

The Firm as an Emergent Phenomenon

An Exploration

PhD Thesis Dirk P Bruin VUB /CLEA February 2022

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Figures of Game of Life Dennett 1992

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Synopsis

Introduction

Part One

The traditional view we oppose

Part Two

Memes of the firm

Part Three

Individual Behavior to Behavioral Identity

Part Four

Emergence and Demise of Autopoiesis

Part Five

The Firm as an Emergent Phenomenon

Evaluation and Bottom-Line

Acknowledgements

A PhD research project is a training more than a course, aiming for the student to acquire a second nature for independent thought, considering ideas uninhibited, open to the existence of alternatives. Having earned the title, the latter is assumed capable of undertaking independent scientific research. To achieve scientific skill in combination with the mental state requires that one is left to one's own devices, reflected in these sentences: 'There was a weight on her wings that I could feel, bearing her down. She could not lift the weight. Tom must have felt it, but he never moved. When you can see the branches of trees from a cockpit, and the shape of rocks no bigger than your hands, .. You are so close that thought is a slow process, useless to you now - even if you can think.

The sound of our propeller got trapped between a wall of rock and the plane before Tom straightened in his seat and took the controls. He banked sharply, dusting the trees and rock with blue exhaust. He put the nose of the Gipsy down and swung her deep into the valley while her shadow rode close on the hill. .. It was all so simple.' (Markham, 1942, West with the Night). Only 'walking the walk' as the business adage goes, left to one's own devices, organizing one's own trouble and getting out of them with as little assistance as possible, can one obtain the independent approach of a scientist.

The gist of this thesis is that a firm is a meme distributed over people's minds on behalf of which they act. When they encounter another person involved with the firm memes are 'weeded' or reinforced and their behavior is accordingly. From the behavior of the individual members of the firm's population emerges the behavior of the firm up to the point that the latter become autonomous and cognitive.

Inspired by Feynmann's quote: 'What I cannot create I do not understand', I set out to develop a model of the firm to all but create it. Precisely, I pursue to represent the mechanisms and memes pertaining to the latter, thereby enabling recognition by an observer of the generated behavior of all involved (the actors) as a firm.

As a beginning scientist I entertain the wish to glimpse eternity: I prefer what strengthens over what weakens through use. On the other hand, the doubt motivating this project is moral, inquiring into the relation between people and firms. Qualification fickle and variant apply to morality, but not to the nature of my research subject, because I pursue the

development of a durable instrument. Awareness of the nature of the firm, might better equip people for their dealings with firms in the long run.

I wish to profoundly thank my supervisors, Professor Francis Heylighen, Doctor Marta Lenartowicz, and Doctor Tomás Veloz González for creating exactly those circumstances. I have been allowed the luxury of making many mistakes, and to get myself in and out of trouble, their assistance my last resort, profound and parsimonious. I cannot truthfully say I have enjoyed every minute of it, but most of them, and I feel thoroughly trained as an independent scientist.

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Introduction

Some of the great issues of this era are climate change, systemic financial risk, socioeconomic disparity, privacy and ensuing control issues, and, urgently at this time, the effects of the Corona pandemic on the globalized economy. The backdrop to engage with the firm as a subject matter is a concern about the shelf life of the way humanity currently operates, inflicting damage and bringing uncertainty to humanity.

It isn't all bad however: important demographic parameters such as mortality, especially child mortality, the average number of children per woman, and gross income per capita have continued to improve over the past decades. However the case may be, firms seem to play large roles in the latter developments, both advantageous and disadvantageous.

It is easy to verify that firms play an important part in people's lives: Who can honestly say she has performed any conscious action without the involvement of a firm at all? Anywhere? Ever? I guess an affirmative answer to these questions is rare, because firms are ubiquitous and affect human activity to a large extent. They are powerful, fulfilling an important role in society and in practical terms their influence is unavoidable - for better or for worse.

Reciprocally, firms are considered to be useful, because worldwide many individuals depend on them in some important way. They create your job, for example, generate a return on your investment, and serve as a platform for generating and collecting taxes. You buy your branded products or services from them at ever better quality and lower prices. Firms are seen as a pivot in the economic system originally called capitalism, but of late often referred to as 'the market system' (Galbraith, 2004).

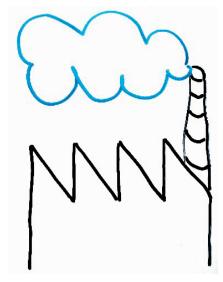


Figure 1: What everybody knows a firm looks like

Everybody 'knows' that the firm looks 'kind of like this', see Figure 1, a physical manifestation of progress, industrialization at large scales and commercialization, in continual pursuit of meeting the customer's needs, and the requirements of all concerned. They are suspected to be professionally organized, but up close they may turn out to be clunky and inefficient machines, although apparently continually perfecting themselves through myriad projects.

And indeed, when a customer orders, say, a bread, she purchases the product of a highly industrialized process trained for efficiency, not customized to personal needs. The employee abides by company practices, enjoying some elbow room in her practical job, but not fully determining her actions. The investor gets a return and she is said to have influence on companies' decisions but her ideas may not be reflected in the corporate strategy.

The assumption is widespread that agency resides in the individual person and not in the firm. The former is considered to be autonomous, namely unaffected by external influence, and the firm is seen as malleable, implying that all involved, for instance customers, employees, investors, suppliers and governments, get from the latter what they require.

But firms are resistant to perturbations perceived as not conducive to their particular interests, inert and their behavior is not easily changed. Even though possibly originating from the people associated with them, the consequences of such perturbations are not necessarily acceptable by the firm. What is considered important by the individual is not automatically also considered important by the firm. Thus, I suggest that the firm is not an instrument in the hands of the associated individuals.

In fact the latter may be at people's expense, just because the influence of firms reduces their autonomy (cf. Dennett, 2004):

'Yes it's over: profit won the game, but like an infection, killed its host. We were the host. Quality died out because we relinquished the right to filter our own choices; profit became the filter of all choice. Truth died out because we no longer filter true experience; media profit became the filter. .. So adieu!' (DBC Pierre, Lights out in Wonderland, footnote p. 5).

The assumption that firms are instruments of autonomous people implies that the latter experience no external influence from firms, but influence in the opposite direction does occur. I doubt that this perspective is true to reality and I propose a second perspective, whereby people are not in charge and firms are not their instruments.

The latter inference would be countered, however, with the argument that people and no one else establish firms. People are the single cause (and reason) of the firm's existence and they must therefore naturally and autonomously be in control of the firm. Unless of course they relinquish the latter after the firm was established. And in the same vein that the end of a firm removes the influence of the firm on the people associated with it, restoring their control desired or not

Thus, prior to founding a firm the person is without external influence and autonomous. Once established, the firm becomes an identity in itself, capable of influencing people and separate from the founding entrepreneurs. The firm can lose its autonomy again when it ends as such and the person regains autonomy and is once again in full control. I suggest that passing through these stages, the relation between person and firm can be characterized by their mutual autonomy.

Addressing the second perspective must therefore at least involve the stage of development of a firm in relation to autonomy, precisely at the point of establishment and ending of the latter, where there appears to be a change in the autonomy. To illustrate this notion of development, imagine this start-up situation:

- 1. 3 guys with no money think about creating an app. Are they a firm?
- 2. The same 3 guys the day after, still no money, invite 2 more and start working on a prototype of the app. Are they a firm?
- 3. Few days after they have a prototype of the app and a few people tried it and their friends (say 30 pax) are excited about it, they still have no money and no visibility. Are they a firm?
- 4. A few months later they become legally existing, start paying taxes, get a small grant and some publicity. Are they a firm?
- 5. Few months after they get nice contracts and everyone in the country knows about it.

 Are they now a firm?

The latter raises the question how the autonomy of the firm develops as a function of the development of the firm, reflected in a reversal of the notion 'people having firms' to 'firms having people' (Weeks and Galunic, 2003). The latter reflects the origin of my doubt, namely the truth of the traditional instrumental view of the firm, motivating me to engage with this subject matter, starting the present research project, more so because it affects the lives of many people in myriad ways.

This thesis reports on my contribution to knowledge in regards to such a second perspective, namely that firms to an extent 'have' us. The topic of autonomy in relation to the stages of

development of firms is not addressed in any single scientific area and consequently I take a multidisciplinary approach starting from the vantage point of systems science.

The method of this study is to present support for - and against - a proposition which answers the research question: What is the nature of the firm in terms of its autonomy and its (stages of) development? or simply put: What is a firm? The skeleton of the study is the abduction of an hypothesis from the initial proposition exploring systems literature for arguments supporting or negating its validity, to perform a thought experiment, and to present evidence mainly from business science. This abductive procedure leads to an integrated conceptual framework with a focus on explaining the nature of the firm.

I propose that a firm is a unitary pattern of behavior, generated by the recurring observable coherent human behavior motivated by ideas. I assume that the particular ideas motivating the unitary behavioral pattern of the firm originate from the market system. From these notions and ideas I develop a toy model of the firm and I scrutinize the latter for its validity to explain practical business situations making use of a thought experiment.

The product of the study is a conceptual framework consisting of a body of arguments from systems science, evidence from business science, and a discussion of the experiment, to serve as a foundation for a theory of the firm. The main contribution is first a groundwork for the future development of a theory considering the aspect of autonomy of firms in relation to the autonomy of people in the various stages of their existence. Lesser products are a novel interpretation of the concept of a meme and a novel suggestion for the way memes cohere into complexes.

This study offers a second perspective on the nature of the firm, starting from a critique of widely held traditional views on the firm and the relation between firms and people. It is well positioned within the current body of firm theory to which it is complementary.

The thesis is divided into six parts: in Part One I specify and critique my doubt concerning the traditional view on the nature of the firm. From the latter critique the research question is derived. I introduce the use of a thought experiment, and the case of Jansen Bakery starting with the traditional view. The state of the art of systems science is presented from which stem the lion's share of the constituent arguments and theories. I move on to propose abduction as a method for the development of the theoretical framework and a proposition for the nature of the firm as a basis for the development of the framework through abduction. I introduce process ontology and the corresponding epistemology to cater for the processual nature of the firm as it develops and object ontology for firms as observable patterns. I continue to suggest a processual understanding of systems in general, and specifically of

autopoietic systems. Last, I argue that the nature of this research is multidisciplinary and the consequences for the present research project.

<u>Part Two</u> focuses on the underlying concepts and notions enabling a shift of agency from the person to the firm. Continuing from the tenets of the process ontology previously introduced, I suggest that the basis for the coherent behavior of people can be constituted by the notions of ideas and memes depicted in the processual (not Platonian) framework of Deleuze, suggesting a relation between the latter, and a model for the internal structure of memes. I move on to introduce an analytic procedure for the derivation of memes from the global body of culture known as the market system. Last I apply the previously developed notions of ideas and memes to the derived memes from the market system, and I present them as the memes of the firm.

I shift the focus in <u>Part Three</u> from the scale of individual memes and their internal structures to the scale of the multitude of memes proper, and their structure. Inspired by the theory of explanatory coherence, I suggest that theories can be substituted by ideas, and thereby that the latter caters for the coherence between memes to form memeplexes and I illustrate its application with examples concerning the firm. Having established their conceptual relations, I suggest an explanation for the becoming of a complex of memes, its morphogenesis, and its development into the firm's memeplex. I move on to suggest enactment as a cognitive operation by which interaction between people and memes takes place, depicted in the processual ontology discussed earlier. The relation between people and memes is defined making use of the notion of the population included by a memeplex.

In <u>Part Four</u> I show the principal properties of autopoietic systems applied to the firm, suggesting a literal application to social systems. I demonstrate through a discussion of the Game of Life how emergence implies the shift of ontology to a different focus of our observation. I continue to demonstrate how the organization can become autopoietic, thereby shifting the autonomy and the cognition of the emerging system. This brings us in a position to examine how a behavioral identity of an autopoietic system serves as an invariant both in terms of its proper autopoiesis and of 'its' observation. Suggesting an enactive approach to cognition, I add to operational closure the design condition of precariousness in order to characterize the nature of the firm. I specify the cognitive operations of the firm as transactions, namely the making and erasing of differences. I show how the firm's repertoire can increase, to a limited and an unlimited extent respectively. Last, I present evidence for the relation between the loss of autonomy of firms and their 'death', and evidence against the hypothesis that the rationale for corporate transactions is shareholder value. The latter paves a path for alternative explanations for this phenomenon.

In <u>Part Five</u> I represent the firm as a behavioral entity operating through the *enactment* of memes by members of its population under the conditions of operational closure and precariousness. The memes derived in Part Two are integrated into the framework so as to form a coherent memeplex. The proposed model shows how these memes, depicted in the conceptual framework, lead to a toy model of the firm as it comes to be, as it is, and as it ends

In the <u>Part Conclusions and Bottom Line</u>, I draw conclusions regarding validity and implications of the product and I make recommendations for further research. I assail an extension of this work towards the development of a theory of the firm as an emergent phenomenon and of various theoretical aspects. The contribution of this study is an account of widespread moral beliefs catering for coherent behavior of a human population such that the emerging behavioral unity classifies as a firm. Thus, I suggest that the firm as a behavioral phenomenon is constituted by the behavior induced by the enactment of memes originating from the market system. The mentioned behavior is recognized as a behavioral entity of the class of firms, without a description by the memes associated with it. I hope that the present study eventually contributes to the better understanding of the ways whereby change might be brought about in firms. Last, I would like to draw the attention of the reader to the Table of Concepts, which as a whole identifies the conceptual framework.

The envisaged audience of my thesis consists of scientists from various backgrounds, including business economists and firm theorists, management and organizational scientists, systems scientists in general and in particular from theoretical ecology, sociologists, and hopefully the odd anthropologist and psychologist. I sincerely hope that the foundations I suggest enable and catalyze interdisciplinary discussions about the concept of firms and their development, their role in society, and their relations to individual persons.

Part One -

Study of a Second Perspective on the Nature of the Firm

I set out to critique the traditional view that firms are heteronomous, presenting elements of a second perspective. I introduce the use of a thought experiment and continue to apply the latter to the traditional view. Next, from the questions arising from the latter, I define the scope of the research, formulate the research question, and establish the state of the art. I move on to introduce abduction as the methodology applied in the study, as well as a proposition avoiding the critiques to the traditional view serving as the point of departure. I next present conditions for the development and the outcomes concerning its processual nature, the understanding of self-referencing (autopoietic) systems and their applicability to social systems, and highlight the need for an integrative and applied approach originating from the multidisciplinary nature of the topic. Part One debouches into a summary of the suggested methodology and conditions and a list of the main concepts first introduced.

Chapter 1

The Traditional View that a Firm is not Autonomous

The sociological debate in regards to human organization can be represented along the dimensions subjective-objective and regulation - radical change. The latter positions social theories on regulation and stability versus a focus on radical change of the social individual in a social situation by their focus. The former positions it by its structural (objective) nature, namely rational and well-informed human behavior and the viability of empirical testing of corresponding sociological theories on the one hand. And on the other hand an individualistic (subjective) nature, explaining stabilities in human behavior from the individual's perspective combined with a spiritual view on the world. From the combination of dimensions result four quadrants, each corresponding with a sociological paradigm (e.g. Burrell and Morgan, 1979).

The functional paradigm is dominant for the reasoning about human organization, seeking to provide rational explanations of human behavior from a positivist and pragmatic tradition. The nature of the individual is rational, can be well informed, and is assumed to have the agency to take action. Relationships between people are concrete and they can be researched through scientific effort. Most studies of organizations depart from this paradigm, and I refer to it as the traditional view.

Our concern in the remainder of this chapter is to bring two important aspects of the functional paradigm to the light, first concerning the thought that the individual can be a rational well informed agent acting such that the behavior of the firm changes through directed behavior. A lack of external influence exerted on one agent by another is understood as autonomy of the former. In the functional paradigm the individual is assumed autonomous, namely acting without external influence of the firm, and the firm is heteronomous, namely acting based on the external influence of the individual. Next, the thought that the relation between the behavior of an individual and a firm can be empirically verified, or in other words that they are reducible to one another, is rejected. The three remaining paradigms are discussed in the following chapter where an alternative is formulated.

Organizational Redux

Considering the firm a singular object, then a perfect version of the latter is also imaginable (Mintzberg, 1983). This version is the ideal of the one presently in our focus, and a difference from the ideal is considered a deviation in some respect.

