter lists in what order the different parts of the organisation are best designed, and provides a set of rules to adhere to. This gives the practitioner a clear idea of how the design process itself takes place. However, a great design that is not implemented is not useful to an organisation. In his book, De Sitter consciously does not include a section on the actual implementation. The reason for that, he argues, is that design concerns must be addressed before choosing a change approach. As such, the book does not include any concrete steps towards actual implementation. De Sitter et al. (1997) do briefly describe how one should go about starting the change process (see the five steps in 4.1.3), but the process ends with step 5: designing. That still leaves actually implementing a newly designed infrastructure into the organisation.

1.2.4 Narrative Representation

Pragmatic validity in narrative representation also needs three requirements to be met. They are the following: vivid imagery and persuasiveness, ambiguity, and plausibility.

1. Vivid imagery and persuasiveness:

To achieve pragmatic validity, a narrative theory must elucidate vivid imagery. The reader gets a clear mental picture of what is going on through expert storytelling, and in the organisational context that means stories that stand out, are persuasive, and inspire retelling (Barry & Elmes, 1997). Although De Sitter does make use of storytelling (*Doorsnee Nederland BV*, a generic example company, is a recurring guest to show how not to design a structure), the story scarcely inspires vivid images. However, in the sense of being a mediator between the general and the particular (see 2.4.2), it does somewhat help bridge the gap between the more abstract concepts of sociotechnical system design and how that would apply in a particular organisation.

2. Ambiguity:

An ambiguous theory does not restrict itself to a predetermined decision. Rather, they allow the user to interpret the theory in a way that is suitable to their situation (Worren et al., 2002). This is somewhat applicable to L-STSD: designs grounded in it always operate under the same principles, but retain some degree of freedom based on their particular situation. For example, this is one of the strengths resulting from having no predetermined norm values for the essential variables: it allows the user to interpret L-STDs concept of norm values based on their needs, within the limits of the theory.

3. Plausibility:

Plausibility is achieved through logical and consistent storytelling. Calling the recurring example of Doorsnee Nederland BV a story is a stretch, seeing how it is little more than a

convenient example of how not to do things. As such, this part of narrative representation is hardly present in L-STSD.

1.2.5 Visual Representation

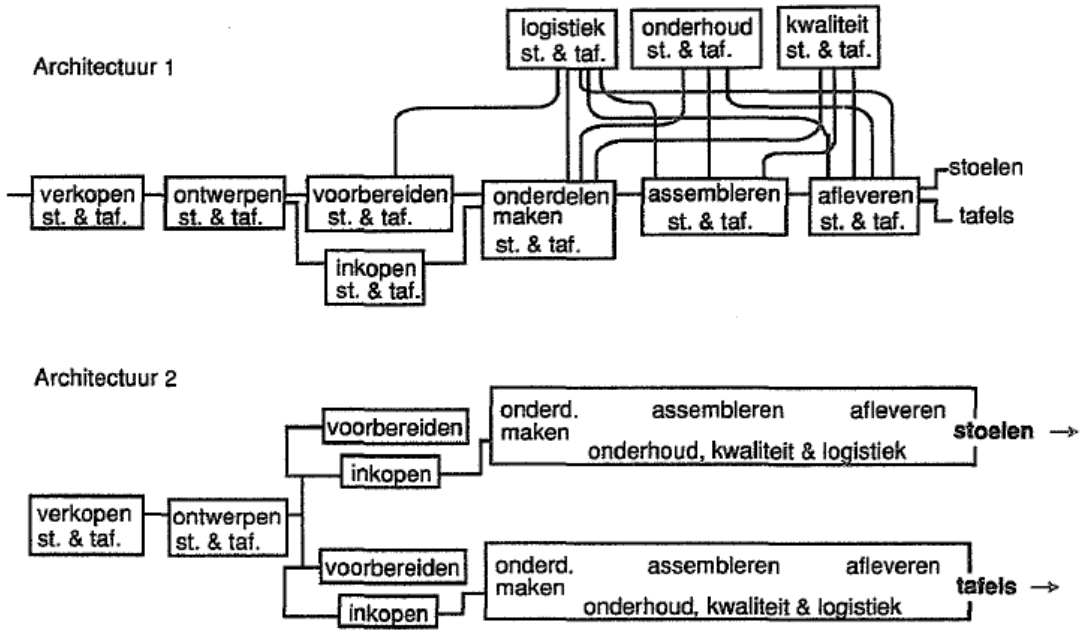
Visual aids is arguably the mode of representation where De Sitter's book truly shines. It contains many images and diagrams in support of theoretical concepts and their relations. This mode is judged by two requirements: appropriate symbolic and iconic representation of concepts and relationships, and simplification or aggregation of complex information into meaningful patterns.

1. Appropriate symbolic and iconic representation of concepts and relationships:

De Sitter's liberal use of graphs, drawings, and other visual aids is not without reason. They certainly add to the concepts described in the text. Take Figure 3, for example: even without any information as to the context of the two different architectures, the rectangles are easily recognisable as distinct parts that fulfil some kind of function. The lines between them, then, show interactions. And even without knowing any Dutch, one should be able to recognise that whereas the above architecture outputs 'stoelen' and 'tafels' at the same point after a complicated set of interactions, the below architecture does so through two separate flows with much fewer interactions in its process.