Taking the position that people are in charge of the firm, and the latter is a malleable instrument, then its ideal version can be attained by people's directed actions, raising the question how this change towards the ideal can be brought about. In other words: which sequence of human actions brings about the change in the behavior of the firm eliminating the noticed difference with the ideal in a chosen aspect?

The latter implicitly assumes that the effect of individual actions on the behavior of the entire firm can be known and planned in order to achieve its ideal. The latter yields the question of what enables us to predict the behavior of the entire firm. Reductionism suggests that a greater level of detail of the supposed atoms of any system, connected with people in our case, leads to greater predictability of the behavior of the whole.

Depicting the latter in the conceptual framework of complex systems made up of component elements interacting between them, and with external elements (Von Foerster, 1961; Ashby 1962; Von Bertalanffy, 1968), first, complex systems theory suggests that knowledge of the behavior at the scale of the components of such a system do not necessarily lead to knowledge of the behavior at the scale of the entire system, and conversely that knowledge of a system's behavior does not unveil that of the *components* (Wolfram, 2002; Strogatz, 2004). The case in point is that reduction to smaller scales does not lead to a better understanding of the behavior of the firm, nor does greater knowledge of the macro-behavior of the firm lead to a better understanding of the micro-behavior of the people involved (Schelling, 1978).

Next, when the environment of the system is dynamic, as in the case of the firm, given that interaction between system and environment takes place continually, its conditions change in myriad unforeseen ways. Thus, in this perspective the system generates behavior which is unpredictable and contingent on the behavior of its environment.

Limited Influence of a Person on a Firm

Performance defined as 'How well you do something' (Oxford-English Dictionary Online 2020) implies that a particular directed kind of behavior generates a desired state or

behavior with a rate of success. The performance of the person - exhibiting directed desired individual behavior - in general and of a boss in specific, is notoriously difficult to relate to the performance of the firm. This difficulty originates in the many aspects of firms and the complex nature of the relations between people's actions and the global effects, not to mention factors like large numbers of interactors, and inter- and co-dependency with others' efforts. The latter suggests that personal performance only in straightforward and simple relations, say laying brick, planting trees or sewing garments, leads to a desired increase of corporate performance.

However, assuming that the relation between the performance of people and that of the firm is meaningful, and quantifying it financially is a widely accepted and implemented practice in a variety of corporate activities, though seldom straightforward. Take for example the widespread application of performance related remuneration in bosses' benefits packages, with the final objective to improve firms' performances through the rewarding and propagation of particular behavior expected to contribute. The following 'back of an envelope calculation', however, shows that the correlation between firms' performance and the performance of the leadership is probably small: 'A very generous estimate of the correlation between the success of the firm and the quality of its CEO (Chief Executive Officer, General Director of a Firm DPB) might be as high as .30, indicating a 30% overlap. To appreciate the significance of this number, consider the following question:

'Suppose you consider many pairs of firms. The two firms in each pair are generally similar, but the CEO of one of them is better than the other. How often will you find that the firm with the stronger CEO is the more successful of the two?'

In a well-ordered and predictable world, the correlation would be perfect (1), and the stronger CEO would be found to lead the more successful firm in 100% of the pairs. If the relative success of similar firms was determined entirely by factors that the CEO does not control (call them luck, if you wish), you would find the more successful firm led by the weaker CEO 50% of the time. A correlation of .30 implies that you would find the stronger CEO leading the stronger firm in about 60% of the pairs — an improvement of a mere 10 percentage points over random guessing, hardly grist for the hero worship of CEO's we so often witness' (Kahneman, 2011, p 205). Thus the CEO, considering that chairing the board of directors of a firm renders the person fulfilling her position 'visible', influential, impactful, and thereby in a position to make the highest individual contribution to the firm's performance. The previous calculation, however, shows that the CEO's contribution to the performance of the firm is modest at best. If the contributions of the other staff are equal or smaller than hers, it follows that individual people have little influence on firms' performance.

Similarly, a small correlation is found in the relation between the individual performance of football coaches and the performance of their teams (cf. ter Weel, 2011). The performance of a team is widely believed to improve when the coach of a repeatedly losing team is replaced by one who has had more luck in the near past. However, a study to find evidence for the hypothesis for the existence of this correlation showed no significant difference in the performance of the team between the period prior to, and the period after the coach was replaced: 'Nominal differences in performance in the periods before and after the firing were found to be due to 'regression to the mean effects' (ter Weel, 2011).

Thus, human and firm behavior are not reducible to the other, and second the influence of the behavior of an individual person on the behavior of the firm is limited.

Chapter 2

Scope of the Study

From the latter conclusions, I specify the research scope by first explicating the two main elements of a second perspective, extending it with the thought that firms can have an influence on people's behavior. I continue next, to introduce a format for thought experiments and their application to the traditional view in order to enable a comparison with the second perspective. Next I formulate the research question and, last I describe the state of the art, principally in systems science.

Elements of a Second Perspective

I surmised in the Introduction that nothing but the presence of people is invariant in firms, and that individual human behavior constitutes the behavior of the whole of the firm. I inferred that a redux of the micro-behavior at the scale of the individual from macro-behavior at the scale of the entire firm is not possible. Instead of understanding a firm as a singular object on its way to perfection, I pictured a firm as a system, an emergent product of the behavior of its interacting elements.

First, the outcomes of the coach dismissal - team performance studies discussed previously show a weak relation between the performance of the coach and the performance of the team, supporting the thought that the effect of individual behavior on firm behavior is limited. The empirical analyses of these studies were carried out independently in various countries, and specifically regarding The Netherlands (Ter Weel, 2011). Although there was some variation in approach, the results were equal or similar in different countries, suggesting that these conclusions are universally valid across cultural contexts, excluding mainly Asian countries.

Next, studies into the relation between manager performance and firm performance concerning management practice performed across countries, including Asian ones (Bloom and Van Reenen, 2007, 2010), and concerning human capital (Dorfman Tate, 1997) found no significant bias for Asian cultures in these respects. Thus, it is plausible that this leadership effect is similarly weak in the Asian countries, thereby supporting the second perspective.

The long standing agency-structure debate concerns the question of presupposition of agency and structure (e.g. Burrell and Morgan, 1979; Giddens, 1976). The agency position means that a person is capable of taking a conscious decision to act undirected. The structural position on the other hand means that the agency of a person is reduced or nil when structure such as a procedure is in place.

First, in the light of the present study, the latter position in this debate questions whether and

to what extent firms direct the behavior of people. The individual only acts without a conscious decision (or consciously deciding there is no alternative), acting on behalf of presupposed rules. The former position presupposes structure and the agent opts out or is directed, while according to the latter, agency is presupposed and the structure is designed so as to accommodate the agent's decisions.

Next, take the phenomenon of Karoshi, (過労死), Japanese for 'death by overwork' as an extreme instance of the latter position. The victim is not enslaved in a legal sense or directed to work long hours, nor is anyone else responsible for the ensuing suicide. Had the victim had full agency, or in other words had she been fully autonomous, she would not have acted against her own interests until exhausting or famishing herself until death.

This phenomenon is not particular to the Japanese culture: similar cases are reported in the French telecom industry in recent years, supporting the argument that agency can be limited in a social setting up to the point of suicide. However, a propensity to extreme overwork can also be explained with different arguments, for instance psychological compulsion, or labor ethics, for example in investment banking e.g. (Luyendijk, 2015).

Next, it is unlikely in any practical sense that one can act without any external influence at all, acting fully and completely conscious and independent, and hence to be fully and solely responsible for one's own actions (cf. Dennett, 1992). The fact that nearly every decision imaginable including the devolvement of decisions to a social structure (at the cost of decreased autonomy) is based on external involvement, implies that some structure - that is, a prior circumstance in the context of which the agency takes shape - must be presupposed.

On the other hand is it plausible that firms with high levels of suicide on record do not structurally recruit people with a corresponding psychological (or other) inclination to account for their high suicide rates. The latter supports the argument that agency can not be presupposed, because it is reduced to the extent that the individual commits suicide, thereby eliminating the agency.

Thus, I previously showed that the traditional view belongs to the functional paradigm, assuming individual rationality and agency (Burrell and Morgan, 1979). According to this view, a weak effect of the consciously directed action of individuals on the behavior of the firm is not easy to explain. In order to identify support for a second perspective from elements of critique on the traditional view, we investigate the opposite of the functional paradigm.

The dimension objective-subjective underlying these paradigms implies that agency and

rationality (who directs whom) are either attributed to the individual or to the structure. But this topic is precisely what is questioned in this study and using it as its foundation contains an 'englobement du contraire'. The immanent dynamic on the dimension structure - radical change presupposes either change towards a steady state or away from it. Presupposing this immanence however denies the thought that the change of an organization may evoke a movement in the opposite direction. Thus, none of the three paradigms resulting from these dimensions are well suited to fulfill an opposing role of the functional paradigm.

Next, I suggest instead to synthesize the position from the agency-structure dichotomy that agency and structure presuppose the other (Giddens, 1976), implying that social structures including firms are capable of restricting people's autonomy (the firm directing the individual) whereby they act on behalf of the structure. However, it is at the person's discretion to make a decision to act in accordance with the structure or deviate from it, thereby continually inducing change.

The latter supports the thought that a firm can direct the behavior of a person, thereby reducing the autonomy of the latter, while there is no need for an immanent dynamic towards a steady state or radical change. Thus, in the light of the latter, taking a conceptual framework offered by systems science as the basis might facilitate the explanation dramatically.

Thought Experiment

The thought that people have agency determining the behavior of firms by directing them consciously and rationally is doubtful, while the thought that a firm is capable of determining the behavior of people is plausible.

To facilitate a better grasp the second perspective, I suggest a thought experiment so as to lay bare elements of the nature of the firm in the light of the traditional and the opposing view. The proposed experiment is curated to enable a focus on particular aspects of its behavior, consisting of an event causing a cognitive operation and a reaction. Making use of the same experiments the predictions of the traditional view - this section - are compared with the second perspective - Part Five.

The subject of the experiment is Jansen Bakery. Their business is to bake non-specialty bread, and to sell their products from two shops. Apart from Mrs and Mr Jansen, five employees are active in the bakery and fifteen are staffing the shops. Jansen Bakery is appreciated by their customers, because of the high quality, the prompt delivery and serviceable staff. Jansen have shown to be sensitive to changing customer tastes, and

dynamic in a broader sense: when an opportunity to extend and improve Jansen's business presents itself it is seriously considered.

Jansen's primary business process (directly conducive to satisfying customer demand) consists of the activities: identify customer taste and expected quantities of demand > purchase materials > bake bread products using proven recipes > sell bread products. The secondary process (not primary) includes staff management, financial administration, and marketing. The business is managed by the founders and current owners Mrs and Mr Jansen. Mrs Jansen runs production and purchasing and Mr Jansen looks after the administration and runs the shops. They have a hands-on attitude to doing business and they strategize to the point that they pursue maximum efficacy of the firm in its current state (they are opportunistic).

The imaginary events which are the topic of our experiments take place at three stages of the firm: establishment (become), operations (be), and its demise (stop). Examples of events during its existence are: a sales transaction, improving the shops, changing the recipe, introduction of a semi-related and a new product, expanding into a new business, reducing the number of staff. Each case culminates in a prediction of the reaction of Jansen Bakery discussed as per these topics:

- Stage of development of the firm.
- Observation of change including the behavior of the stakeholders for example the employee, the investor, the supplier, and the customer, and their observations of the others' observations.
- Cognitive operation of the person and the firm reacting to the change.
- Effect of the change on the autonomy of person and firm.
- Change of the organization and the physical manifestation of the firm caused by it.

Whereby the stakeholder is defined in the narrow sense of the 'identifiable group or individual on which the organization is dependent for its continued survival' (Freeman and Reed, 1983, p 91). In the following subsections the aforementioned thought experiment is done taking the traditional perspective.

Become a Firm

Mrs and Mr Jansen make their calculations and reach the conclusion that the demand for non-specialty high-quality bread in a particular neighborhood merits the start of a bakery and two shops. They reach out to an investor and the bank for investment and trade funding, select a location and identify the buildings to lease the bakery and the shops, invite contractors to send proposals for building and furnishing them, get quotations for machines,

a website and materials. They familiarize themselves with the requirements of the tax authorities, ask around for employees, and plan the marketing of products via their envisaged website and in the local newspaper.

Although they have no prior experience establishing a firm, Mr and Mrs Jansen have ideas about it and know-how about how to act serviceably from their training and previous retail experience. Their specific implementation originates from imitation of peers such as previous employers, the state of the art, and the details follow from their imagination.

They can be seen as autonomous and having the agency to take the decisions required for the establishment of the bakery. The firm is being envisioned, planned, established and shaped by their decisions. The firm comes into being from the design of the founders and they decide on the overall organization and the details of its physical manifestation. According to the traditional view, Mrs and Mr Jansen direct the firm and the firm fully depends on their decisions.

Re a Firm

Following the events during the existence of the firm, Mrs and Mr Jansen observe its present state and the interests of the stakeholders in order to identify how to adapt the present state of the firm to better suit their needs.

According to the traditional view, the decision to take a certain course of action resulting from each of these events, and their physical implementations are consciously taken by them. They are taken consciously, rationally, informedly with the final objective to improve performance to a norm. The staff is instructed about the required changes and their expected responses. Where the primary business processes are concerned, the latter may involve decisions about Jansen Bakery's organization.

The reaction to the perturbation caused by an event is defined autonomously by the management, including the ensuing design and physical manifestation. They adapt the firm to the requirements of their perception of the situation following an event. The latter represents the traditional view whereby the firm is the instrument of Mr and Mrs Jansen and malleable to their specifications. They direct the firm determining its behavior.

Stop Being a Firm

The demise of Jansen takes place in the case that the firm no longer satisfies the customer's demands. There is no longer a need for their services under the conditions set by the other stakeholders. The shop employees observe a declining number of visitors and smaller order

size, and Mrs and Mr Jansen notice decreasing revenues. Indirectly, they may obtain the observations of the accountant, suppliers, including the bank.

Mrs and Mr Jansen identify ways to better the situation, and they make corresponding rational and informed decisions aimed at improving the situation of the firm. They formulate actions, instruct others how to act, and monitor the outcomes.

Prior to the demise of Jansen Bakery, Mr and Mrs Jansen were its autonomous principals. When Jansen defaults then their autonomy is unchanged, and Jansen ceases to exist as a firm. In that case, the component parts of Jansen Bakery such as machines, recipes, staff, furnishing, leases, and trade stock, are liquidated and physically dispersed. The organization is annihilated, and its physical manifestation disappears.

According to the traditional view, demand for Jansen's products decreased, and the efforts to meet customer demand did not save the business. Although they have the agency, they did not, because they were ill informed, irrational, and they failed to keep the technology of Jansen Bakery updated. The demise may also be provoked by the large impact of a large external event, for instance when a newly established supermarket outlet close by starts selling similar bread products. The direction of its founders has led to the demise of Jansen Bakery.

Conclusion

The interesting question is whether Jansen Bakery can be established, run, and stopped by individuals different from this particular management and staff.

Imagine that all the stakeholders believe their interests are met by the business plan drafted by Mr and Mrs Jansen: they are committed and ready to engage. However, when the execution is supposed to start the Jansens cannot proceed for personal reasons and they withdraw from the venture. It is plausible that another entrepreneur is found who is interested in the plan, capable of executing it and willing. Given that the business case is sound, it is plausible that the personal change is acceptable to the stakeholders. Soon the entrepreneur is fully informed about the details, accepted by the stakeholders and ready to proceed.

In business, the staff of Jansen Bakery turns over for reasons such as illness, a change of job, retirement or relocating. New staff members are recruited on a regular basis without adverse effects on the business. Complex tasks like the introduction of new products, investing or divesting are also not pegged to the presence of Mr and Mrs Jansen, who are not specialists, outside of the production of regular bread. Moreover, at some point Mr or Mrs Jansen might wish to withdraw from the business and be replaced successfully.

The firm defaults if the conditions of one or more of the stakeholders are no longer satisfied (formally if they are not paid their dues). It is plausible that the outcome is similar regardless of the individuals involved: other management and staff would have acted similarly and with similar outcomes. Having said that, when business has deteriorated considerably, it is in some cases possible to recover it and to continue, but this is a specialist's job.

In conclusion, once the business plan is developed and accepted by the stakeholders, the firm can take off and be run by other individuals than the owners, managers, or staff. Under different management and staff it is likely to fail in similar circumstances.

Research Question: What is a Firm?

In the light of the latter, the question: What is a firm? Is equivalent to answering the subquestions concerning emergence: How does a firm come into existence?, What are its structure and its operations (behavior) while it exists? and: How does it come to an end? are answered in regards to the autonomy of the firm and of the associated people.

Multidisciplinary Topic: Integrative and Explanatory Approach

Firms are studied by various disciplines including economics, organizational and management studies, strategic management, sociology, psychology, socio-psychology, business science and behavioral sciences. Table 1 summarizes which key notions concerning this study are addressed by the listed disciplines. The notions are:

- The nature of the firm as such or the person as the basic unit.
- The development of a firm as micro to macro behavior (emergence) or not.
- Limitations of rationality namely factual and logical decision making.
- Focus of the chosen discipline is theoretical or empirical (re conceptual framework).
- Based on object ontology or on process ontology.

Discipline Notion	Econ- omics	Socio- logy	Organization, Management, Strategy	Psycho- logy	Behavi- oral Science
Nature of the firm as such	Y	N	Υ	N	Υ
Emergence	N	Υ	Υ	Y*	N
Limitations of rationality	Y	Υ	Y**	Υ	N
Unified Modeling Framework	Y	Υ	Υ	Υ	Y
Process ontology	N	Υ	N	Υ	N

Table 1: Identification of basic notions per discipline

Table 1 first demonstrates that knowledge of the topic is claimed by different disciplines, while secondly not one single discipline addresses every identified aspect of the research topic. Choosing one of the listed disciplines also implies vesting in foundational concepts which might pose problems for this research. For example, selecting economics to explain the nature of the firm introduces advantages of the existing body of knowledge, and at once introduces problems concerning the foundational assumption of agency, which is a topic of this research. The latter does not bring the discussion of the issues central to the research question forward. In addition the knowledge generated by the scientific disciplines studying these phenomena is a source for management practice and business conduct. Thereby they become coupled with the subject matter, implicitly reducing their foundational elbow room.

In order to avoid these limitations, I choose systems science - including the field of social systems - as the discipline from which to study the nature of the firm. Because the objective of this research project is to identify what a firm is by its emergent behavior, the nature of this research is best described as multidisciplinary epistemological.

Positioning

Our concern is to provide an overview of available sources of theories for integration in the framework, or contributing to the latter as a source of inspiration.

^{*} e.g. Group relations. Group dynamics

^{**} e.g. Organizational Anthropology, Critical theory, Leadership studies

According to the method, I abduce theories better explaining particular aspects of the nature of the firm compared to their peers, namely similar theories.

The selections I made in the following subsections are preliminary, because I make additional choices and specifications in the main text.

Frame of thought

The research question involves an alternative mode of thought, thereby directing us to philosophy, and in particular the philosophy of science.

First Popper (1959) proposed an evolutionary approach to scientific development, thereby selecting a theory from available peers through critical inter-subjective empirical testing.

Next, Feyerabend (1975) suggested that such focus on connectivity hinders progress, proposing a radical approach. A hypothesis generating a better explanation merits consideration regardless of its coherence with existing theories. Thus internal consistency and coherence with a perception of reality are considered important criteria.

Kuhn (1962) suggests a regime whereby theory develops steadily and coherently within a scientific paradigm. Shifting away from the current paradigm, a radicalization against current beliefs is instigated through scientific debate, leading to a new paradigm, reconsidering existing assumptions and new ones proposed.

Take for example indications of such a shift taking place in the *communis opinio* about the nature of the firm. First, the 'statement concerning the purpose of the firm' issued by the (Business Round Table, 2019) challenging the assumed primacy of the shareholders' interests over other stakeholders'. Next, Shiller (2019), in his book Narrative Economics explains how narratives (transcending human agency) cause economic events.

However, the current scientific debate in general does not indicate a paradigm shift nor a reconsideration of axioms. In order to stay on 'neutral ground' see the section Multidisciplinary Topic, the sources of this study originate from systems science, not gist for a paradigm shift.

Systems theory of the firm

The systems approach to scientific development of Boulding (1956) advocates research without a priori adherence to the methods of a particular discipline. The topic of the category of social organizations is an exponent of the individual person: 'The unit of such systems is not perhaps the person - the individual human as such - but the "role" - that part of the

person which is concerned with the organization or situation in question, .. tied together with channels of communication.' It is considered difficult to separate the levels of individuals and the organization, because the behavior of the individual is based on symbolic images. Boulding acknowledges the mutual influence from interactions between the person and the environment they create ('the hole becoming rounder and the object squarer'). He suggests that the focus is on objects and their relations by way of communications in the sense of the information theory of Shannon,

Schilling (2000) proposes an overarching causal model for the migration towards or away from modularity. The latter concept is based on the nesting of systems in a hierarchy (Simon, 1962), 'formal organizations' in the case of human organization. Modules of '*rules*' make up a system, restricting degrees of freedom and enabling coupling with other modules. Next, the dynamics of human organization are characterized by further modularization or integration of modules. Each module can be reduced to smaller ones until '*elementary particles*': teams and team members carrying the '*rules*' (ibid p 316).

The organization of the modules adapts in competition with others under environmental change, scrutinized by their relative fitness. Thus, the modular contribution to fitness depends on their exposure to others so as to integrate or further modularize. The organization tends to diverge from an ideal, inert and adapting 'slowly and clumsily', and, the system influences its environment in similar ways. Last, a change of modularity depends on changes in the system's fitness through correlations with effects of changes in specific synergy between modules.

Kast and Rosenzweig (1972) suggest an understanding of organizations as systems, taking the view of configurations of sub-systems, or interrelated components. Listed concepts include entropy, input-transformation-output, multiple goal seeking and hierarchy. Systems in general have organizations which may include non-purposeful components. Next, social organizations, people their components, may not include the latter and change is induced by internal influence. Thinking in terms of sub-systems and their relations, which are assumed to be knowable, reduces complexity but the sight on the general system is lost. Social organizations do not occur in nature, but are contrived by man. They are made of events and they do not follow the same life-cycle as organisms.

Capability-based theory

Pitelis and Teece (2009) suggest to integrate explanations of the nature of the firm, such as transactions cost, property rights, metering and 'resources'. Based on capabilities it pivots on the entrepreneurial creative process in markets through creating and capturing innovation by

the firm. The entrepreneur has a crucial role in this process, over and above the exercise of authority (Coase 1937). The nature of the firm is to generate value in incomplete markets and its essence is the way in which the firm achieves this.

The latter implies making resources available and organizational capabilities updated by way of innovation in order to create value through competitive advantage. It is not limited to running the business, but about creating markets and 'designing the business' (Pitelis and Teece 2009). Innovation is generated through creative activity over and above selecting from existing alternatives: 'This enables firms to capture value by creating, leveraging, adapting, upgrading, and combining their assets internally and/or through inter-firm cooperation' (ibid).

The firm is considered to be a useful instrument: '.. the objective and nature of the firm should be seen as inseparable; namely that firms exist in order to (because they can) serve the objectives of their principals' (Pitelis and Teece, 2009). Entrepreneurs and managers coordinate so as to reduce transaction costs (Coase and Williamson) and create markets and new combinations, with the objective to capture value for their principals.

Freiling, Gersch and Goeke (2008) suggest a competence-based theory of the firm, focusing on entrepreneurship, dynamic capabilities and competences. Competences are defined as: '.. a repeatable, non-random ability to render competitive output. This ability is based on knowledge, channelled by rules and patterns .. Competences direct goal-oriented processes for surfacing future performance potential while offering concrete input to the market' (ibid p 1151). Their considerations first include: 'They (economic agents dpb) reflect, learn and exercise by each decision. The results are idiosyncratic capabilities and 'entrepreneurial theories' (Harper 1995) in every point in time'. This emphasizes that the collected competencies are not perfect or organized. Second, an important role is assigned to the entrepreneur to design and shape the firm so as to reach (presumed) corporate goals.

Teece et al. (1997) define resources as: 'Resources are firm-specific assets that are difficult if not impossible to imitate', and organizational routines/competences as the clustering of firm-specific assets involving individuals and teams so as to enable distinctive activities, The latter constitute organizational routines and processes, and last: 'We define dynamic capabilities as the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environment'.

In sum: a common element of the systems theories of the firm and the capability-based theories is a distinction between a particular individual and a person of the social organization. This detachment between the person and their intentions seems to be deferred to 'rules' (Boulding), 'teams and people with rules', and 'fitness' (Schilling), and to 'purposeful

components', and in regards to the firm in se to 'contribution to society' (Kast and Rosenzweig). In the same vein, Pitelis and Teece mention creative entrepreneurial processes. Freiling, Gersch and Goeke notice that competences generate goal-oriented processes leading to a future competitive edge, and Teece et al. suggest that firm-specific assets involving individuals and teams so as to enable distinctive activities.

These definitions enable distantiation of causal relation between individual performance and firm performance, in a sense the de-individualization of human organization, and in particular of the firm. They enable a transfer of intentionality away from the individual person to the respective notions, paving the way for a separate development of the latter. On the other hand the latter notions seem to be teleological, because they concern rules and routine presupposing the nature of the firm and its functioning. However, I wish investigate the nature of the firm, how it comes into being and how it develops, and therefore without presuppositions.

Economics and organization

Coase (1937) describes the 'purpose' of the firm as an elemental economic unity and a nexus of differential costs of transaction between firm and market, human primacy assumed implicit Williamson (1979, 1981, 2005) and Ouchi (1980) expand this thought by its manifestation as hierarchy and organization. The latter view on the firm is extended by the thought that corporate culture (Kogut and Zander, 1992, 1996), knowledge (Conner and Prahalad, 1996), and leadership e.g. (Collins, 2001) respectively enable effective processing of cost differentials. Chandler (1962) suggests that strategy is the determining factor for corporate organization, and e.g. Mintzberg (1983) suggests that an ideal structure exists facilitating business conduct.

Critiques concerning the foundations of economics developed by e.g. (Nelson and Winter, 1982) are widely recognized, proposing a theory for economic change based on the notions of progressive technological innovation (Schumpeter 1942)..

Of particular interest here is the concept of a routine: 'Our general term for all regular and predictable behavioral patterns of firms is "routine". ... In our evolutionary theory, these routines play the role that genes play in biological evolutionary theory. .. they are selectable in the sense that organisms with certain routines may do better than others, and, if so, their relative importance in the population (industry) is augmented over time' (Nelson and Winter, 1982, p 14). The authors suggest that in this way heuristics concerning repeating elements of business conduct, including those dealing with non regular situations are encompassed. It is further assumed that non-regular elements are catered for by the evolutionary (stochastic)

mechanisms of their proposed methodology. Thus, the randomized processes of evolutionary mutation are coupled with the capriciousness of business decisions in the face of unpredictability.

This critique concerns the assumptions of intentionality, agency, rationality, the special role assigned to the entrepreneur, perfect information, the exogenous nature of culture, and the presupposition of organizational ideal 'urtypes' are widely assumed, for example in microeconomics (e.g. Varian, 2010), business science (e.g. Douma and Schreuder, 2013), and strategy development (e.g. Porter 1980).

The institutional view on firms as proposed by North (1987, 1991) and Hodgson (2006) focus less on the structure but instead on the societal functionality of the firm. Firms' behavior intentionally has a function in society in relation to other institutions and people. These views rely on presupposed immanent intentions, but they do not explain the emergence of institutions. Cyert and March (1963), taking the firm as the basic unit of analysis, opposed the assumptions of profit maximization and perfect knowledge. Thereby the smaller firm is guided by the entrepreneur and the larger one by a coalition of stakeholders. Thus, the firm is seen as a nexus of stakeholder interests, whereby each optimizes results in view of their goals and vis-a-vis the others in a process coined as 'satisficing'.

The works of Kafka (e.g. 1925) and on a lighter note of Gall (2002) inspire the thought that organizations functionally 'take on a life of their own', and Ten Bos (2000, 2015) philosophizes that bureaucracy devolves humanity to a system. Morton (2010, 2013) suggest that firms are 'hyperobjects', and the human mind is allowed mere glimpses, because they are incapable of understanding them in their large and intricate whole.

Psychology and agency

The suggestion that human agency is limited implies that not the individual (rationally) decides, but allows external direction instead. The psychological ramifications of this view are described in general terms by Kahneman (2011), Tetlock (2005), Baker (1996), and Ainslie (2001), and in particular to rational choice and belief systems by Kelly (2002), and Foley (1991). In regards to conscious free will, Dennett (1992) embraces an algorithmic view on human interaction, taking distance from determinism in general, and regarding the mode of human thought in particular. The latter suggests that one course of action is selected from a variety of possible behavior, catering for the avoidance of deterministic outcomes and a predictable future. Room for choice enables free will, whereby the person is autonomous to some extent.

Process and object

My thinking about them starts from the premise that the firm emerges as a pattern from a behavioral process. Once emerged, the firm is referred to as an object. The latter is also reflected in the use of modern English, trained for objective not processual use. The philosophies of Simondon (1958), Deleuze (1968), and Bergson (1968), synthesized by Weinbaum (2017) in regards to the aspect of thought inspired thinking in terms of individuating processes in me.

The thought that emergence of patterns originating from processes caused by interactions between individual people can be depicted as machines is inspired by Ashby (1962). Wagensberg e.a. (2010) writes about individuality in the organic sense as multiple organisms assuming one identity. Individuation whereby a unity emerges from many possible ones in a recurrent process is described by Simondon (1958Gell Mann (1996, plectics), Deleuze (1968, idea and Idea), Ashby (1962, potential and effective)], whereby the latter points out that a system selects one next state (effective) from the states it can assume (potential).

Organization in Natural Processes

Examining the nature of the firm as a pattern emerging from chaos, in search of descriptions of randomness from which to distinguish the latter, I studied orderly and chaotic behavior in computational, thermodynamic, and evolving systems.

Next, one point of departure of this study is just that the firm emerges as a pattern from disorder, namely uncertainty. Alchian (1950) points out that firms are founded in a dynamic and unpredictable environment, uncertain whether their business will be sustainable, suggesting that the future is contingent on the conditions of the environment from which the firm emerges. I furthermore examined Strogatz (1994) and in regards to complex systems Prigogine and Stengers (1985), Prigogine (1997), Cohen and Stewart (1994), and Wolfram (2002).

I justified the choice for systems science as the basis of this project in the section Multidisciplinary Topic, starting from the basis provided by Von Foerster (1961), Ashby (1962), Von Bertalanffy (1968), Simon (1962). Inspiration is taken for the systemic approach to human organization from evolutionary principles of redundancy (Simon, 1961, formal organization), a characterization of complex systems by Cohen and Stewart (1994, complicity and simplexity), Heylighen (2008), and complex adaptive systems with a focus on the notion of fitness addressed by Miller and Page (2007), Holland (1975, 2012), and a

particular focus on artificial life discussed by Bourgine and Varela (1972), Levy (1992), and Casti (1997). In regards to systems control and cybernetics I studied Ashby (1958), Heylighen and Joslyn (2001), for self-organization I turned to Ashby (1960, 1962), Heylighen (2011), and Campbell (1960), and for a theoretical focus to Mayr (1997) and Eigen and Schuster (1977), Padgett (1997) with a formal approach making use of hypercycles of skills.

Next, universal computation offers a perspective on invariant organizations of natural processes, whereby the computing unit is made up of interacting components, computing its next state at every cycle. This approach is fundamentally processual, the nature of the substrate indiscriminate, and processing is seen as emergent order. Thus, many natural processes including human interaction can be seen as a non-specific computational process Wolfram, 2002), (Lindgren and Nordahl, 1990), (Fredkin, 2003), (Dodig and Crnkovic, 2011), (Michelucci, 2016). The appeal of the latter is first its universal nature as a natural emergent process, and second an expression for the level of complexity on which a system can generate complex behavior and patterns, for instance the notion of equivalent computational sophistication suggested by Wolfram (2002) may in future provide a dynamical nonfunctional parameter of the fitness of a system in an environment.

The thermodynamic perspective on systems, next, researched by Bawden en Robertson (2015), Hermann Pilath (2015), Mikhailovsky and Levich (2015) hinges on the increase of entropy as an invariant of systems, and the relation between entropy and information in organic systems is a relatively new avenue such as addressed by Wolpert (2016).

Cultural evolution and memes

A next candidate to understand the development of human culture and organization is an abstract interpretation of Darwinism identified by Darwin (1859) and Wallace (1889). This view waned through the early twentieth century, but revived by the hand of Campbell (1960). This mode of thought was coined as universal Darwinism by Dawkins (1976), and extended by e.g. Heylighen (1992, 1999), Dennett (1995), and Blackmore (1999). A cultural understanding of evolution is addressed by Aldrich and Ruef (2006), and the relation between cultural and genetic evolution by Boyd and Richerson (2001), and a focus on population dynamics of Hannan and Freeman (1977).