Figure 3

Two different architectures for producing chairs and tables



Note: taken from De Sitter (1998), p. 97

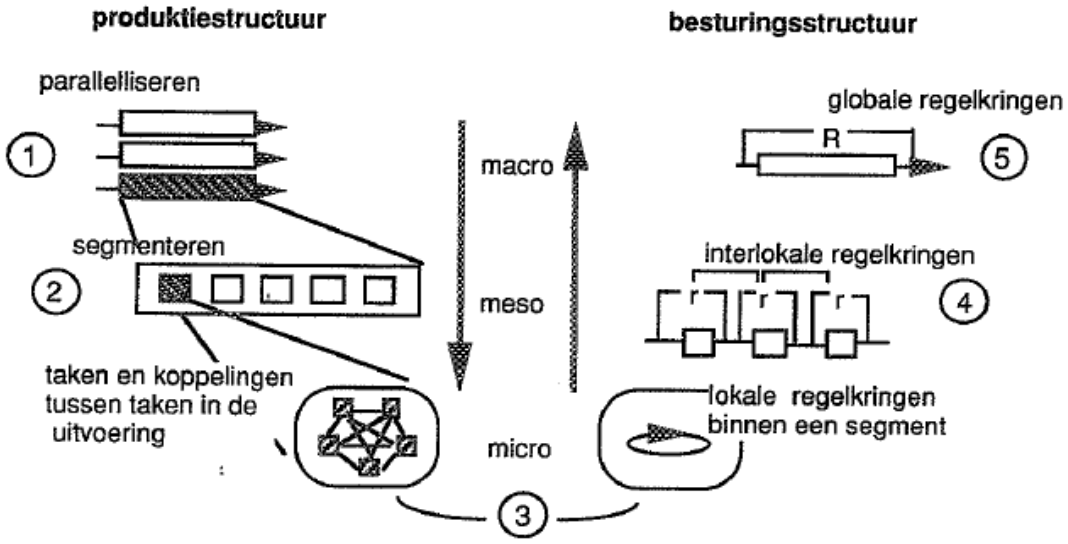
This goes to show that correctly designed visual aids can and will effectively support a text. In fact, intentionally using a poorly designed graph can also serve a purpose - please see Figure 2.

2. Simplification or aggregation of complex information into meaningful patterns:

Simplification is easy, *meaningful* simplification is decidedly harder. Summarising the process of designing the production structure top-down, and then the control structure bottom up, De Sitter uses the graphic shown in Figure 4. Although it requires knowledge of the five steps displayed, it does summarise the process without compromising its meaning. Admittedly, it does not capture the full extent of each of the steps. But that is not the point - it adds a visual layer to a textual description, which together allow the reader to understand this simplified version.

Figure 4

Summary of five steps of designing the production- and control structure



Note: taken from De Sitter (1998), p. 211.

Appendix 2: Mintzberg's Configurational Approach

2.1 Necessary Requirements

2.1.1 Diagnosis

Mintzberg identifies the 'elements of design' for organisations: these are the 'knobs that can be turned to structure an organization' (Mintzberg, 2023, p. 46). Taken together, they determine how the organisation is designed to form a configuration. Much like De Sitter's structural parameters, they can be used to design (or configure) a new organisation, but can also be used to analyse an existing organisation (although this is not explicitly mentioned in Mintzberg [2023]). If putting them together in a certain combination yields a specific configuration, tracing them lets one determine the current configuration. They are the following, and can be grouped:

Designing Positions

1. Job Specialisation
2. Formalisation of Behaviour
3. Training & Indoctrination

Designing the Superstructure

4. Unit Grouping
5. Unit Size
6. Untangling Decentralisation

Fleshing out the Superstructure

7. Planning & Control Systems
8. Lateral Linkages

However, determining that an organisation has a certain configuration is not necessarily indicative of a problem. The problems arise when that configuration is a poor fit with the organisation's environment, or the elements of the configuration have a poor fit amongst themselves.

2.1.2 Design

2.1.2.1 Essential Variables

Mintzberg's configurational approach is ultimately geared towards one thing: structural effectiveness. He presents two hypotheses that together, when they hold true for an organisation, lead to an effective structure. The first Mintzberg (1983, p. 122) calls the *congruence hypothesis*: "effective structuring requires a close fit between the situational factors and the design parameters". The organisation must design a structure that fits its situation to be successful. The second is called the *configuration hypothesis*: "effective structuring requires an internal consistency among the design parameters" - the design parameters must fit together in a logical way.

These two hypotheses can be taken together to form the *extended configuration hypothesis*: "effective structuring requires a consistency among the design parameters and contingency factors". In other words, when the design parameters have a good fit amongst themselves as well as with the organisation's contingency factors, the organisation will have an effective structure. As such, the two types of fit (internal and external) are Mintzberg's essential variables: they must be achieved for the organisation to be successful.

2.1.2.2 Adaptivity

Although fit between the design parameters and the organisation's unique external situation (the 'environment') is important, the nature of the environment is not so important as is the organisation's ability to deal with it. Four environmental factors influence the organisation: stability, complexity, market diversity, and hostility (Mintzberg, 1983). They do so through intermediate variables - these four factors do not automatically influence all design parameters, but rather they come with implications for the organisation that influences *some* of the design parameters. Mintzberg (2023) mentions two cause-and-effect relations for the influence of an organisation's environment on its structure, compared to five such relations in the 1983 work. Starting with the two relations as per *Structuring in Sevens*, they deal with stability and complexity.

- *"The more dynamic an organization's environment, the more organic its structure"*. This remains unchanged from Mintzberg (1983). When environmental conditions are predictable, little flexibility is required of the organisation. After all, not much changes to react to. However, in highly dynamic environments, the organisation must be able to respond swiftly. Since it can no longer accurately predict what is going to happen, the

organisation must rely on less formal means of coordination to respond to its environment.

- *"The more complex an organization's environment, the more decentralized its structure"*. Also unchanged since 1983, centralised decision-making makes sense when all information required to do so is both available and understandable centrally. However, when the environment is complex (and thus, the required information is spread out and complicated), decision-making power must be diffused to those with the knowledge to deal with this spread-out and complicated information.

There are three more such statements in Mintzberg (1983). They pertain to market diversity, hostility, and what happens when environmental demands do not line up.

- *"The more diversified the organization's markets, the greater the propensity for it to split into market-based units"*. When an organisation can identify distinct market segments - whether they are based on product type, geographical location, or target segment, it is more likely to split into units on that basis. Those units are then given lots of control over the decisions affecting its own markets.
- *"Extreme hostility in its environment drives any organization to centralize its structure temporarily"*. In the face of extreme hostility, an organisation must respond swiftly and decisively in order to preserve its very existence. In such a case, it is beneficial that there is one leader to make decisions - everyone knows where to send information, all information is available centrally, and little time is wasted in meetings and debate. Centralised power thus allows for far quicker decision-making in these situations where time is of the essence.
- *"Disparities in the environment encourage the organization to decentralize selectively to differentiated work constellations"*. Disparities in the environment are conflicting demands resulting from environmental conditions. Mintzberg raises the example of two oil companies: local competition versus national cooperation. Here, two petrol stations across the street from one another may compete fiercely, while their parent companies cooperate closely in an effort to influence legislation. The point here is to structure the organisation in such a way that it has 'pockets' capable of dealing with the environment at the required level - near the top when the environment influences the entire organisation, more towards the bottom if the influence is localised.