The latter research especially in regards to cultural evolution, but in particular the notion of a meme inspired me. The latter is coined by Dawkins (1976), explicated by Blackmore (1999, 2000), Heylighen (1998), as a means to provide people with tools for thought Dennett (1995). The way its 'effect' can be gauged (Heylighen en Chielens, 2005), how it can be seen as propagating information e.g. (Hokky, 2004), the absence of self-replicating

capabilities in a meme and its relation to human beings (Gabora, 2004). It is described as an element of cultural evolution of human organizations in general by Dennett (1995), and Heylighen (2009) and specific for firms by Weeks and Galunic (2003). The meme as a concept is critiqued by e.g. Benitez Bribiesca (2001), and Burman (2012).

A model for the coherence of theories to form overarching theories is proposed by Thagard and Verbeurgt (1997), Thagard (2005, 2007), and commented by Rooij (2006), applicable by extension to complexes of ideas and memes. I was inspired regarding the internal structure of memes by the Just So Stories of Kipling (1902). The difference between reality and its representation is identified through deconstruction of Derrida (1994), or in other words the difference between what it is and what it is said to be (Galbraith. 1958, 2004).

Autopoietic systems

Autopoietic theory describes a particular kind of self-referencing self-maintaining system (Maturana and Varela, 1972), seeking to explain what is invariable where selection takes place in living systems, and involving an inevitable combination of cognition and autonomy. Conceived for the biological sphere, its application to social systems is subject to discussion. Having said that, the nature of the latter is inherently processual, connecting with the Deleuzian schedule for the relation between structure and operations, the subtitle of the essay pointing out the machine-like nature of the latter.

Holland ea (1986) describes cognition as an inductive process. Polos, Hannan and Carroll (2002) write about fuzzy categories constructed by the observers of behavior, emphasizing the subjective role of the observer of reality. The latter inspired me to embrace the notion that the development of the function 'making sense to' and that of 'making sense of' takes place at once in the evolutionary process. An embodied approach to cognition is provided by Varela, Thompson and Rosch (1991), Thompson (2010) and Hutchins (1996). The notion of enactment is described by Weick (1988) as a mechanism whereby operatives act on what is not there (in the special case of emergency), and by Thompson and Rosch (1992) as an embodied cognitive operation. The enacted approach to cognition by Di Paolo and Thompson (2014) adds the notion of precariousness to operational closure of autopoietic organization with a focus on behavioral phenomenology. A theory of the firm as a cognitive entity, built on the thought that the human cognition of individuals constitutes the cognition of a firm, is put forward by Nooteboom (2008, 2009), whereby the directing of individual cognition generates corporate cognitive focus.

A meaning of the relation between autonomy and heteronomy is suggested by Steiner and Steward (2009), maintaining that allowing heteronomy enables a system to achieve a higher

level of autonomy. The latter is conceived for human organization, but possibly with a wider application to other self-referencing systems. Autopoietic identity results from the functions to maintain itself also generating its behavior, its operations determined by its structure. I was inspired by the notion that maintenance of a system's identity is 'the invariant around which selection operates', serving as the linking pin between the system and its environment (Varela, 1997), and (Seidl, 2016).

Sociology and social systems

Knorr-Cetina (1981) suggests a micro-sociological view of the coherence of social behavior, whereby human social behavior is founded in micro-social interactions, resembling double contingency (Luhmann, 1995). The sociological theory of Giddens (1976) synthesizes the opposite positions of the agency-structure dichotomy, connecting with the philosophy of individuation, reification as machines, and formal organizational theories, and thereby with the dynamics of the relation between the individual and 'its' population.

Luhmann (1995, 2002) and Moeller (2006) suggest the view that institutions are self-referencing recurring social systems expanded to the scope of society, and deepened to explicate functional relations between them and between them and the individual (Lenartowicz e.a. 2016, 2017). Heyligen c.s. (2017, 2018, 2019), and Frank RH (1998) suggest that social systems influence people making use of the strong guidance of emotions

A view on the micro behavior of people generating the behavior of the multitude, the firm in this case, connecting with the notions of systems and machines is inspired by social dynamics research (Schelling, 1978), social strategies (Axelrod, 1992). I found of particular interest research (Montroll, 1981) into the random distribution associated with human behavior, pointing out that particular behavior of multitudes of individuals tends to occupy the entire space of varieties, their behavior showing a Gaussian distribution (maximum entropy). I took notice of the works of Lane ea (1991, 1997) and Arthur (1995) focusing on formal models of the mechanisms whereby information propagates through a population.

The relation between firms and people is an important derivative of this study, because the latter are the main subjects to the actions of firms. I focused on the anthropological through the writings of Fabian (1983) concerning time as a concept for power differentials but allowing a broad view in anthropological thought.

Formal representation

In order to represent the structure and the operations of the firm in a formal model, I examined cellular automata Von Neumann (1952), Wolfram (2002), Sutner (2007), Schiff (2008), and the Game of Life as a well studied instance (Conway, 1976), (Berlekamp and Guy, 1982) and (Dennett, 1992], the latter focusing on the shift of ontology in emergence. The investigations into the Game of Life as an example of an autopoietic self-referencing system, making use of a literal understanding of the latter by Beer RD (2004, 2014, 2015) I found of particular interest.

For inspiration regarding formal systems in natural processes I turned to Frank S (2009), with a focus on power laws in nature, to Gabaix (2009) for an examination of financial markets. I made use of the ideas concerning complex systems of Ashby (1962), and a neurological model for the brain as a complex system (Tononi, 2008, 2012), (Albantakis and Tononi, 2015). The study into the shape of the spots of the leopard of Turing (1952) I thought was very interesting, first for the mathematical description of this morphogenetic mechanism from first concepts. Second, this study fosters the thought of morphogenesis connected with emergence, and last, the practical scientific 'making' approach connects with my wish for an explicit model.

I examined SK Combinators (Smullyan, 1985) for their applicability as a formal language to represent the interaction between data and operation as one process but failed to identify a meaningful way to represent the subject matter. I examined and used NetLogo as a tool by Wilenski and Rand (2015) to simulate memes and enacted behavior. Chemical Organization Theory provides flexibility and rigor for modeling and representing (Dittrich and Winter, 2005, 2007), (Dittrich, Speroni and diFenizio 2008), (Heyligen, Beigi and Veloz 2015), (Veloz and Razeto Barry, 2017).

Evidence concerning the demise of firms

The empirical elements around which the abductive reasoning of this study pivots are, first, the absence of evidence for creation of shareholder value by corporate transactions (Coscelli, 2001), and (Tichy, 2001a, 2001b). Second, empirical research into the relation between the reduction of the autonomy of firms and their 'death' (Daepp cs, 2015). A third element concerns the issue of individual effectiveness on firms' performance, examined widely including The Netherlands by Ter Weel (2011). The results corroborate with similar studies undertaken elsewhere, e.g. Buraimo ea (2017), and with a focus on the justifiability of bonus schemes is studied by Kahneman (2011). A practical approach is offered by Luyendijk (2015) who, embedded with investment bankers as an anthropologist, describes

the culture of investment bankers, albeit in popular terms. In (Bruin 2016), I reply to his piece to identify that not the individuals but a system of ideas 'flies the plane'.

Cultural analysis of the market system

In regards to the kind of ideas which may guide our thoughts when dealing with firms, the present study is guided by the overarching perspective offered by Goudzwaard (1982), wary of normative views. The works of Marx (1867–1883) are foundational for the view of the firm as a societal device. The ideas of Schumpeter (1942), strongly rooted in the Western thought that the existence of firms depends on their ability to remain effective on the capital markets through the mobilization of technological innovation. The basis for thinking about the firm as a coordinator of human effort is provided by e.g. Smith (2012), Schliesser (2017) in particular regarding political economics. Regarding the notion of utilitarianism I refer to Bentham (1748-1832), Mill (1806-1873), the notion of progress and its belief to Comte (1798-1857), Spencer (1820-1903). I refer to Schumpeter (1942) for the notion of creative destruction to explain the necessity of the end of the firm, and its explanations by Freeman (2009). Veblen (1994) is the source for the original understanding of consumerism, the understanding expanded by Richins (1994), Richins and Dawson (1992), Eriksson (2012). My understanding of the market system as providence started at De Mandeville (1715), extended by Burns (2005), Goudzwaard (1982) and Galbraith (2004).

Chapter 3

Methodology

The purpose of this chapter is first to justify and explicate abduction as the method for this research project. Second, starting from the critique of the initial chapters, I propose a preliminary representation of the nature of the firm. The final sections address the conditions for the development of the study and of its outcomes, and a summary of the method and conditions.

Abduction of a Hypothesis of the Nature of the Firm

Because this study relies on limited empirical evidence, data providing a limited reference, supplement is sought from other constituent ideas. I wish to integrate existing ideas with an emphasis on explanation and application, and therefore I choose abduction as the method. Inspired by its application by Dennett (1987), I studied its use at the online Stanford Encyclopedia of Philosophy (plato.stanford.edu last visited 2021). A practical application and an implementation method for developing hypotheses by Roth ea (2020), and a study starting from a data set by Zelechowka (2020).

Abduction is a form of explanatory reasoning. J.S Peirce first introduced the method to generate hypotheses. Its modern use emphasizes justification, also known as 'inference to the best explanation'. The latter use is more frequent, both in scientific and everyday reasoning). What is inferred by deductive reasoning is necessarily true if the premises are true, or in other words: the truth of the premises guarantee the truth of the conclusion, formally: All A are B. a is an A. Therefore a is a B. This inference is problematic if the premises is plausible, or statistically probable, instead of true. This implies that the relation between premise and conclusion is not qualified as necessary.

Abduction resembles induction because in both methods an explanation is inferred from incomplete facts. Induction is generally associated with plausible relations such as frequencies or statistical distributions: x% of A are B in the above example, leading to the conclusion that a is a B. In this case the relation no longer qualifies as necessary, because the probability is (100-x)% that the inference leads to a false conclusion. However, its statistical use alone does not provide a sufficient distinction to define an inference as inductive. Abductive and inductive reasoning are both ampliative, because in either case the conclusion goes beyond what is stated in the premises. The latter implies monotonicity, namely that a conclusion can be inferred from a subset of the premises, which cannot be inferred from the whole set. Abduction differs from inductive reasoning because the former aims to provide the best explanation for the observed facts or statistics, whereas inductive reasoning only appeals to the presented frequencies or distributions to reach a conclusion.

Abductive methodology can therefore be used to generate explanations for the structures in a dataset or justify a generated hypothesis.

A critique on abduction is that the conclusion implicitly depends on the implausible privilege of the one making the inference. The part of the conclusion which is beyond the premises is 'filled in' by the reasoner. The congruous version of abductive inference avoids this potential error:

Given evidence E and candidate explanations H1,...,Hn of E, if Hi explains E better than any of the other hypotheses, infer that Hi is closer to the truth than any of the other hypotheses..

This version of abduction implies that the hypothesis H_j which explains the evidence E better than the other candidate hypotheses available is inferred to be closest to the truth of all candidates available to us.

There is at this point no empirical theory explaining the nature of the firm. However, partial evidence is presented that the agency of people in regards to their relation to firms is limited - the opposite may be the case - and there is support for the thought that the behavior of people and firms cannot be reduced to one another. In addition evidence is presented for the idea that the 'death of firms' is infrequently induced by their liquidation or bankruptcy. Abduction is a suitable method to collect support by way of 'connecting beyond the dots', explaining the behavior of the firm equally good or better than the existing body of theories.

The method is to abduce an hypothesis, selecting ideas from systems science which together best explain aspects of the firm, compared to all the hypotheses available to me. *H*j from the entire set does in the present study not refer to a hypothesis for the nature of the firm, but to aspects of it. It is my task to select the partial hypotheses and integrate and apply them so as to develop a hypothesis which better explains the nature of the firm compared to the ones which do not corroborate this evidence.

For example, one aspect of the nature of the firm is the dynamic relation between the internal structure of the firm, and its behavior. Three candidate hypotheses (Hj) regarding this aspect of the firm have come to my attention. H1, first, originates from a computational perspective on natural systems. It might propose that rule-based behavioral agents can cater for patterns of behavior generated by particular rules. An hypothesis H2 from physics might suggest that patterns of structure and behavior can be described through an informational perspective on entropy production. A third hypothesis H3 from theoretical biology would provide a perspective on the nature of firms as analogous to living systems, enabling an

explanation of this aspect of firms as self-referencing systems. In order to develop an integrated explanation of its nature of the firm several other aspects are examined, coming to the fore in its formation, its functioning, and its decay, all of them successful at explaining some questions, but fail at answering others. The proposition presented next is so designed as to explain the nature of the firm, taking available evidence into account and avoiding the critique. It forms the basis of methodology using it as a 'coathanger' for the consecutive introduction of aspects of the nature of the firm, and discussions of alternative hypotheses to achieve the best explanation of the nature of the firm.

Proposition whereby ideas generate Firms' Behavior

The argument is doubtful that people are capable of determining the behavior of firms as conscious and rational agents. In addition, the behavior of the one is not reducible from that of the other. The argument that a firm is capable of directing the behavior of people, on the other hand, is plausible. But the traditional view on the nature of the firm is based on just those principal arguments. In order to finally develop a conceptual framework, I set off with a proposition describing the nature of the firm avoiding critique on the traditional view and taking selected evidence into account. Let the question: What is a firm? be answered by this proposition:

'From ideas of an economic and moral nature:

Does a firm emerge as a coherent pattern of behavior motivated by them in a wider societal context.

It emerges as a unity by the global behavior of a far-from-equilibrium system - of these ideas and that behavior- in social interactions of persons inside and with the environment of the firm.

As this unity, it:

Becomes a self-referencing system once the body of ideas is coherent from a multitude of related ideas in a network.

Acquires and maintains a behavioral identity at its global scale.

At that scale it attributes importances different from the local scale of its components.

Makes sense of itself as distinct from its environment.

Organizes itself from its former structure vis-a-vis its environment - which also

continually develops.

Ceases to exist when its autonomy is lost'

The proposition serves as the premise for the abduction of a conceptual framework. Building on the concepts presently available to us, it is refined and expanded as our understanding of the subject matter develops.

Chapter 4

Setting the Scene

The proposition revolves around the thought that the firm emerges in a recurrent process when it mentions *emergence*, *becoming* and *organizes itself from its former structure*. The purpose of this chapter is to first establish the ontological foundation for the processual understanding of the emergence of firms, and for a reific understanding once they have emerged. Second, I suggest a model for systems and their environments, and specifically, third, for self-referencing systems.

The Processual and the Rhizomatic Nature of the Firm

According to the proposition the firm is generated in a process. However, once it has come into being, we wish to describe it as such and not be limited to process. This raises the question which ontology enables us to address its emergent nature, and the firm in se.

Let us first examine the opposite of our desire: to know an object and its relations to other objects. The latter is captured by the notion of a monad, conceptualizing an object which consists only of itself. It is pure and essential with a unique identity featuring unique properties. Its boundaries and its *identity* are immanent, and perfectly distinct from its environment (cf. Leibniz, 1714, Monadology). Outside influence can cause its present manifestation to deviate from the monad one, towards which it gravitates, hindered by circumstance. Its ideal state is its immanent equilibrium, and when imperfect it is not perfect yet.

Deleuze (1968) opposed the latter notion of immanent *identity*, suggesting that difference and change are the foundational notions, instead of essence and stasis. Moreover, differences are an *environment* for others, and a change in one generates differences for others, reciprocally inducing change in themselves, &c. The latter perspective is captured by the notion of a *nomad environment*, where *continual* change at every scale is the norm.

Thus, Deleuze does not deny the existence of identity, but contests the primary position of objects and their supposed identities in traditional object-centered descriptions of reality. The philosophy against *identity* rests on the metaphysical notion that differences between series of differences and in particular phenomena generated by them are the elementary notions.

The concept of an assemblage as described by Deleuze and Guattari (2004) caters for the latter notion: 'Comparative rates of flow on these lines produce phenomena of relative slowness and viscosity, or, on the contrary, of acceleration and rupture. All this, lines and measurable speeds, constitutes an assemblage'. Differences are generated on their own account depending on their current states and relative to those of others. Using the phrase 'lines of flight', the authors point out that assemblages do as they do, because they can do

nothing else. The authors refer to the latter trait as 'machinic', which I understand as showing unavoidable behavior characteristic of a machine discussed in the next pages. They can be known thanks to their relative phenomenal differences with one or more other such series: externally they are a 'body without organs'. Last, how they are known determines how they are dealt with, thereby affecting their 'machinic' nature.

The recurrent nature of the latter is captured by the notion of *individuation* (cf. Waddington, 1952; Simondon, 1958; Deleuze, 1968). The real (next structure of a system) is constructed in a selective process (current operations of the system) from the virtual (possible structures of the system), under the conditions of the actual (current structure of system and environment). This process, whereby the arrangement of a multitude vis-a-vis its *environment* and itself is determined by its operation while its operation is determined by its structure. That potential for change is its Idea (sic), the set of all 'its' solutions. The particular one selected is the idea (sic), the solution to solve the problem posed to it (Deleuze, 1968).

Myriads of assemblages generate their 'lines of flight' through their operations and are knowable by their relative phenomena. We may shift our focus to many assemblages and their 'machinic' operations, identities, 'lines of flight' and so on, and refer to that focus as a focus on multiplicity.

Deleuze and Guattari (ibid, p 6) begin to define a rhizome by the parsimonious constitution of dimensions of a multiplicity, directions in motion of the constituting assemblages: 'Whenever a multiplicity is taken up in a structure, its growth is offset by a reduction in its laws of combination.' When assemblages, doing as they do, are adopted into a structure, they continue to do as they do, but their degrees of freedom are reduced by others. Their combinations are reduced, coerced by the structure and they can be said to have become organized. The number of dimensions of a rhizome is what is available to it (n), and the unique belongs to the multiple by subtracting one dimension (n-1). Our focus shifted from the individual to the multiplicity and 'the world has lost its pivot' (ibid, p 6).

A rhizome is first characterized by a connection of each point to every other one, between them not necessarily of the same nature or wielding the same sign system. In this study the focus is on memes and the ensuing behavior of people in social reality, but the influence of other assemblages, for example access to natural resources and the weather must be taken into account too. Next, the rhizome is not reducible to the multiple nor to the observable system it makes up (Deleuze and Guattari, 2004, unity), or to the constituents of the multiple. It is thereby not a subject or an object or even multi-centered, but a multiplicity. Next, a rhizome is not itself subject to structural development, but instead develops as an emergent phenomenon from the changing directions of motion of the assemblages whence it is

produced. A rhizome is furthermore dynamic because changing differences generate different phenomena and next it is deterritorial, because the assemblages may become relayed to different ones. In conclusion a rhizomatic system is '.. an acentered system, in other words, as a machinic network of finite automata (a rhizome),...' (ibid p 18). According to this view, potential for change (directions in motion) is immanent in assemblages and thereby in rhizomes, and change is necessary and abundant.

Next, because we have set out to make a system in order to understand it, we turn to an engineering perspective, in order to deal with the situatedness and the machine-like nature of assemblages constituting a rhizomatic system. A machine can be defined as: '.. that which behaves in a machine-like way, namely, that its internal state, and the state of its surroundings, defines uniquely the next state it will go to' (Ashby, 1962, p 261) enables the examination of a shift of focus from processes, to stable patterns. First, a machine can exhibit its behavior independent of the material substrate it is embodied by or its design. Second, it stagnates if the former condition is not satisfied and if there is no interaction with its environment. Thus, a machine is a locus - not necessarily physically embodied - where a real is produced from a virtual real, under the conditions of the actual. I propose to implement it as the locus of a process where ideas are selected from Ideas, the invariable around the selection process (cf. Maturana and Varela .1972).

Now, individuation can be depicted in such a framework as: ".. the essential idea is that there is first a product space – that of the possibilities – within which some subset of points indicates the actualities. .. Whence comes this product space? Its chief peculiarity is that it contains more than actually exists in the real physical world, for it is the latter that gives us the actual, constrained subset" (Ashby, 1962, p 257]. The product space depicts the virtual real, from which the machine given the initial conditions - the actual - selects its next state - the next real. The parts of the machine and the whole of the relations between them is its organization. The latter exists because of the focus of the observer on the relation between the components of the system, and - to a lesser extent - between it and its environment (cf. Ashby, 1962, p 257).

Last, a system of a multitude of recurrent differences is first a phenomenal pattern observable as such. But we were concerned with an opposition to stasis, and the question is pertinent how this view caters for novelty. The potential of a system for generating variety originates from the variety and changeability of its components, and their mutual relationships: 'These second-degree differences (relating series of differences to others DPB) play the role of the 'differenciator' (sic) - in other words, they relate the first-degree

differences to one another' (Deleuze, 1968, p 117, emphasis by the author). The system is referred to as a differenciator (sic): a dynamic source of unlimited difference.

In conclusion, the basis for our thoughts on the subject matter is first differences and change, captured assemblages and rhizomes. Second, situated and observable then what is knowable is a *machine*. The processes described by Deleuze generate systems with potentially unlimited outcomes.

Self-organizing System, Milieu and Boundary

In the proposed framework for change, patterns represent assemblages in a rhizome. Because emerging from a process, persistence of a system implies that a repetition occurs of (our observation of) it; we observe that it maintains itself making a reference to itself. A self-referencing machine is capable of keeping its processes (operations) within the boundaries specified in its organization (structure). We are concerned in this section with the definition of the boundary of a self-referencing system and its milieu, the part of the environment it is capable of interacting with. Changes in the environment of machine M are by definition external. When $f: I \times S \to S$, where S represents an observed system. I the interacted part of the environment of the system, its milieu, and a represents a controller of the behavior of the system, then f is defined as a set of couples such that s_i changes to s_i by the internal differences of the system S. Self-organization in a strict sense means to allow f to be a function of the state, nonsensically implying immanence of the machine's behavior in its parts: 'Were f in the machines to be some function of the state S, we would have to redefine our machine. .. We start with the set S of states, and assume that f changes, to g say. So we really have a variable, a(t) say, a function of time that had at first the value f and later the value q. This change, as we have just seen, cannot be ascribed to any cause in the set S; so it must have come from some outside agent, acting on the system S as input. If the system is to be in some sense 'self-organizing', the 'self' must be enlarged to include this variable a, and, to keep the whole bounded, the cause of a's change must be in S (or a). Thus the appearance of being 'self-organizing' can be given only by the machine S being coupled to another machine (of one part)..' (Ashby, 1962, pp. 268-9). Because a is not a part of S, it belongs to the milieu of S. The controller is not part of its own organization, but it cannot be fully external to it: the system is self-referencing only in its milieu, providing the functionality of controller a. The range of all future states of a machine are restricted by its actual organization S and the state of its actual milieu I.

Thus, the *boundary* of a self-referencing machine is generated by its operations, and distinguishes the system from its *milieu*: 'Consequently, the system cannot use its own

operations to connect itself with its environment since this would require that the system operate half within and half without the system. The function of the boundaries is not to pave the way out of the system but to secure discontinuity' (Luhmann, 2002, p 134). It follows that a boundary belongs to the system and to its *milieu*, *self-organizing* its distinction from the environment while making use of it, thereby generating its *identity*.

Firms emerge from a complex economic *environment*, where uncertainties are large and dynamic. According to the traditional view, firms adapt their operations to the demands of the *environment*, making use of human agency. But when uncertainties restrict the interactions and the corresponding next states of the firm in unforeseen ways - controller *a* is not in place - the question is raised how firms can be consciously directed to get there. The latter can be resolved by assuming that firms are initially *adopted* into a rhizome, instead of immediately adapting to their *environment*: 'It is sufficient if all firms are slightly different so that in the new environmental situation those who have their fixed internal conditions closer to the new, but unknown, optimum position now have a greater probability of survival and growth' (Alchian, 1950, p 216). Because of 'fixed internal conditions', the firm is initially not equipped to adapt to external exigencies. Only once adopted into a *milieu*, it can adapt to the perturbations it encounters. Device *a* is provided by the system's *milieu*, defining *S*.

Literal Take on Autopoiesis of Social Systems

The boundary enables a machine to maintain a discontinuity through a lasting distinction from its environment. The latter brings cognition into view, continuing Luhmann's previous quote: 'Whatever one wants to call cognition, if it is supposed to be an operation then the operation necessarily has to be one incapable of contact with the external world, one that, in this sense, acts blindly' (Luhmann, 2002, p 134), because systems (what I presently refer to as machines) are both distinct and they distinguish. We are concerned with this kind of self-referencing machines, catering for the structure and the operations of cognitive machines, namely involving people.

Inspired by Luhmann I suggest that autopoietic theory caters for the latter. Luhmann focuses on the development of society and of the social systems making it up and functionally coevolving (Luhmann, 2002). My focus is on the structure and the operations of the firm, one protagonist of Luhmann's philosophy of society. In order to answer my research question concerning the nature of the firm, I suggest a literal over a purely functional approach to the theory of autopoiesis.

Autopoiesis was conceived to explain the structure in relation to the operations of organic (biological) systems, taking an abstract and literal approach. In the remainder of this section

I highlight the main features (underlined) connecting autopoiesis with the processual and objective thoughts developed so far, bringing the firm into focus. *Autopoietic* theory concerns the question: 'What is the invariant feature around which selection operates?' (Maturana and Varela, 1972). An autopoietic system is self-referential, changes from its own point of view through self-organization, subordinating every operation to maintaining itself, including its means to replicate. The capacities of the latter to actively compensate for deformations from external perturbations, presupposing a principle of organization: '... any change in it should take place subordinated to its maintenance, and thus sets the boundary conditions that specify what pertains to it and what does not pertain to it in the concreteness of the realization' (ibid, p 87). Thus, this theory builds on the thought that living systems are self-referencing machines which generate their boundaries as previously discussed (ibid, subtitle: 'De Maquinas e Seres Vivos'). The latter execute their operations as per their present organization and their perception of external activity through perturbations.

An autopoietic machine is by definition <u>operationally closed</u>: it recurrently specifies itself as its structure defines its operations (behavior), while the latter defines its structure, an example of *individuation*. A system is operationally closed when it is closed and self-maintaining at once. A system can have access to a limited number of processes which it can add to its current repertoire. Adding a process may result in an extension of the repertoire of the system. This continues until the entire number of processes is exhausted. The system is closed when no new operations of the system, its repertoire, are enabled from those in the initial limited number and a new *attractor* is said to be reached: the system now with the additional operations can exhibit a new repertoire of behavior. In addition, a system is self-maintaining when no operations are removed by the current operations: all of them continue to actively contribute without becoming exhausted. This autopoietic conception of an operationally closed system connects well with the rhizomatic conceptualization, because the assemblages have come to be taken up into an organization such that they go on doing what they do while they enable others to do exactly that, thereby maintaining the operational closure of the overarching system.

<u>Unity</u> is the distinctiveness of a *multitude* from an *environment* for an observer. Its nature and its domain of operations are specified by this distinctive and determining process: 'Unity distinction is .. an operative notion referring to the process through which a unity becomes asserted or defined: the conditions which specify a unity determine its phenomenology' (Maturana and Varela, 1972, p 97). The properties endowed to a unity by its operations are separate from the operations at the scale of its parts: the properties of the emergent unity are *irreducible* to the latter. A rhizome takes up exactly the number of dimensions it requires

(spanning up its own space), while a unity adds the new dimensions required for the distinguishing observation.

An <u>observation</u> focuses either in the domain of the *unity* or in the domain of its constituent processes (Cohen and Stewart, 1994). Next, 'Anything said is said by an observer' (Maturana and Varela, 1972, p 8), meaning that descriptions of observations are on account of the observer, not of systems- lest they are themselves the observer - and observations by systems of themselves are different from those by external observers (cf. Ashby, 1962).

Autopoietic <u>organization</u> is the arrangement of the constituent processes of a machine including their interrelations: 'Due to the circular nature of its organization a living system has a self-referring domain of interactions (it is a self-referring system dpb), and its condition of being a unit of interactions is maintained because its organization has functional significance only in relation to the maintenance of its circularity and defines its domain of interactions accordingly' (Maturana and Varela, 1972, p 10). The latter reference to <u>interaction</u> is understood as an individual act, and a perturbation is what is perceived by another, and what may cause the latter to act in response, contributing to an interaction. The interactions a system can engage in (contribute to) are determined by its organization. The <u>cognitive domain</u> is the repertoire of all the interactions into which the system could enter, given its present organization. The interactions the system engages in is determined by the elements in its environment it is capable of engaging with, namely its milieu.

Depicted in the framework of (Deleuze, 1968), the next state of a machine, its next real, is generated by its current virtual real restricted by its actual repertoire and its *milieu*, integrating internal states of adjacent systems. Rhizomatic systems of this kind are necessarily operationally closed, lest they *continually* mix up their own operations with those of others in their *environment*, and their internal states with external states.

Such a machine is categorized as a member of a <u>class</u> of machines by behavioral properties (phenomena) lending it an <u>identity</u> by way of the interactions it can engage in (determined by its <u>organization</u>). An <u>observer</u> categorizes the latter in a <u>class</u> because of its <u>identity</u>: the interactive behavior rendering it observable as a <u>behavioral unity</u> (cf. Maturana and Varela, 1972, pp. XIX – XX; Varela, 1997). A machine of a particular <u>class</u> can <u>emulate</u> the behavior of other members of that <u>class</u> without breaking its <u>operational closure</u>. Thus, a <u>unity</u> is subjectively defined by the relation between the observer and the observed (cf. Ashby, 1962).

The <u>structure</u> of an *autopoietic* machine is determined by the part of its constituent processes which physically and observably realize it (cf. ibid). In this respect, Deleuze and Guattari (2004) maintain that: 'Perhaps one of the most important characteristics of the rhizome is that it always has multiple entryways;..', meaning that it can be distinguished in (widely) various ways, and what underlies that distinction is its structure. It specifies the machine as an individual member of its class: 'The actual components (all their properties included) (constituent processes DPB) and the actual relations holding between them that concretely realize a system as a particular member of the class (kind) of composite unities to which it belongs by its organization, constitute its structure' (Maturana and Varela, 1972, pp. XIX - XX). Organization determines the membership of a class, structure determines the realization of the individual member. Class and identity change if the organization changes, but changes to its structure have consequences for the individual.

Take the example of a pharmacy making an effort to exhibit the behavior of another pharmacy, whereby it emulates behavior in its *cognitive domain*. Its *operational closure* and its *organization* are unchanged, and it remains a member of the *class* of pharmacies, although its *autopoietic structure* changed. However, take the example when a pharmacy pursues to *emulate* the behavior of a bakery. It is forced to show behavior outside of its *cognitive domain*, leading to improvisation. The firm is forced to show behavior originating from its present *organization* to compensate for unfamiliar perturbations, forcibly leading to a change of the *organization* or a disintegration of the *organization* and the demise of the firm.

Autopoiesis in Social Systems

We are concerned with different perspectives on the viability of the notion of autopoiesis for social systems, resting on a different understanding of the nature of social relations (Cadenas and Arnold-Cathalifaud, 2015a, 2015b; Maturana, 2015) in (Lenartowicz, 2016).

Maturana understands social relatedness as a biological phenomenon, having in mind for example the fondness of next of kin and of children, maintaining that the realization of the *component parts* of a social system constitute realization of the whole, whereby the latter cannot be *autopoietic*.

Cadenas and Arnold-Cathalifaud understand the social sphere as a symbolic system, capable of *autopoiesis* developing in social processes, separate from social features generated by organic *autopoietic* development.

I suggest the decisive argument proposed by Lenartowicz, that the latter are not two different understandings of the same social phenomenon, but instead address different social

phenomena involving different *cognitive* operations from different kinds of *autopoietic* embodiment.

Thus, biological social is an expression of biological embodiment with an *operational closure* in a biological sense, and sociological social is an expression of self-organizing behavior of multiple individuals.

This rationale keeps the door open for the substantiation of the social systems making use of the notion of social systems.

Chapter 5

Summary of the Methodology

The structure of my research project is determined by an abductive procedure for the presentation of arguments and conditions concerning its approach and presentation focusing on explanation. I set out to develop a proposition avoiding critique concerning the nature of the firm in the aspects of autonomy and emergence. The proposition is supported with the state of the art in systems science in order to lay a foundational framework of concepts and conditions towards a theory of the firm as an emergent phenomenon. The constructed conceptual framework is independent of the kind of human organization in focus. Particular ideas determine the particular kind of organization which emerges and are thus particular to it.