2.1.2.3 Structural Parameters

As previously mentioned, Mintzberg's elements of design are the structural parameters in the configurational approach. They represent the choices that can be made by designers to shape the organisation, ultimately leading to a configuration that fits (or should fit, at least) the organisation's needs and its environment. The elements of design are eight in total, and I briefly discuss them below.

Starting with the design of jobs, or the cells of the organisation's body, as Mintzberg calls them (2023, p. 46), we are met with three elements. Together, they shape a job within the organisation ranging from its contents to the worker's freedom (or lack thereof) to perform that job in a way they see fit.

1. Functional Specialisation (called 'scope' in Mintzberg (2023)):

Jobs can be specialised or general. High degrees of specialisation leads to incredible efficiency in the production process, but generally also to unhappy workers. Adam Smith (1776) provides an extreme example of specialisation in a pin factory: it takes about 18 distinct tasks to create a pin. This specialisation allows the factory to be remarkably efficient: a relatively small factory with only 10 men employed (some of whom thus necessarily performed more than one task) was able to produce about 48.000 pins in a day, or 4.800 per person, as compared to the perhaps 20 pins that Smith estimates a single person going through the entire process by himself would be able to produce.

However, this efficiency comes at a cost: workers generally do not enjoy such narrow jobs. As such, two centuries after Smith's work, the concept of *job enlargement* surfaces (Mintzberg, 2023, p. 47).

2. Formalisation:

Organisations can formalise jobs to, ultimately, predict and control them. Again, jobs can be highly formalised or barely at all. Mintzberg compares his own job as the writer of a book to that of a worker that prints his book - whereas Mintzberg is limited more or less just by the rules of grammar that dictate as to what goes in the book, the printer must adhere to a specific set of instruction regarding the type and size of the paper, typeface, binding, etcetera. The more formalised a job is, the more rules are associated with performing it, and as such the less freedom in performing the job.

3. Training and Indoctrination:

The final element related to job design is concerned with training and indoctrination of workers. At one end of the spectrum, there are jobs that require little to no skill and training to perform:

these are your average fast-food jobs. All the way at the other end of the spectrum are jobs that require a lot of formal training and high degrees of skill - think of neurosurgery. In between are jobs that require *some* training, be it in an institution or on the job. The organisation must specify what skills and knowledge are needed for a specific job.

Similarly, they must determine what needs to happen for a new employee to assimilate into the company properly. This is called indoctrination, or, choosing a less loaded word (in this context, indoctrination of course does not refer to convincing a person or group of the superiority of a set of beliefs), *socialisation* (Mintzberg, 2023). This process is especially important in organisations that pride themselves on having a unique culture, where attention must be paid to making sure that new hires internalise the organisation's norms and values.

Now we arrive at what Mintzberg refers to as the Superstructure: this is the 'skeleton' that holds the different parts of the organisation together (2023, p. 49). It, too, contains three elements:

4. Unit Grouping:

Individual positions are grouped into units. Those units are then grouped into successively larger units in order to ultimately arrive at a hierarchy of authority (Mintzberg, 2023). Mintzberg identifies three main reasons for grouping:

- To encourage mutual adjustment: people that are grouped together (whether physically, administratively, or both) are encouraged to work together. They are more likely to share experience and knowledge.
- To enable direct supervision: it is easier for a manager to oversee a group of employees when they are grouped together compared to when they are spread loosely across the organisation.
- To attain a common result: an organisation might group together employees performing different functions to encourage cross-selling.

Although this might be beneficial *within* groups for the above reasons, Mintzberg warns that it can have an opposite effect *between* groups - less of all of the above. Units necessarily have barriers between them, and those barriers might prevent communication horizontally between units (or 'silos') or between different layers of hierarchy (also called 'slabs') in the organisation. To mitigate this, Mintzberg says organisations need not be seamless - to have no barriers between units, but for the connections to be tailored so that communication is possible when required or desired (more on this when discussing Lateral Linkages on p. 71).

That just leaves the question of how units should be grouped. There are several common bases for unit grouping listed below. Note that these categories can (and often do!) overlap. They are certainly not mutually exclusive.

- What: by the function of their work - purchasing, manufacturing, etc.
- How: by the nature of their work: in an orchestra, string instruments are sat together, as are brass, and percussion, and so on.
- Why: units can be grouped in order to achieve a common goal. For example, an electronics producer might have separate units for laptops, desktops, and printers.
- Where: by the physical location of their work. Multinationals can divide their operations by geographical region.
- For whom: by target audience/ consumer. Paediatricians treat children, geriatricians treat the elderly.
- When: by the timing of their work. Factories might operate on different shifts - day and night, or 3 8-hour shifts across a day.

Mintzberg (2023, p. 52) goes on to make some observations about grouping and its consequences. Some methods of grouping can be grouped: by means (what and how) and by ends (why and for whom). The former favours specialisation, so that they may learn from each other - but at the expense of coordination with other specialists - whereas the latter encourages coordination across groups at the expense of specialisation within it. Moreover, there is no perfect solution for grouping. It is and always will be a case of weighing advantages and disadvantages of each option against each other and selecting the one that best fits the needs of the organisation.

5. Unit Size

Mintzberg first identifies a problem with the typical nomenclature of this element - it is commonly called 'span of control', which implies that this element is solely related to control by a manager. However, as other forms of coordination come into play, it is not. Many jobs are controlled by some form of standardisation, which allows many workers to report to one manager (it is certainly not unheard of for 10 to 20 16-year-old supermarket employees to report to one shift lead - stocking shelves is fairly standardised and requires little need for mutual adjustment). When the need for mutual adjustment increases, the size of the unit must necessarily decrease to accommodate.

6. Untangling Decentralisation

The final element of designing the superstructure is the degree of centralisation. Again, organisations can find themselves at either end of a spectrum of centralisation, or somewhere

in between. Extreme centralisation occurs when all the power for decision-making rests with a single individual. Entirely opposite to that is a case where decision-making power is shared amongst all employees. In between these two extremes, decision-making power may be spread across the organisation either vertically (delegated) or horizontally (dispersed). That delegation or dispersion can then occur either partially or comprehensively - regarding a single (type of) decision only, or most/all decisions for a unit, respectively.