An analytic procedure is developed for the derivation of the ideas particular to the firm and implemented on the body of culture known as the market system to derive these ideas. I continue to present a toy model first of a complex of ideas of a firm as a basis of a toy model of the firm.

The proposition plus the whole of the support found for it is the hypothetical conceptual framework. The body of concepts and arguments thus generated is my contribution towards the development of a novel theory of the firm as an emerging phenomenon. These findings lead to a supported hypothesis for the second perspective, avoiding the critique on the traditional view. The latter is discussed making use of a thought experiment, intended as a 'thought laboratory' (cf. Polyá, 1944). Practical business situations relevant for the various stages of the existence of the firm are discussed whereby the traditional view on the nature of the firm is compared with the newly developed second perspective.

An integrated body of concepts and conditions which is capable of explaining the nature of the firm as an emergent phenomenon is presented and applied. Through a discussion of its shortcomings, I develop recommendations for further research. In addition to the above presented structure of the activities of this research project, Table 2 shows the decisions in regards to its conditions.

Nr	Methodological Decision	Summary Description
1	Involve the focus of the observer	Suspected behavior depends on the relation between the observer and the observed. Observations are by definition incurably subjective. A philosophical framework of choice takes the focus of the observer into consideration.
2	Made reality	The firm is hypothesized to be an exponent of the behavior of people. A connection between action and reality is noticed: what you make is what you see.
3	Conceptual parsimony	The relations between the concepts and conditions developed into a body must be scientifically plausible, logical and consistent among themselves.
4	Explanatory power	The developed body of concepts must explain the operational mechanisms which generate a firm such that they describe reality.
5	Theoretical connectedness	There appears to be room for improvement from the current entrenched body of theory in regards to the firm. The condition of a strong connection with it is weakened so as to enable a contribution to a new scientific consensus.
6	Multitude to unity (micro to macro)	A firm is not one singular entity (one object), but it is made up of a multitude. Coherent behavior of people associated with it generates the behavior of a firm.
7	Design to phenomenon	The nature of a firm can be known through its behavior.
8	Process central	Considering the nature of the subject matter, the starting point of our thinking must be its only invariant, namely process.
9	Systems approach	The subject matter touches on many disciplines which results in a multidisciplinary project. The subject matter is engaged with making use of a systems approach

Table 2: Decisions regarding the conditions for this framework

Ontologically, the firm is not an 'ideal object' in an essentialist sense, but only a pattern of the contributing behavior of people. Nevertheless, being ontologically 'only' that, this overall

pattern will be argued to achieve its own operational autonomy by managing to appropriate and maintain control over the contributing behaviors. The nature of this thesis is epistemological, because the question of the nature of the firm is a question of how the firm is knowable. It is knowable by its behavior which is constituted by the behavior of the people associated with the firm: the whole sequence of their actions and the actions they entail. Thus, the nature of the firm is phenomenal, and its study is epistemic. The nature of the firm is processual, because its behavior consists of sequences of actions and the actions these evoke.

Main Concepts

Name	Definition or Description		
Process	Ontological notion of repetition of a difference between series of differences.		
Problem	Making of a difference between series of differences internal to the system or with or between system and milieu. Substitute: lack		
Solution	Erasing of a difference between series of differences. Erase difference when threat to the system's operational closure.		
Question	Representation of a problem		
Answer	Representation of a solution. See idea.		
Pattern	Correlation of redundant behavior of an interconnected (human) multitude such that an observer can observe (cognize) it as a regularity. The latter is reducible, because aspects of its underlying structure can be inferred.		
Idea	One answer to a particular question. Comes into being when double contingency takes place. See answer.		
Milieu	The part of the environment which an observed system is coupled with. The set of external elements that an observed multitude can interact with.		
Organization	The set of relations between the <i>components</i> of an <i>autopoietic</i> system which defines it as a system of a particular <i>class</i> and which guarantees its <i>operational closure</i> .		
Structure	The (physical) manifestation of a system caused by its autopoietic organization, by which it is realized as a system of an autopoietic class.		
Operational closure	When the conditions of <i>closure</i> and of <i>maintenance</i> are satisfied		

Name	Definition or Description			
	then a system is operationally closed. Every current <i>component</i> of an <i>autopoietic</i> system is replicated (and no more) including the <i>components</i> required for its replication (and no more). See: <i>maintenance</i> , <i>closure</i> , <i>autopoiesis</i> .			
Individuation	A <i>process</i> whereby the organization of an <i>assemblage</i> or a rhizomatic system determines its operation, while its operation determines its organization in a <i>milieu</i> . Also self-individuation.			
Emergent behavior	Unitary (macro) behavior originating from the behavior of constituent (micro) elements of a system in the focus of an observer.			
Autonomy	Of a system to have control over its acts without external interference, in view of its <i>self-referencing</i> character. Re autopoietic system: ability to control its acts so as to maintain its <i>operational closure</i> and to stay on its <i>cognitive domain</i> . Antonym: Heteronomy			
Cognition	Operation of the making and erasing of differences between series of differences. In other words: solving problems in order to maintain the operational closure of an autopoietic system. The latter results in a process whereby, given an actual, the (new) real is produced from a virtual and an actual from the existing real. See: <i>Pattern, Expression, Perception, Realization, Reduction.</i>			

Table 3: Main concepts first appearing in Part One

Part TWO -

Meme Fundamental for Understanding the Nature of the Firm

I commence this Part with an introduction of the *idea* as a singular answer - representation of a solution - to a particular question - representation of a problem. I introduce the *meme* as a concept of all the conceivable answers to such a particular question. The relation between the *idea* and the *meme* is defined, the internal structure of a *meme*, the role of the *observer* suspecting it, and I discuss the mutual influence of minds and *memes*. Next, I propose an analytical procedure to derive memes from the market system, suggested as the principal source of memes. I break the market system down into its aspects, and into meta-memes and their constituting elements, in order to arrive at the memes 'of' the firm. I conclude this Part with a summary, a presentation of a list with the derived memes, and the main concepts first featured in this Part.

Chapter **6**

The Dynamic Nature of the Meme

According to the proposition:

'From ideas of an economic and moral nature.'

Does a firm emerge as a coherent pattern of behavior motivated by them in a wider societal context.

According to this view, firms are dynamic processes generating patterns instead of objects with an immanent *identity*. The *pattern of behavior* caused by ideas comes to be in a continually changing *environment*, and perfection seems to be continually pursued but not achieved. The system, *en route* to perfection in the present, is bound to remain imperfect, but lasts longer than expected (cf. Schrödinger, 1948). The purpose of this chapter is to describe the nature of the proposed ideas making use of the notion of memes and the relation between them.

Positioning of the Concept of a Meme

The proposition builds on the notion of an idea as one answer to a question, a particular representation of a solution, which induces human behavior. But the firm exists in a dynamic environment, and an idea in se exhausts itself for a lack of renewal. In a *nomad* environment where continual and reciprocal activity is the norm, new problems present themselves continually through the differenciating (sic) capability of systems' interactions.

Thus, representations of solutions are generated through observations of new problems. The question arises what caters for a source of alternative or new ideas in this recurrent and dynamic process. Deleuze suggests an Idea as this source by their selection from all they could be through *individuation*. Our concern in this section is a specification of the Idea in the present framework, and I suggest we examine whether the notion of a meme can cater for this need through an examination of its uses and a potential synonym.

A meme is a hypothetical unit, derived by analogy to the gene, and its conceptualization is deductive, not empirical. It might be such a source, implementing the Idea, specified by the idea. First, I examine whether the history of the meme allows its present use through a discussion of the comments from its 'biography' (Burman, 2012).

The phrase was launched by (Dawkins, 1976) as a unit of cultural transmission, shaped after (organic) natural selection to uncouple people's behavior from biological

motivators. The statement that memes are a tool to 'rebel against the blind forces of biological evolution' (Dawkins, 1976) suggests intentionality, implying that people differ from other animals because they rebel against their organic ancestry by making use of memes.

The latter is refuted by the argument that a meme, developing separately from and outside of the individual, pursuing its own interests, is by definition indifferent to effects it might induce on people. Memes as subjects of evolution are selected to serve memes, not genes: 'we humans have become just the physical hosts needed for the memes to go around' (Blackmore, 1999, p 8; cf. Heylighen, 1998; Heylighen and Chielens, 2005), and the answer to the question: 'Cui Bono?' (who benefits?) is the memes (Dennett, 1995).

Moreover, Blackmore (1999) argues that Dawkins' claim is void, because 'there is no one in there to rebel', suggesting that the meme instead of the individual has agency, questioning the capability of people to make decisions intentionally. Specifically, Blackmore takes the argument that memes put people in motion to its extreme. Dawkins surmises that memes behoove people to break loose from their biological chains by enabling fast mental experimentation. Blackmore takes this further and argues that memes motivate people's nearly every act (we think that we think), concluding that Dawkins' claim does not logically hold water.

A next critique concerns their lack of definition of components and uniformity of scale (Benítez-Bribiesca, 2001). For example, the General Terms and Conditions of Trade of a firm as well as its individual terms, say the terms of sales and the terms of purchasing respectively, are memes. Although the latter are compositionally nested in the former, they are not necessarily related by the same overarching idea, and they may circulate in separate circles.

In terms of what is previously discussed, first they give (a class of) answers to different questions, and second a meme should not be seen as a *monad*, but instead as a species with a dynamic internal structure.

A critique concerning the lack of embodiment of a meme follows from the assumed strict analogy between evolution in the cultural and the biological sphere. However, assuming that Darwinism is universal, it extends to all selective mechanisms including cultural, regardless of the substrate (Campbell, 1960; Ashby, 1962; Dennett, 1996). The invariant of evolution is the selection process, not the physical properties of its

subject. Thus, human genetic information is not required to cater for cultural expressions, beyond the capability to generate (utter) them. From the same analogy follows the argument that cultural evolution generates too much variation, whereby no stability can be achieved (cf. Benítez-Bribiesca, 2001). A similar critique concerns a lack of a 'code script' of the meme, analogous to DNA in the organic. Both arguments are invalid, because the selection process is the pivot, not common coding, intention to achieve an equilibrium, or the kind of substrate in play.

Next, a common critique on the use of the concepts of the meme is that it is reductionistic. By that argument they could not contribute to an understanding of overarching interconnected, distributed and dynamic systems. Since they focus on the smallest and unchanging, they fail to explain changing behavior of the whole. But this need not be the case when the instrument is wielded wisely, namely to first denounce the use of '...cheating by embracing mysteries or miracles at the outset.' (Dennett, 1996, skyhooks). As we wish to offer a second perspective for the dogmatic perspective on the nature of the firm and the people associated with it, the meme is not ruled out. Secondly Dennett emphasizes the importance of concepts as logical 'cranes', namely to stop our efforts where further reduction is meaningless as such a crane for the explanation of a next scale of intricacy and dynamics. It should not be further reduced as to serve the main heuristic questions people ask themselves, a little different every day. When the latter conditions of catering for behavioral change and 'reasonable reductionism' are heeded, the meme can be used as a concept

Last, Mayr (2001) questions whether the concept of a meme can be substituted with the concept of a concept, the latter defined as: 'An idea or mental image which corresponds to some distinct entity or class of entities, or to its essential features, or determines the application of a term (especially a predicate), and thus plays a part in the use of reason or language' (Lexico Online last visited 2019). By definition a concept is a stable linguistic unity intended for guiding thoughts, a monad. It is a denotative linguistic tool for making exact distinctions, thereby making selections according to a static not a dynamic norm.

Thus, the discussed antecedental arguments do not hinder implementation of the meme as a dynamic notion of an Idea, and the concept cannot conceptually replace the meme. I therefore continue to demonstrate the dynamic nature of the meme through an examination in the next section.

The Relation between ideas, Ideas and Memes

Having paved a path in the debate about the meme, we are concerned to specify its relation to an idea in this section. The statement that: 'A meme acts as a unit for carrying cultural ideas, symbols, or practices that can be transmitted from one mind to another through writing, speech, gestures, rituals, or other imitable phenomena with a mimicked theme' [Dawkins 1976] pivots around transmission: people express themselves making use of 'imitable phenomena' and others perceive these expressions. This understanding of the notion of transmission is well suited for process ontology, because the process - transmission - is primary, and objects are secondary. However, the formulation is ambiguous, because it does not clarify what carries the cultural significance and what is carried: e.g. the cultural idea or the ritual (cf. Saussure, 1916, signifier, signified].

The latter issue is addressed by this definition: 'An information pattern, held in an individual's memory, which is capable of being copied to another individual's memory' (Heylighen, 1998; Heylighen and Chielens, 2005), whereby a meme is a mental representation of a person copied by way of a 'meme vehicle' (ibid). The person not the idea (or the meme) is the replicator doing the copying (cf. Gabora, 2004), represented by the notions of expression and perception, carried by any physical medium: 'a wagon with spoked wheels not only carries grain or freight from place to place but it also carries the brilliant idea of a wagon with spoked wheels to carry grain or freight from place to place' (Dennett, 1995). The meme we might call spoked wheel wagoneering is under the guise of its expression as a particular example of such a wagon.

Understood as the implement of an Idea, a meme is virtual (though in the Deleuzian real sense), because it hides behind its examples in the same way as an organic species and its individuals (Deleuze, 1968, masqué). The *expression* and the *perception* can for instance pertain to its design, its use of material, its operation, and in the case of the cart, to its 'brilliant idea' of solving a logistical problem. Different observers, including designers, builders, and operators have their particular individual *perception*. The latter are subjective but related by the overarching meme and contributing to it. The internal structure of the meme is associative, because it is made up of ideas which are subject to *nomad* change and because every observer contributes to it. This specifies the definition of Heylighen, because each observation is different, none having the complete picture. Or in other words the pattern on the memory of the observer associatively concerns a part of the whole meme, whereby all the patterns constitute the meme.

This relation is specified by the notion of *connotation*, first defined as: 'An idea or feeling which a word invokes for a person in addition to its literal or primary meaning', and second as: 'The abstract meaning or intention of a term, which forms a principle determining which objects or concepts it applies to. Often contrasted with denotation' (Oxford-English Dictionary online, last visited 2018]. Denotation implies an exact, specific and implicit relation, whereby its opposite is loosely defined, associative and reciprocal. The principle of the definition determines whether an item belongs in a category, but once categorized it contributes to the basis for the abstraction which forms the principal.

A connotative relation is contingent on individuals' transient *expressing* and perceiving them when an observation is made: 'Cognitive systems .. operate on the basis of events that have only a momentary presence and that already begin to disappear at the moment of their emergence. Furthermore, these systems operate on the basis of events that cannot be repeated but that must be replaced by other events. Their structures must, therefore, provide for the passage from event to event ..' (Luhmann, 2002, p 137). When an expression is perceived the interactors simultaneously have a subjective understanding of the topic and the conversation continues, while failing to close the loop means that the conversation peters out. Having closed the loop even once means that the ideas can contribute to the meme, which exists independently from the interlocutors.

Thus, the relation between ideas and memes is twofold: first ideas exemplify memes (cf. Steiner and Stewart, 2009), and second memes are *connotative* relations of *ideas, through* sequences of expressions and perceptions. Examples of expressed and perceived memes contribute to the scatter of different but related others, its contour shimmering through and becoming the pattern which Heylighen refers to. The contour emerges by the apparent *connotation* as a statistical notion analogue to the individuals making up an organic species.

Memes Develop in Sequences of Events of Communication

According to the proposition a firm is an idea, though it does not distinguish between an idea (one answer to a particular question) and a meme (conceivable answers to a particular question). Memes develop separately but not independently from minds: '.., communication (a meme DPB) fascinates and occupies the mind whenever, and as long as it continues. This is not its purpose, not its meaning, not its function. Only, if it doesn't happen, then it doesn't happen' (Luhmann, 2002, p 172). Or, in other words, what communicates is not the individual, but the communication: Figure 2 depicts the latter double sided process.

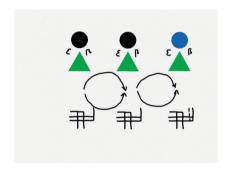


Figure 2: Sequence of events of communication

Figure 2 is inspired by the notion of double contingency, depicting from left to right a series of two consecutive events between one individual represented by the green triangles and another (the interlocutor of the latter) represented first by two black circles and then one blue one. The series of two social interactions between the two individuals is represented by the arrowed circles. Luhmann (1995 emphasis of the author) describes the notion of double contingency, whereby interaction takes place and a series develops: 'Orderly communication, in which we can <u>first</u> expect to be understood by others and <u>second</u> to understand them, emerges from <u>double</u> contingency... Communication that is not mutually understood will not continue'. Thereby individual ideas add to the meme, represented in Figure 2 as a cross.