Now what is left is fleshing out the superstructure: to make sure the skeleton (superstructure) and cells (positions/ jobs) can work together. There are two elements:

7. Systems of Planning and Control

Action plans determine for the organisation its intended goals: what is to be produced, when, to which specifications. Performance controls then measure how successfully these targets have been met. Planning is done top-down: from somewhere (relatively) high in the hierarchy, targets, budgets, etcetera are assigned for implementation by people lower in the organisation. Performance controls are also *designed* higher up in the chain of command but executed from the bottom up.

8. Lateral Linkages

Grouping into units may present problems regarding communication between different units. However, that communication and cooperation can be very beneficial. To that end, an organisation must think about lateral linkages when creating a new configuration (or changing its current one). Lateral linkages are methods of encouraging mutual adjustment between slabs and silos. The simplest form is a *liaison position*, created to sit between two units and bridge the gap. More involved is the *integrating manager*, with more formal authority over resources and the ability to negotiate with involved units.

There are more ways to facilitate mutual adjustment - *meetings*, *standing committees*, *teams*, and *task forces*. Meetings can be impromptu or be scheduled as a one-time thing. When they occur regularly, and/or with pre-designated membership, they become standing committees. For the purposes of a specific project, a group of people may be brought together from across the organisation to complete it. This is a task force. After completion of the project, the task force disbands.

2.1.2.4 Regulation by Design

Regulation by design can occur as a result of choosing the aforementioned elements of design. Some configurations are more conducive to regulation by design than others. For example,

machine bureaucracies (or 'programmed machine', as it is known in Mintzberg (2023)) rely rather heavily on standardisation of both work and outputs, and as such employees have limited ability to deal with disturbances within the context of their workplace. Mintzberg (1983) also recognises that job specialisation leads to problems of communication and coordination - effectively saying that highly specialised jobs have lower regulatory potential. 'Job enrichment', a combination of vertical and horizontal job enlargement (basically, lowering functional concentration as well as specialisation), leads to workers having more decision-making power: "a group of workers may be given responsibility for the assembly of [...] a natural unit of work, including the power to decide how the work will be shared and carried out" (Mintzberg, 1983, p. 30).

Additionally, Mintzberg recognises that sometimes a project might require the creation of a project team - bringing together employees from across the organisation on a temporary basis. This is a change in the organisation's structure (albeit a temporary one), which can be seen as regulation by design - the incoming project cannot be completed by the existing structure and as such is a disturbance, which can be resolved by the creation of the temporary project team.

2.1.2.5 Hierarchy

The official hierarchy of authority is a result of unit grouping. First, individual positions are grouped into units. Then those units are grouped into larger ones, progressively going on until the organisation arrives at its full structure with associated hierarchy (Mintzberg, 2023). Each unit has its own manager. In this bottom-up process, the base for grouping units also influences hierarchy. Generally, more market-based units can be grouped under one manager than can be functional units. This hierarchy can lead to problems - as seen before, there might be barriers between slabs and silos. These potential problems should be taken into account when designing the structure but can also be mitigated through the use of lateral linkages.

Broadly speaking, Mintzberg considers much of the downsides related to certain hierarchical setups of some configurations to be an inherent downside to that configuration. The configurations must be seen as a whole and then the pros and cons weighed against each other and the organisation's needs. As such, there are no real guidelines to hierarchy, other than that it is a result of design parameter choices and as such part of any resulting configuration.

2.1.2.6 Relationship Between EV and Structural Parameters

To ensure survival, an organisation must possess an effective structure (Mintzberg, 1983). That effective structure is attained by ensuring that the configuration meets two criteria. One, it must be internally consistent. Two, the entire configuration must fit the organisation's environment. These are the two essential variables: if they are not met, the organisation does not have an effective structure and as such cannot ensure survival.

Seeing as the configuration is a direct result of choices made regarding design parameters, and the configuration is at the heart of the two essential variables, the relationship between the structural parameters and the essential variables is clear. The organisation's environment and needs inform design choices. Those design choices should then combine into one of Mintzberg's configurations. That configuration should then be a good fit to the environment. If the designer makes the right choices along the way, this should not be a problem. Note that there is no predetermined set of right choices - the 'right' choices are always dependent on the organisation's specific circumstances.

2.1.2.7 Design Principles

Mintzberg (2023, p. 3-4) writes that the single worst way of managing an organisation is to believe that there is one single best way of structuring it. We can view this as Mintzberg's first design principle: there is no single best structure that works across all types of organisations. This is in line with the extended configurational hypothesis that was discussed earlier - configuration depends on internal and external fit.

2.1.2.8 Precedence Rules

The order in which Mintzberg (2023) prescribes that the organisation be designed is clear:

> the knobs that can be turned to structure an organization. We start this description from the ground up, with the design of positions [...]. Next comes the design of the superstructure [...]. Finally, there is the fleshing out of the superstructure [...] to connect all these positions and units together. (p. 46)

This ordering makes sense, considering that the organisation should end up with a configuration that fits its circumstances. It should not (have to) change its needs and wants to fit a certain configuration. By designing the positions first, they fit the organisation's purpose. Having done so, those positions can then be grouped together. Only then does it make sense to design the way in which they are all coordinated.

2.1.3 Implementation

As extensively as Mintzberg deals with the elements of design and how they combine into different configurations, his work does not deal with the implementation of a new structure/configuration. In the context of Mintzberg's work that is not particularly strange, for two reasons. First, structures being self-inhibiting is not a concern outside of sociotechnical systems design. That means an organisation will not necessarily require an intervention to change, but can do so on its own and is expected to do so over time as conditions and goals change. That brings us neatly to the second reason - that organisations naturally morph from one configuration into another (or perhaps a hybrid form of some kind). Generally, organisations in simple environments tend to start out as the Simple Structure (Mintzberg, 1983) or Personal Enterprise (Mintzberg, 2023) [these are two different names for the same configuration]. Then, as they age and become larger, they transition to Machine Bureaucracies. Organisations in more complex environments tend to initially resemble Adhocracies, and some may desire more stability. If successful at escaping the complex environment, they take the shape of the Professional or Machine Bureaucracies.

Of course, these developments are not set in stone, but the idea is clear: changes in structure happen organically as a result of changing conditions, even if lagging behind the change in conditions that brings them about. Not only that, but Mintzberg (2023) argues that natural development of structures as opposed to strict design is what *should* happen. Designing it all in one go leaves little to no room for adaptation. Rather, it is best to begin tentatively and let experience take it from there.

Without delivering a judgement on the correctness of this argument versus De Sitter's strict design approach, it is clear that any designer wanting to follow Mintzberg's approach is left without any tools to actually implement his design, needing to find a suitable approach to implementation elsewhere.

2.2 Characteristics

2.2.1 Employee Involvement

At the basis of the employee involvement characteristic is the question "does the organisational design theory incorporate elements of employee involvement in any part of the process?". The answer for Mintzberg's work is as simple as it is brief: no.

In clear contrast to De Sitter's L-STSD, where employees are involved before the design process even begins, Mintzberg makes no mention of involving employees at any point in the process.

2.2.2 Infrastructure

Given that Mintzberg's configurational approach does not deal with implementation (as established in 5.1.3), it is not surprising that there is no mention of any kind of intervention infrastructure either. Operating under the assumption that Mintzberg's 'regular' design approach (there is a configuration that fits the intervention organisation, or perhaps a hybrid form) holds for a potential intervention organisation may prove difficult, but not impossible. Does the organisation need a separate intervention organisation? If so, what kind of organisation should it be?

Mintzberg's opinion that design should begin tentatively and then completed on experience suggests that a more flexible intervention organisation is desirable - one that is able with changing and emergent demands. Moreover, organisational design is a complex matter, which requires that the organisation be able to cope with complex problems. Of the configurations presented by Mintzberg (2023), flexibility rules out the 'programmed machine', problem-solving the 'professional assembly', and complexity of the problem the 'personal enterprise'.

Four remain: project pioneer, divisional form, community ship, and political arena. Of those, the 'project pioneer' and 'political arena' have things working in their favour in the context of structural configurations of intervention organisations. The project pioneer form is characterised by its ability to find innovative solutions to complex problems. However, it generally excels at creating *customised* solutions to open-ended problems. The political arena is characterised by its complete lack of structure: conflict dominates and overwhelms legitimate authority. It is this conflict that allows the political arena to overpower existing conditions that inhibit an organisation's ability to change. In this sense, it could kickstart change within the organisation, and as such, the political arena is often found in organisations transitioning from one configuration to another.

It warrants mentioning again that none of this is explicitly mentioned by Mintzberg - it is merely a line of reasoning based on Mintzberg's configurational approach.

2.2.3 Propositional Representation

1. Testability

Structuring in Sevens contains limited propositional representation. There are examples, mostly in Chapter 6 ("Design in Context") used to describe contingencies that drive design elements - see section 5.1.2.2 for some examples. These are strong examples of propositions - each contains a causal relationship between clearly defined parts, and most are also (relatively) easily testable.

2. Operational Definitions

Important terms and concepts are conveniently explained briefly in bold text throughout the book, with the accompanying text providing more (contextual) information and often an analogy or real-world example for further clarification. However, these descriptions are more narrative and generally don't serve as airtight operational definitions.

3. Description of Implementation

As discussed in 5.1.3, Mintzberg's theory does not contain any information on the process of implementation.

2.2.4 Narrative Representation

1. Vivid imagery and persuasiveness

Structuring in Sevens compares organisations to many day-to-day objects and phenomena. As early as page 9, organisations are compared to cows and later on, coordination mechanisms are explained using sports teams. These types of comparisons and analogies will be par for the course for all 21 chapters of the book, aimed at helping the reader understand organisational design concepts that may otherwise be somewhat abstract. The examples and analogies help negotiate the gap between general, conceptual descriptions of configurations and their constituent parts, and what that looks like in reality. This increases the theory's persuasiveness (Worren et al., 2002).

2. Ambiguity

When theories are strictly defined, they might rule out viable design options prematurely. Mintzberg's configurations are not strictly limited to organisations based on size, age, or other characteristics. Although generally speaking organisations follow relatively standard developments through the different configurations (see 5.1.3), this is certainly not set in stone. There are no guidelines as to how and when an organisation should adopt a new configuration.

Thus, Mintzberg's configurational approach is sufficiently ambiguous so as to allow the reader to apply it to their own organisation with some degree of freedom.

3. Plausibility

There is no continuous storyline to support Mintzberg's theory, but there are several returning analogies (similar to how De Sitter has the recurring example of Doorsnee Nederland BV). Sports teams are used several times throughout the book to explain how design concepts work in real-life settings that aren't a traditional workplace. To call this a storyline, though, would be a stretch and as such this is lacking in Mintzberg (2023).

2.2.5 Visual Representation

1. Appropriate symbolic and iconic representation of concepts and relationships:

Mintzberg frequently uses symbols and figures to display information about configurations, parts of organisations, and processes. In these representations of configurations, the size of components is not necessarily to scale, but does imply that larger parts play a larger role in the organisation. Mintzberg's figures are clear and easily readable, ensuring that they add to the text they accompany and do not lead to unnecessary confusion.

2. Simplification or aggregation of complex information into meaningful patterns:

Mintzberg uses diagrams to graphically display the sizes of parts of the organisation in certain configurations, and has developed 'logos' for each of them. This allows the reader to quickly get an overview of how large each of the parts is in relation to the others. Although this does not capture all characteristics of a configuration, it does provide a good approximation at a glance. Similarly, a diamond-shaped diagram is used to display the prevalent forces acting within certain forms (configurations).

Appendix 3: Puranam's Microstructural Approach

3.1 Necessary Requirements

3.1.1 Diagnosis

Puranam (2018) outlines no explicit process of diagnosis. An organisation's complexity and variety can be understood in terms of simpler elements that Puranam calls 'microstructures'. Thus, by looking at the microstructures we can analyse the organisation. However, inherent in diagnosis is the idea that something is currently wrong that can be identified so that it may be remedied through a new or revised organisational design. Lacking proper variables that can be too high or too low, analysing an existing structure by way of microstructural characteristics may yield a view of the current structure, but will not result in an immediate overview of areas requiring attention. That is to say, the characteristics of the structure itself are not inherently indicative of the existence of a problem.