The minds of the individual and of the interlocutor do initially not change, depicted as green and black respectively before and after the first event. And the meme initially doesn't change, depicted as an unchanged cross before and after the first event. At the second event, moving to the right, the meme develops - depicted as a change of the cross - and the mind develops - the depicted color of the circle representing the interlocutor changes from black to blue. Thus, memes and minds develop in a series of social interactions (cf. Luhmann, 2002, p 158). First, ideas are selected to become a part of memes, and second the attractiveness and repulsion of the latter for a mind develops through reinforcement caused by social pressures.

First the sequence is precarious, because the unique condition for the continuation of double contingency is that the sequence of events is not discontinued, needing continual positive contribution of the interlocutors for its continuation. The conditions for the latter are utterability and social acceptability: '.., for instance, only in the form of language, only by claiming speaking time, only through imposing oneself, making oneself visible, exposing oneself – thus only under discouragingly difficult conditions.', whereby Luhmann (2002) emphasizes the precariousness of the double loop.

Second, what gets *perceived* and *expressed* is at the discretion of the individuals and bridged and connected by memes as they guide individuals' thoughts. In case double contingency occurs the corresponding ideas are at once appended to the meme by the *connotation* by which they were selected. By implication a meme is the equivalent of a communication suggested by Luhmann. When double contingency takes place, an addition to a meme occurs in pairs of an *expression* and a *perception* represented by the circular arrows connecting the symbolic individuals shown in Figure 2.

A sequence of recursive operations - its outputs are inputs - *continually* tests the consistency of the production of the system. The states produced by the operations of the system form the criteria for acceptance or the rejection of further operations.

Conclusion

Starting from the definition of an idea as an *answer* to a question, I presented the meme as a dynamic and connotative concept to represent all conceivable *answers* to the question, changing in a series of social events. Having depicted ideas and memes in this dynamic framework, I connected the latter with the concept of double contingency, enabling its exposure to and influence on (physical) reality. A firm can be depicted as a complex of dynamically changing memes under the influences of first the changed recordings in the minds of associated people and the level of their attraction, and next the *nomad* environment. Thereby a meme is understood as a set of conceivable answers to a particular question. Thus, the change of a meme means a change of the members of the set and their interrelations when a new one enters, or becomes less prominent or disassociated.

In this framework the firm is the processual connection in the sequence of events of communication of all the individuals associated with it. Under the conditions of the actual, at a new event, one new present (a new real) of the firm is selected from an array of possible ones (the virtual), again enabling as many futures as there are answers provided by the meme. Following the analogy of chickens and eggs, people (their minds) are a way for a firm to create another firm, with emphasis on another, because the next state will not represent exactly the same firm, but show *nomad* variation.

Chapter 7

Deriving Memes of the Firm from The Market System According to the proposition, the firm emerges from human behavior put in motion by memes (ideas) of an economic and moral nature, and therefore not specific for the firm but for a wider culture:

'From ideas of an economic and moral nature:

Does a firm emerge as a coherent pattern of behavior motivated by them in a wider societal context...

As this unity, it:

Becomes a self-referencing system once the body of ideas is coherent from a multitude of related ideas in a network...'

Individuals seeking answers to questions concerning their everyday life may receive an answer from memes originating from cultural realms (other than the firm). For example, when an employee of a firm struggles with a management problem, she may turn to the textbooks, to the sports club where she encountered a similar case, or to her religion to ask the corresponding question.

Reality and its observation shift when individual behavior changes: *Was wir als Wirklichkeit verfassen haben wir erfunden* (cf. Von Foerster, 1961). Thus, representations of reality produce reality: memes generate a wider culture through expressed behavior.

We are concerned with the source from which to derive memes associated with the firm, and into which the memes from the firm may feedback. Many of people's economic and moral decisions are guided by the central ideas of (liberal) capitalism e.g. (Goudzwaard, 1982). I previously showed that the entanglement of the firm with people's 'everyday lives' is all-encompassing and pervasive. Therefore I assume that ideas (for now a general understanding) underlie the make-up of the firm.

Following the quoted statement of Von Foerster, capitalism as an ideology first provides assumptions about the functioning of reality, and second guides people's actions regarding economic and moral decisions, thereby shaping reality through ensuing actions. Before examining aspects of capitalism in the next section from abstract meta-memes (memes concerning other memes) to concrete memes, let us review its history and its nature.

First, Marx characterized capitalism as an economic system whereby production factors - entrepreneurship, capital goods, natural resources, and labor - are privately owned. Key aspects are private ownership, accumulation of assets for production, wage labor, voluntary

exchange on markets, and competition between firms. The firm is seen as a nexus for owners to exercise control over production factors. Next, instead of economic planning systems designed and run for purpose, the market is seen as the device to distribute wealth and income. Last, capital is defined as a social relation between people in the economic sphere rather than a relation between people and objects. Breakdown of their social contract is thought to lead to revolt of the laborer, followed by socialism as a new socio-economic and political phase.

Losing its practical (geo-)political importance as a political system at the end of the twentieth century, communism as an interpretation of socialism at once lost ideological importance. Thus capitalism, having lost its principal political and ideological competitor, can be said to have won the competition and gained importance as a practical socio-economic system. For lack of competition - competing with itself - versions of the latter developed, including 'the market system' (Galbraith, 2004).

Examples of versions (brands) are corporate capitalism of the United States of America, the free-market version in the United Kingdom and Singapore, market-capitalism of China and the state-capitalism of Russia. The Netherlands' 'polder model' was traditionally close to the German social market economy (the Rhineland model), but it has recently incorporated features of a free-market economy of the United Kingdom. We are concerned with the market system, a liberal, present-day Anglo-Saxon interpretation of capitalism, its influence on everyday life beyond the strictly economic.

In regards to its modern instance first, Galbraith (2004) points out that the latter kind of capitalism is 'rebranded' to The Market System (lowercase henceforth) to harness and emphasize its primacy over the communist ideology and the corresponding social-economic-political system.

Next, originating from neo-liberal capitalism of Western make, the market system is presently in vigor almost everywhere, an apparent monad apparently without competition, and supposedly imperfect while its conditions for perfection are not met.

In addition, the spheres of business and science are connected first, because this system induces a particular way of conducting business, connecting with the discipline of neoclassical economics, and next, because business is often conducted making use of the theories generated by neoclassical economics e.g. (cf. Galbraith, 2004).

In order to determine the nature of firms, our task is to identify the memes answering moral and economic questions (Weeks e.a., 2003). We therefore continue to identify the memes particular to the market system taking a culture-philosophical perspective on aspects of the

market system identified by (Goudzwaard, 1982). Said aspects offer abstractions regarding people's assumptions about the functioning of reality, and how to act correspondingly. We refer to the latter as meta-memes, because, integrated into the market system, they integrate other meta-memes as well as concrete memes offering guidance to individuals (Dennett, 1995; Blackmore, 1999). The direction of this integration is from a higher level to a lower level of abstraction from the perspective of the individual. The derivation of the latter from meta-memes (aspects) is the subject of the following section.

Breakdown of Meta-Memes and Memes

Thus, the task at hand is to derive memes from the market system, namely practical answers required by the individual to guide her everyday actions in the context of the society of which the individual is a member. I propose to achieve the latter by breaking down descriptions of important aspects of the market system into memes answering the everyday question: How do I act good? referring to a social understanding of the utilitarian aspect, addressed in the following subsection. The descriptions contain historical elements, because the memes have evolved over time to what they are, thereby enabling the presence of the firm.

In the remaining subsections I describe the principal aspects of the market system, deriving the corresponding practical memes from each. I suggest that the order of the procedure directs from the abstract (meta-memes) via integrated meta-memes to memes. Humanism, social utility, progress, invisible hand concern all members of society, and ownership, consumerism and government concern specific members.

Humanism understood as Freedom and Control

The next principal aspect of the market system is humanism, a philosophical stance concerning humanity. The latter focuses on the value and agency of human beings both individually and socially, and it affirms freedom and progress: 'It views humans as solely responsible for the promotion and development of individuals and emphasizes a concern for humans in relation to the world' (Wikipedia last visited 2020, Lemma Humanism). Depicted in a societal and practical view: 'Humanism is a progressive philosophy of life that, ..., affirms our ability and responsibility to lead ethical lives of personal fulfillment that aspire to the greater good' (Website American Humanist Association, last visited 2020), reflecting a connection between the development of the individual and a greater good, such as progress for all society.

The ideals of individual control and freedom are central to humanism (Goudzwaard, 1982). To be in full control means for an individual to be able to take decisions leading up to the present situation and the future without external influence, and to be able to reduce external uncertainties. They are interrelated, because personal freedom becomes manifest in personal control over the world. A tension surfaces in the parallel fulfillment of these ideals, because control and freedom require availability of all individuals in their entirety and the entire world at once. It is logically impossible to idealize the pursuit of human control of the entire world but to opt out when personal freedom is jeopardized by control of others pursuing the same ideal.

Conversely, it is logically impossible to impose one's personal freedom on the entire world thereby implicitly idealizing the control over others. People tend to explore every possibility offered by the space allowed by their circumstance (cf. Montroll, 1982). Assuming their pursuit of the ideals of maximum freedom and control, exploitation of every possibility offered is inevitable.

As a sideline, this present understanding of humanism induces depletion of resources, thereby putting humanity at peril, begging the question whether the current interpretation of humanism requires revision in order to save humanity.

The memes derived from the aspect of humanism answering the question How do I act good? are:

Maximize control and minimize control over me.

Develop to achieve these connected ideals.

Affirm that human life is invaluable (cannot have a price), and all else is not (can have a price).

Table 4: Memes derived from humanism

Social Utilitarianism

The singular pursuit of well-being, the central principle of utilitarianism, is seen as the only good leading to happiness. Aristippus (435 – 356 BCE) and Epicurus (341–270 BCE) conceived the basis of the philosophy underlying modern utilitarianism. The former understood well-being as the result of a luxurious lifestyle, hedonistic in the modern sense, the latter as the pursuit of a peaceful life in the presence of friends without pain and stress. The commonality of the latter is that achieving higher levels of well-being requires the pursuit of pleasure and the avoidance of pain, controlling adverse and advantageous events. The

more social - Epicurean view yields the notion that the pursuit of happiness involves the presence of others, extending individual well-being to well-being for most people.

Jeremy Bentham (1748-1832) is considered the founder of modern utilitarianism. Starting from the latter viewpoint, his philosophy summarizes as: 'It is the greatest happiness of the greatest number that is the measure of right and wrong' (Burns, 2005). Bentham develops a calculus from this formula and ethical, legal and governmental (policy) frameworks. His student JS (John Stuart) Mill (1806-1873) goes on to specify good as a social quality, and defines utility as the result of a good action. Thus, social utility entails that all individuals pursue happiness taking into account the happiness of all, thereby contributing to the increase of social (societal) utility. In this frame of thought, the best individual act contributes most to the happiness of the largest group of people. Mill specifies that an individual's character is better when more good actions are done with a higher and lasting intellectual effect, thereby emphasizing the ethical requirement of a personal contribution to 'social utility'.

Utilitarianism is a key concept of economics (e.g. Varian, 2010), implying the latter moral framework has the primate (everything but the individual can be assigned a utility). Hence, because all else is considered to be a function of utility, simultaneous processing of economic and non-economic norms is sterile. Utilitarianism as the organizing system of society precludes an individual from opting out, because in so doing society is denied the individual's contribution by way of good acts.

The memes from the utilitarian aspect answering the question How do I act good? are:

Every act has utility: do not opt out.

Maximize social utility through acts leading to maximum utility and minimum disutility for the most members of society.

Table 5: Memes derived from utilitarianism

Belief in Progress

The conditions of life in society in the utilitarian sense are believed to continually improve. Every condition at a next point in time is believed to be naturally better compared to a previous one. Progress conceptually developed as an exponent of social theory, involving the sociocultural evolution whereby societies change over time, i.a. Auguste Comte (1798-1857). The latter was, starting from the nineteenth century, considered an aspect of the general evolution of humankind, whereby societies reach different stages of social

development over time. This notion inspired Herbert Spencer (1820-1903) to consider human society to be subject to evolution in the sense of continual progressive development, according to general principles of evolution. At the time this notion was impracticable, because the selective mechanisms of evolution (e.g. Darwinian, Lamarckian) were not yet available to explain these developments.

The progressive difference between the conditions of the current state and the next state of society is bridged by personal development, a connection between personal and societal development called modernism: '.. ideas that aim to make men and women the subjects as well as the objects of modernization, to give them the power to change the world that is changing them... 'modernism' (Berman, 1988, p 16). The latter connection between development of society and the individual is modern, because the individual gains access to control over society, its principal condition is the commitment of its members to contribute. Such conditions, including scientific, technological, economic and social, are believed to (on average) improve, thereby connecting this view on the relation between individual and society with social utilitarianism.

The individual is enabled to progress through deliberate action with the rational objective of liberation from dependencies beyond one's control. Thus, individual progress is an attainable ideal through personal planned development, and progressive development of society takes place in the individuals developing in their struggle with nature. The latter conviction has culminated in the positivist view that progress is good in se.

Thus, society is seen as a device for contributing to utility and the personal freedom of its individual members. However, the latter is at once restricted, because withdrawing from this contract implies defecting from it. Belief in progress is connected with humanism through the tension between individual and society.

The memes derived from the aspect of Belief in Progress answering the question How do I act good? are:

Make a personal effort in order to increase social utility.

Contribute to society: go to school, get a job, save, invest.

Table 6: Memes derived from belief in progress

The Invisible Hand as a Providence

The notion of *The invisible hand* involves that markets are mechanisms that naturally equilibrate demand and supply i.a. (Bernard de Mandeville, 1705, The Fable of the Bees; Adam Smith, 1759, The Theory of Moral Sentiments), enabling a fair and efficient distribution of utility throughout society, applying to many goods and services including human labor. Unrestricted markets are able to function as the proverbial *invisible hand* left to their natural role, in the absence of regulations and undirected. The corresponding governmental economic policy warranting its effective operations is *laissez-faire*. The utility produced through the skill of a person is made available for others through the efficient workings of the market mechanism. Disutility is reduced by identifying and engaging a particular skill accessible through the markets.

Without friction the invisible hand enables the development of all society: 'that great purpose of human life which we call bettering our condition' (Adam Smith, 1786), the market as a mechanistic substitute for the deist notion of providence (Goudzwaard, 1982). From the latter understanding of the nature of the market mechanism follows that the ideal state of a market is an equilibrium between supply and demand. At that natural state every party obtains and purveys their products and services at maximum utility and minimum disutility. At the price corresponding with that equilibrium the buyer is willing to buy, the supplier is willing to sell and utility is maximized for all society.

The program of personal development, originating from humanist ideals and belief in progress, contributes to the development of individual skills. Markets are a pivot for the distribution of utile skills through society, and thereby for the development of society. Taken to the limit, the latter yields the thought that even though an act is not aimed to benefit others, a contribution to social utility is still made: *Greed is good!*.

The memes derived from the aspect of the invisible hand answering the question How do I act good? are:

Enable others to access utility by participating

Pursue own goals to increase social utility.

Affirm unrestricted markets.

Trust that the market distributes utility fair and even when demand and supply equilibrate.

Table 7: Memes derived from the invisible hand

Ownership and economic fruits

Contrary to communism, capitalism embraces private instead of collective ownership as a natural property of the relation between people and objects, and assigns the distribution of utility to the market instead of a planning organism. This section is concerned with the aspect of ownership in regards to the market system.

Ownership of a property establishes a relation between the owner and the owned, by which the former has full control over the latter. Economic fruits of property are also part of the present ownership (cf. Goudzwaard, 1982), thereby characterizing this relation in time. This relationship connects ownership with humanism, because practically everything can be owned, attributed a (monetary) value, and valued relative to human beings rendering the latter beyond comparison.

The scope of the ownership of a firm includes the whole of its value creating (business) processes and their organization. Thus, the organization of the business processes and through their economic fruits - the future returns (profit) of the firm can be owned, whereby the latter is its income after the cost of the infrastructure.