3.1.2 Design

3.1.2.1 Essential Variables

With people at the heart of organisational design theories, it is inevitable that this brings with it enormous complexity (Puranam, 2018). Confronting this complexity cannot be avoided and requires an understanding of individuals' behaviour. This behaviour consists of three hierarchical elements: goals, representation, and choice process. These can be influenced by design choices (as will be discussed in 6.1.2.3) and as such, being key to understanding individual behaviour as well as being able to be controlled by design choices, are three essential variables. Understanding and measuring this behaviour is important, as an organisation per Puranam's definition (2018, p. 4) are a system consisting of multiple individuals, within identifiable boundaries, with system-level goals, towards which the constituent agents' efforts contribute. Although the concepts of goals, representation and choice process aren't easily operationalised in order to be measured, the organisation can strive to influence them in such a way that it leads to desired behaviour by the individuals within the organisation.

The importance of influencing these three elements becomes clear when we make their relevance to organisations more explicit. Individual goals can contradict or align with organisational goals. It is, of course, in the organisation's best interest when its goals align with those of its members. To that end, a designer can employ three tools, so that individuals' goals

can align with the organisation's and their efforts may contribute to both personal as well as system-level goals.

3.1.2.2 Adaptivity

Two sub-processes are critical to understanding effective organisational adaptation: task division and task allocation. These must both occur whenever an organisation's task environment or goals change (Puranam, 2018). These are both aspects of design and as such fall under the first role of authority. Even in situations where authority plays no part in actually solving the problems, it may be critical in selecting a solution from multiple options. By selecting the right individuals to wield this decision-making and enforcing power, the organisation can help ensure that these solutions are determined and implemented swiftly and properly. As such, the hierarchical structure of the organisation and the rights and responsibilities assigned to different individuals in that hierarchy are important for adaptivity.

Control loss (the amount of subordinates increases at an increasing rate the further up a hierarchy you go, leading to less and less control) and information loss (due to information needing to be passed up the hierarchy through nodes) can also, perhaps counterintuitively, increase adaptivity. Puranam (2018) argues that some degree of control loss can be beneficial, as it can lead to adaptive outcomes by 'serving as a valuable source of bottom-up exploration for better strategies' (2018, p. 121), as can designed information loss act as a screening system to ensure better quality information reaches the top of the hierarchy, thereby increasing the quality of decisions.

3.1.2.3 Structural Parameters That Influence EV

Puranam outlines three 'levers' that designers have at their disposal to influence individual behaviour. These levers influence the three hierarchically linked parts of behaviour mentioned previously (Puranam, 2018). They are 'sorting', 'framing', and 'structuring'. Sorting hinges on differences inherent in individuals. By sorting them in such a way that they have the correct kinds of goals (i.e. desirable forms of preferences and intrinsic motivation), the possible diversity of goals is significantly reduced, thereby reducing the complexity of dealing with that diversity. That in turn means that division of labour and integration of effort becomes easier - there is less complexity to account for.

Frames can trigger particular goals and representations. They are a set of contextual cues that determine which set of goals and representations are triggered for an individual. Since the frame influences an individual's goals, design choices that help trigger a desirable frame can be beneficial to an organisation. Consider goal contagion: a process through which the goal

frame others appear to be operating under influences one's own goal frame. Promoting common goals and rewarding actions that contribute to the common goal can help trigger the right frame. Leaders have a critical role, since goal contagion is far more likely to occur from superiors to peers than vice versa, or from peers to peers.

The decomposition of complex organisations into smaller sub-organisations is a key part of organisational structuring (Puranam, 2018). Through this division into sub-organisations, the designer influences the reference groups that are the focus of other-directed behaviours. This happens in a number of ways, in particular through group identity and inequity aversion. For example, when faced with public division into in- and out-groups, members automatically favour the in-group and feel more identified with it. This sense of identity can help trigger behaviours that further the common goals of the in-group (which should be designed such that they in turn further the goals of the organisation), instead of furthering individual goals that might not align with system-level objectives. Further, the design and allocation of tasks and rewards can also influence motivation.

The nature of an organisation's hierarchy also influences the goals, representations, and choice processes of the individuals within it. Consider for example the role leaders play in goal contagion, as discussed above. Similarly, the hierarchy also influences a sense of identity and belonging to groups. All of this is determined by the design of the hierarchy, which can be described in terms of three key concepts: span, rank, and layers, which all have their own effects on the abovementioned parts of behaviour. Span refers to the amount of nodes that are direct subordinates of a specific other node. Lower span leads to a more vertical hierarchy as the amount of people in the organisation increases, whereas higher span results in a flatter hierarchy. This of course influences the power dynamics within the organisation, in particular through the delegation of authority. Ranks within the hierarchy describe how close a particular part of the hierarchy is to the apex node (the very top of the hierarchy). Within a layer, members of the organisation are in equivalence classes of equal rank. Others in that layer are their peers (at least as far as the hierarchy is concerned).

With respect to job design - or more accurately, choices made during task division that have implications for job design - the microstructural approach distinguishes between object- and activity-based division of labour. It appears that employees prefer object-based divisions based on skill variety and the extent to which their work produces a recognisable piece of the final product, both of which increase intrinsic motivation. As such, the choice for object- or activity-based divisions influences goals, representations, and choice processes, and carries implications for other parts of the organisational design - namely the hierarchy and the

provision of rewards.

3.1.2.4 Regulation by Design

By designing the organisation in such a way that it promotes behaviour congruent with system-level goals, the designer can avoid disturbances in the shape of contrary goals. Similarly, when the organisation's structure promotes goal contagion, the ability to deal with the disturbance in the form of member goals that are not aligned with, or even contrary to system-level goals is designed into the organisation. However, goal contagion does not necessarily allow the organisation to deal with outside disturbances. Authority within the organisation plays an important role here: aside from the authority to design, there exists the authority to *direct* and to *resolve disputes*. The latter two are useful when problems arise with regards to motivation and coordination, and when exceptions occur due to imperfections in the solutions to the fundamental problems of organising (Puranam, 2018).

This implies two things: one, that employees are expected to be able to effectively coordinate their efforts unless exceptions occur; and two, that when exceptions do occur, the task of regulating is in the hands of the superior. The authority to design may rest with a superior that chooses to delegate that authority to a person lower in the hierarchy. As such, someone close to the disturbance may possess some degree of authority to change (part of) the structure to deal with the disturbance. Other than that, there is little in the way of regulation by design in the microstructural approach.

3.1.2.5 Hierarchy

Puranam distinguishes two types of hierarchies: a hierarchy of authority and a hierarchy of tasks. I first discuss the hierarchy of authority: a set of objects grouped into subsets, where the relationships between subsets as well as the relationship of objects within a subset must adhere to certain restrictions. *Within* a subset, relationships must be symmetric and transitive. This subset is called an equivalence class. Relationships between objects of differing equivalence classes must also be transitive, but *a*symmetric. Further, there are three properties of hierarchies that are useful in describing them:

- The *span* of a node: the number of nodes that receive a directed link from that node
- The *rank* of a node is the shortest distance up the hierarchy to the apex node (one that has no parent node(s))
- *Layers* are sets of equivalence classes whose members have equal ranks.

Describing a hypothesis that 'does seem to capture key aspects of the spirit of the process' (Puranam, 2018, p. 115), the hierarchy of authority tends to develop according to somewhat common patterns, starting from a single entrepreneur (remember that this is not yet an organisation according to Puranam's definitions [2018, p.4]) leading to a hierarchy with increasing amounts of layers (Puranam, 2018, p. 111-2). First occurs the so-called separation point, where task and authority hierarchies diverge due to either scale or skill constraints - the entrepreneur either cannot produce sufficient quantities by themselves, or they do not possess the specialised skills required to produce their product. This is called a separated hierarchy.

At this point, the hierarchy consists of two layers: a production layer with at least one subordinate, and an integration layer that contains one supervisor. This is called a segment, a microstructure of one supervisor and several subordinates. Further down the road, the organisation encounters a *span of control* problem, at which point the until now solitary supervisor is no longer able to effectively supervise their subordinates. Now, more managers are required to supervise the production layer. With the addition of more managers, the hierarchy consists of multiple segments. The hierarchy of authority thus grows bottom-up: when control is no longer possible, a new layer is added above the layer that can no longer be controlled effectively.

The very existence of a hierarchy also brings with it the possibility for information loss and control loss. As information passes up the hierarchy some of it is virtually guaranteed to get lost. Thus, having more layers in the hierarchy makes it harder for all layers to hold the same information. At the same time this can lead to control loss. When information loss occurs, it is harder for lower layers to understand what the upper layers expect of them. Similarly, it is harder for those higher layers to properly observe or process what the lower layers are communicating to them. This lack of overview may be compensated for by moving decision-making power closer to where the information is, leading to control loss.

In the event that the separation point does not arise, we speak of a nonseparated hierarchy - the task and authority hierarchies coincide. The task hierarchy expands top-down: large tasks are broken down into smaller sub-tasks. Here, the potential span is the maximum amount of subtasks a task can be broken down into. The optimal number of subtasks is determined by the tradeoff between gains from specialisation (smaller subtasks), and the increased cost of managing interdependencies between tasks that is associated with a higher number of subtasks.

3.1.2.6 Relationship Between EV and Structural Parameters

The relationship between the aforementioned structural parameters, or 'levers', is made clear in chapter 2 of Puranam (2018). Table 7 displays how the three levers influence the three aspects of individual behaviour.

Sorting exploits inherent differences between individuals, by either selecting based on similarity or differences depending on which is beneficial for the organisation. Framing helps trigger desired goals and choices, and provides a common (set of) representations for members to align their behaviour. Structuring helps manage motivation, both intrinsic through the creation of environments that promote it, as well as extrinsic motivation (rewards) when intrinsic motivation is not sufficient or not present.

Table 7

Influence of each of the three mechanisms (levers) on goals, representations and choice process.

Mechanism - -> Influence on:	Sorting	Framing	Structuring
Goals	Selection into the organization to exploit variation or similarity in goals	Evoking desired goal frames; changing goals to change representations	Manage pro-social and intrinsic motivation through grouping and task design
Representations	Selection into the organization to exploit variation or similarity in representations	Providing common representations	Specify constraints, objectives and decision premises; feedback shapes learning process
Choice process	Selection into the organization to exploit variation or similarity in exploratory tendencies	Changing representations to trigger variation in choices	Incentives and accountability influence exploration in choice

Note: taken from Puranam (2018, p. 36)

3.1.2.7 Design Principles

Although certainly not as explicitly listed as De Sitter, the microstructural approach does contain some (implicit) design principles.

1. Division of Labour and Integration of Effort should be treated as interrelated problems that cannot be solved independently of one another.

   These two universal problems of organising are inherently linked to one another. The integration of effort must necessarily take into account the specific division of labour, and conversely, even the most optimal division of labour will not function without properly designed mechanisms of integration.

2. "An organization design is a set of *specific* [emphasis added] solutions to these universal problems of organizing" (Puranam, 2018, p. 12).

Puranam, like Mintzberg and De Sitter, argues that there is no universal solution to the problem of organisation design. The fundamental problems of organising (task division and allocation, provision of rewards and information) are universal, their solutions are not (Puranam, 2018, p. 9). As such, each organisation must find the set of solutions that works best for its specific situation. An example is clearly present in Steinberger & Jung (2019), who analyse two restaurants that go about dealing with the same challenges in very different ways.

3.1.2.8 Precedence Rules

Puranam does not prescribe an order of precedence for the design of an organisation. In fact, 'no sequencing is presumed here; solutions to the division of labour may take into account the existence of solutions to the problem of integrating effort.' (Puranam, 2018, p. 9). The two fundamental problems of organising are assumed to be intertwined. The design of actual parts of the organisation is therefore not subject to a predetermined order. However, the *re*design of an organisation from start to finish can be seen in terms of multiple stages (Puranam, 2018). They are the following:

1. Careful observation of phenomena
2. Behavioural lab/ agent-based model
3. Adjust design
4. Randomised field experiment
5. Scale up and implement

This is reminiscent of the DDIE-cycle, with step 1 roughly equivalent to Diagnosis, steps 2 through 4 under Design, and step 5 finally being the Implementation phase (although of course one could argue that Step 4 is a form of implementation).

Furthermore - while division of labour and integration of effort may occur in any order or even simultaneously - we know that per Puranam (2018) the development of task hierarchies occurs top-down, and that the development of hierarchies of authority occurs bottom-up.

3.1.3 Implementation

The microstructural approach is a tool to analyse organisations using the fundamental problems of organising and the 'building blocks' that are microstructures. It does not offer any insights with regards to the implementation of new designs.

3.2 Characteristics

3.2.1 Employee Involvement

Puranam's work makes no mention of employee involvement in the design process. It consistently refers to 'the designer', or 'organizational designers'. This implies that, when 'designers' is not referring to the profession of organisational design as a whole, the design process rests on a single person, or a select group of people at best.

If we were to take a slightly broader view of employee involvement, the microstructural approach does make use of employees to some degree in the organisational (re)design process. Key steps in the design cycle involve experimentation with the new design, from a model/ lab experiment to a field experiment (Puranam, 2018). In the field experiment, potential new designs are tested in the context of the organisation they are to be implemented in. Although in this case employees are not directly involved in the design process, it does allow the designer to see how employees deal with the new design.

To consider this true involvement, however, would be a stretch. After all, employees have no direct input in the design process or the features of the new design.

3.2.2 Infrastructure

3.2.2.1 Intervention Structure

Although the microstructural approach does not deal with the intervention process at all, it stands to reason that an intervention organisation designed using this microstructural perspective is subject to the same fundamental problems of organising. Whereas Mintzberg's configurations allowed for continuing his reasoning with some specificity (although admittedly still speculative), and L-STSD acknowledges the potential need for a temporary project structure that would reasonably be designed according to L-STSD principles, Puranam's microstructures contain no indication of what an ideal intervention structure might look like (or indeed if one might even exist or be required for implementation purposes).

3.2.3 Propositional Representation

1. Testability

The following quote is a good example of a testable proposition: "Once the costs of coordination exceed the gains from specialization, we have reached the limit of productivity gains from the growth of the task hierarchy via task decomposition." (Puranam, 2018, p. 117). In order to be properly testable, a proposition must be sufficiently explicit and contain a causal relationship. The proposition outlines a specific cut-off point for when the limit of productivity gains is reached: at the exact moment that costs of coordination exceed gains from specialisation. Therein also lies the causal relationship: exceeding the gains from specialisation causes growth of the task hierarchy through decomposition to be counterproductive.

2. Operational Definitions

Puranam (2018) ensures that concepts are not vague, often providing detailed definitions and sometimes even justifications of choosing a certain definition when other valid definitions are available. An example is the better part of Chapter 1, where they devote a large table to different definitions of 'organisation' that are present in the literature. Puranam (2018, p. 8-9) then goes on to further substantiate the choice for the specific, broader definition as used in this book. Frequently-used terminology is then presented alongside their respective definitions.

Although the concept of organisations is by far the most elaborately explained term in the book, other concepts receive definitions as required and are generally explained well, so that there exists little ambiguity in their meanings.

3. Description of Implementation

As perhaps to be expected given the findings in the Implementation section of the necessary requirements, Puranam (2018) contains little to no information regarding the actual implementation of any of the microstructural concepts in the book.

3.2.4 Narrative Representation

Generally speaking, Puranam (2018) contains very few narrative elements as described in Worren et al. (2002). I briefly discuss each of the elements below, as there are some examples.

1. Vivid imagery and persuasiveness

Bar a few examples in support of relationships explained in the text, there is little in the way of storytelling. The relatively few examples that are also quite shallow in terms of storytelling results in a mostly technical description of relationships between concepts and how they are structured. That is not necessarily good or bad in and of itself, but it caters to a different

audience than an approach that includes examples and backgrounds that are relatable and rooted in reality.

One example of a passage resembling a narrative is Ann and Bob's flag game as presented in the context of organisational learning (Puranam, 2018, p. 87-89). Although the example does serve a purpose in explaining the challenges of coupled learning, it is hardly a story that serves to inspire the reader.

2. Ambiguity

Given the lack of narrative/storytelling elements, ambiguity is hardly applicable. Given that its goal is to allow the reader to relate the narrative to their specific situation, when a text is not written with a narrative purpose in mind, ambiguity is counterproductive. As such, it is for the better that Puranam (2018) is lacking in ambiguity.

When storytelling *is* involved, it is in the shape of relatively abstract examples that result in difficulty translating it to an organisational context for the reader (for example, Ann and Bob's flag game as found on pages 87 through 89). As such, when ambiguity could have been of value to the reader, it is not present either.

3. Plausibility

An author cannot connect pieces of narrative that aren't present, and even the Ann and Bob examples do little in the way of world-building other than that their two names are consistent throughout the book.

3.2.5 Visual Representation

1. Appropriate symbolic and iconic representation of concepts and relationships:

Figure 5 depicted below shows the kind of visual representation of concepts that is fairly commonly found in Puranam (2018). It is relatively simple, yet also conveys several important concepts and relationships. A circle is a node in the hierarchy that is connected to other nodes through directed links to other nodes. The arrow shows the direction of the link. Each diamond shape represents an equivalence class, within which the nodes are of equal rank. Diamonds higher up in the hierarchy are coloured in lighter shades of grey.

As such, this relatively simple graph actually depicts quite a lot of information pertaining to hierarchies. Some of the characteristics could even reasonably be deduced without knowing any of the underlying theory about hierarchies.

2. Simplification or aggregation of complex information into meaningful patterns:

As already briefly described above, Puranam's uses visual aids sparingly but those that do appear are generally simple yet informative. They complement the textual explanations well

and help the reader visualise hierarchical structures and relationships. The same symbolic and iconic representation as found in figure 5 summarises hierarchical relationships by showing transitivity (asymmetrical, directed links mean that Layer K=2's authority over Layer 1 automatically means hierarchical authority over Layer 0), ranks, and layers. Granted, not all of that is immediately clear from the graph, but given the relevant information as found in the text - Puranam chapter 6 (2018, p. 106-27), it does accurately summarise it for the informed reader.

Figure 5

Three-layer hierarchy with 8 nodes and their hierarchical relationships as depicted in Puranam (2018, p. 108)