The conduct of firms is associated with profit, but not obligatory, legal or otherwise. Take the example whereby a business, and thereby the firm, generates little or no return over and above the cost of its infrastructure. Uber and Tesla are firms, undeniably motivated by a desire for profit, but the businesses of Uber, e.g. (Reuters, February 6, 2020, 'Uber sees profit by end of 2020, but still expects full-year loss') and Tesla e.g. (Reuters, October 21, 2020: 'Tesla sets revenue record, makes profit thanks to pollution credit sales to rivals') have not generated an operational profit to date. Next, a service firm may set the salaries of the professional staff to allow for the cost of a receptionist, the lease of the office space, and maintaining the infrastructure (e.g. computers, furnishing).

Last, a firm can legally be incorporated as a cooperative: a club with a business purpose. The latter cannot legally generate profit, because it has no owner and therefore there are no rights of ownership of the generated economic fruits. Instead it may show a surplus on its exploitation, available for the infrastructure or distribution to the stakeholders. Thus, the notion of profit is an organizing principle of the organization of firms.

An investor compares the capacity to create value of the invested firm with alternative investments on the financial markets (e.g. stock exchange). If the investor requirements are not met, the value decreases relative to its competitors on the financial markets. Because the firm cannot compete on the financial markets, it will not have access to new investments limiting its growth potential. The value added for the shareholder, increasing the value of the

shares, is a guiding principle for the financing of a firm, determining its future capacity to sustain and grow its trade autonomously.

A widely accepted method for the valuation of the business of a firm is based on its present and future cash-flows (proxy for return) (Rappaport, 1983). The amount of present and future cash flow is based on the organization of the business processes. The current design of its organization, including its strategic perspectives of generating future cash-flow determines its present value on the financial markets.

Thus, the investor is considered the apex in a utilitarian framework, because the investment is at risk: degeneration and devaluation of utility is real. Savings and investments have a high level of utility, a unique risk for which the investor (owner of the firm) is entitled to compensation with a share of the return of the firm. But if the returns do not satisfy requirements the investor is entitled to execute her control and demand improved cash-flow generating capacity (cf. Schreuder and Douma, 2013). Thus, the organizing principle of profit can be seen as a shadow of the future cast on the present.

The memes derived from the aspect of ownership and economic fruits answering the question How do I act good? are:

Invest in order to increase control of uncertainty and income through economic fruits.

Invest in firms to contribute to the development of society laying a claim (and a commitment) to future cash-flows.

Contribute to the solving of problems by establishing a firm or making an investment.

Be active regarding the (supervision of) the conduct of the invested business.

Table 8: Memes derived from ownership

Democratic Consumerism

First, consumerism refers to a desire to accumulate material goods. Utility often becomes manifest materialistically, whereby welfare (material wealth) represents wellbeing, and the generating of wealth is considered to represent increased utility.

This view that (change in) material wealth is a parameter for the success of an individual or a society in generating wellbeing for its members is widespread. Take for example the Gross Domestic Product (GDP): the sum of the gross values added of resident and institutional units engaged in production and services. The latter serves as an indicator of the prowess

and the capacity of a country's economy to generate social utility, its differential an indicator of progress (OECD: Main Economic Indicators). Thus, GDP is a measure of welfare rather than of wellbeing of a society.

Materialism is a personal attitude of valuing material goods, and affluence connects wellbeing with welfare through the conviction that more possessions generate a greater happiness (Richins and Dawson, 1992; Richins, 1994). The latter is connected with consumerism, negatively associated with abundant material consumption, waste, and a desire to publicly exhibit status symbols for social reasons. It is a replacement of individual wellbeing by its proxy welfare (Veblen, 1899).

However, the consumer can be argued to be a pivot in a capitalist economy, because she has the power to indicate a preference for particular products and services over others by purchasing them or else to 'vote with the feet', in a quasi-democratic process. Thereby the consumer co-determines the success of the product and thereby the future of the producer through a decision whether or not to purchase. And thereby the consumer determines the selection of production factors by way of their (technological) relevance for the development of the market system.

Consumers determine which products contribute to the maximization of their utility - or their minimum disutility. The latter interpretation of consumerism extends to the thought that social utility increases when the better product increases demand for production factors. Consumerism is seen in this view as a generative instead of a parasitic system, the ideological opposite of the Marxist view (Eriksson, 2012; Galbraith, 2004).

The memes derived from the aspect of democratic consumerism answering the question How do I act good? are:

'Vote with the feet'

Consume.

Table 9: Memes derived from consumerism

Subordinated Government

From the perspective of 'the invisible hand', the economy is seen as a natural system and the markets as a natural part of it. The natural state of equilibrium is achieved when markets operate unrestricted, their operations meeting with little resistance.

First, it is considered the role of the government to protect markets and their agents from such restrictions and to refrain from imposing them as advocated by the French Physiocrats

and Adam Smith (1776)), assuming a liberal attitude towards trade and maintaining *laissez-faire* policies. This assumed natural character lends *laissez-faire* a moral aspect by which members of society obtain a 'natural right of law' to free markets and trade, yielding a natural right independent of the positive law given from a political order.

Next, income and possessions determine wellbeing, because of the material perspective on and the central role assigned to utility including its generation and distribution. Therefore the government is assigned the role of the protector of the utility of the members of society and its distribution. The latter involves that possessions and income of economic agents are protected by law and enforced by the government.

Third, social utility is achieved by programs for personal development of the members of society. The government is held responsible for enabling them to develop themselves by promoting and providing education, and reducing unemployment by generating jobs.

Last, these government responsibilities require specific tasks in function of the operations of the market system, and no more, yielding the thought that limited interventions imply limitations to the scope of the government tasks and thereby a limit to the size of the latter.

The latter responsibilities engage governments actively with the economy thereby losing sovereignty to the market system, hence the title.

The memes derived from the aspect of the subordinated government answering the question How do I act good? are:

Affirm the markets operate unrestricted such that utility can be maximized (laissez faire policies).

Affirm the generation of jobs, and that jobs are available for me.

Affirm that education is available, in particular for me.

Affirm that property and its rights to the economic fruits are protected.

Affirm that the control and the size of the government is limited.

Table 10: Memes derived from a subordinated government

Conclusion and Presentation of the Memes of the Firm

I first explained the nature of ideas and memes, the relation between them, and the internal structure of memes. Next through a presentation of the market system, I derived the memes underlying the firm through analysis. I conclude this chapter with a presentation of all the memes associated with the firm and their main connections.

The question: How do I act good? heading the table, is asked by individuals to the cultural subsystems of the market system. The nature of their question is understood first in the humanist sense, namely with a focus on the (social) individual and second in the utilitarian sense of an individual in a social (societal) setting: 'How do I act such that my utility is increased in the light of a higher utility for all society?' The latter encompass the metamemes of belief in progress, establishing a connection between personal development and development of all society, and the invisible hand catering for the distribution of utility throughout society. The latter again integrate the meta-memes of ownership catering for a connection between present and future utility, consumerism enabling utility to increase progressively, and the subordinated government enabling protection of natural rights of ownership and facilitating development of its members and of society.

Table 11 shows the derived memes of the firm concerning the question How do I act good? The left column shows the meme from the previous subsections. The right column shows their connections with others. Note that the grammatically correct wording of the heading would be How do I act well? I chose this wording to point out that the consequences of enactment of memes are intended to lead to good for all society.

How do I act good?				
Humanism				
Meme	Connects with			
Maximize control and minimize control over me.	Ownership, Utilitarianism,			
	Government, Consumerism			
Develop to achieve these connected ideals.	Utilitarianism, Belief in			
	progress, Government			
Affirm that human life is invaluable (cannot have a price), and	Humanism, Utilitarianism,			
all else is not (can have a price).	Invisible Hand			
Utilitarianism				
Meme	Connects with			
Every act has utility: do not opt out.	Humanism			
Maximize social utility through acts leading to maximum utility	Humanism			
and minimum disutility for the most members of society.				
Belief in progress				
Meme	Connects with			
Make a personal effort in order to increase social utility.	Humanism, Utilitarianism,			
	Consumerism			

Contribute to society: go to school, get a job, save, invest.

Humanism, Government,

	Utilitarianism, Ownership		
Invisible Hand			
Meme	Connects with		
Participate by allowing others access to utility or else	Utilitarianism, Consumerism		
sabotage the providence by denying access.			
Pursue own goals as a minimum to increase social utility.	Belief in Progress,		
	Utilitarianism, Consumerism		
Affirm unrestricted markets.	Government		
Trust that the market distributes utility fair and even when	Utilitarianism		
demand and supply equilibrate.			
Ownership and economic fruits			
Meme	Connects with		
Invest in order to increase control of uncertainty and income	Humanism, Utilitarianism,		
through economic fruits.	Belief in progress,		
	Consumerism*		
Invest in firms to contribute to the development of society	Humanism, Utilitarianism,		
laying a claim (and a commitment) to future cash-flows.	Belief in progress		
Contribute to the solving of problems by establishing a firm or	Utilitarianism, Belief in		
making an investment.	progress		
Be active regarding the (supervision of) the conduct of the	Humanism, Utilitarianism,		
invested business.	Belief in progress, Invisible		
	Hand		
*In the sense of voting with the feet on the financial markets			
Democratic Consumerism			
Meme	Connects with		
'Vote with the feet'	Utilitarianism, Invisible Hand		
Consume.	Utilitarianism, Invisible Hand		
Government			
Meme	Connects with		
Affirm the markets operate unrestricted such that utility can be	Invisible Hand,		
maximized (laissez faire policies).	Utilitarianism, Consumerism		
Affirm the generation of jobs, and that jobs are available for	Belief in Progress,		
me.	Humanism		

Affirm that education is available, in particular for me.

Belief in Progress,
Humanism

Affirm that property and its rights to economic fruits are
protected.

Affirm that the control and the size of the government is
Invisible hand, Utilitarianism

Table 11: Memes associated with the firm and their interconnections

According to Table 11, a combination of underlying memes, embedded in the memes present in wider society, underlies the firm, without describing the latter, and therefore not immanent in the memes nor presupposed. Thus, the memes of the firm originate from outside, feeding back through people's behavior, the topic of the next chapter.

We set out to derive concrete memes from the market system through meta-memes, assuming first a wide distribution of the latter throughout society, next that the latter shapes people's assumptions about the functioning of reality, and last that the latter shapes reality through people's actions.

I suggest that the validity of the suggested 'memes of the firm' presented in Table 11 to explain the nature of the latter is assessed by examining 1) whether every suggested meme contributes or enables or whether it can be removed or replaced without resulting in a different outcome, and 2) whether particular behavior associated with the firm is not accounted for by the identified memes, identifying the stakeholders of the firm.

However, I suggest that the completeness of the list of candidate memes mentioned in 2) would ideally be determined by comparing the latter with evidence of the behavioral contribution of individual people to the behavior of the firm. But we are not yet in a position at this point to determine the latter, because we have no description of the unitary behavior of the firm.

I suggest that the latter involves the behavior of the subpopulations of the firm (its stakeholders), for which support is discussed in Part Three, and I therefore propose to address our assessment of the validity of the memes there.

Main Concepts

Name	Definition or description			
Meme	All conceivable answers to a particular question. Internal organization by connotation. Recorded in the individual mind as an 'imprinted' pattern. Conceivable means that it is possible to generate a mental representation including suspected ones.			
Expression	(Physical) act following from the operations of an autopoietic system. Counterpart of perception as per double contingency.			
Perception	Reception and interpretation of an expression from the operations of an autopoietic system. Counterpart of expression as per double contingency.			
Connotative	Descriptive of the non-denotative internal relations between the ideas of a meme.			

Table 12: Main concepts first appearing in Part Two

Part Three -

The Firm as Coherent Human Behavior from an Enacted Memeplex

I set out with an examination of the commonality of memes and theories so as to enable an extension of the use of the theory of explanatory coherence to the coherence of singular memes into complexes of memes, namely memeplexes. Next I explain this theory and I apply it to memes, and last, I demonstrate its workings through a presentation of relevant examples.

I continue to discuss the continual influence of events of life experience on the mind of an individual in a process of socialization and a discussion of the notion of *enactment* of ideas in social situations. Next I shift focus to the mobile and behavioral nature of the firm generated through enactment of memes. I suggest that individual people are included by their enactment of the memeplex. And I propose that the population (and sub-populations) of a firm cater for the coherence of behavior of included members. I move on to extend the notion of observation to cater for the relation between the behaviors of the members of the firm's population, its stakeholders. This Part is concluded with a list of the memes guiding the behavior of the subpopulations of the stakeholders, and a list of the main concepts first appearing in this Part.

Chapter 8

Memes Cohere into a Memeplex

According to the proposition memes (ideas) are somehow related to others to form a 'body':

"... As this unity. it:

Becomes a self-referencing system once the body of ideas is coherent from a multitude of related ideas in a network ...'

, raising the question of how memes interconnect to form such a 'body', or in other words how they cohere.

Dawkins (1976) refers to their organization into a 'body' or a complex of memes, thereby determining its nature, as 'co-adapting meme complexes' and Blackmore (1999) and Speel, (1995 refer to them as memeplexes. I follow the latter terminology: the particular memeplex belonging to the firm provides *answers* to questions asked by individuals associated with it.

The nature of the coherence of memes to form memeplexes is the concern of this chapter.

Memes and Theories

I suggest an examination of the notion of coherence between scientific theories and hypotheses making up an overarching theory by analogy with complexes of memes, to cater for the coherence between memes in a complex.

A definition of a scientific theory is a generalized (body of) statement(s) explaining a phenomenon (Popper, 1959; Thagard, 2007). Coherence of such a theory first refers to the power of the latter to explain and predict phenomena.

Next, coherence refers to the nature of the relation between the constituent theories or hypotheses together forming the complex. When a theory has maximum explanatory coherence, it is capable of explaining the truth approximately (Thagard 2007).

The relation between coherence and scientific truth is assumed to be the result of explanations produced through scientific rigor, and for non-scientific explanations generated through (social) processes of selection. People gauge, anticipate and interact with social realities, thereby causing coherence between memes, and generating explanatory heuristic power. Thus, memes provide people with explanations for practical problems and uncertainties concerning their reality, and with predictions enabling solutions of the latter.

It might appear as though the nature of people's need for understanding reality is epistemic, firms being their device, rendering the present framework an intentionalist endeavor. However, people's motivations are practical, having an interest in the approximate truth to

generate heuristical answers to everyday practical questions. The suggested interpretation for present use of this theory is that individuals seeking the approximate truth generate complexes of memes that satisfy the principles of maximum explanatory coherence.

Questions and answers were previously defined as representations of problems and of solutions respectively. The process of solving a problem is equivalent to explaining (or predicting) it by generating answers cohering with the experienced, recorded reality of the problem solver. The latter is supported by the notion that coherence of a meme means that it is 'consistent with the knowledge that the hosts already have' (Heylighen and Chielens, 2005), coherence of memes with recorded memes.

Thus, I consider the extension of the use of the theory of explanatory coherence for memes allowable, and thereby the substitution of theories with memes regarding the ability to exhibit (approximate) coherence with the truth and with other memes.

Explanatory Coherence and Approximate Truth

We are concerned with the explanation of the tenet of the theory of explanatory coherence and how it may lead to the approximate truth. A complex of memes closer approximates the truth when first, explanatory coherence between the memes presently belonging to the complex is maximized. The latter occurs when their interrelations satisfy the principles presented in Table 13 (cf. Thagard 1989, 1992, 2000 in Thagard 2007). Table 13 shows the conditions which, according to the aforementioned theory, the relations between statements in a hypothesis must satisfy.

Name	Description
Symmetry	Two propositions p and q cohere with each other equally
Explanation	 (a) A hypothesis coheres with what it explains: evidence or another hypothesis (b) Hypotheses that together explain some other proposition cohere with each other (c) The more hypotheses it takes to explain a phenomenon, the lower the degree of exhauses
Analogy	Hypotheses that explain similar pieces of evidence cohere
Data priority	Propositions that describe the results of observations have a degree of

	acceptability on their own
Contradiction	Contradictory propositions are incoherent with each other
Competition	p and q are explanatorily connected if one explains the other or if together they explain a phenomenon
Acceptance	Acceptability of a proposition in a system of propositions depends on its coherence with them.

Table 13: Principles of Explanatory Coherence (Thagard, 2007)

Note that, apart from data priority and acceptance, these principles concern the relations between pairs of statements of a hypothesis. The left column of Table 13 shows the names of the principles of explanatory coherence, and the right column presents their explanations. The letters p and g serve as a variable to represent individual memes or memeplexes.

Of particular interest is the acceptance principle, explaining the relation of one meme, for example a new one, with the memes in an existing memeplex, implying that for a meme to take part in the latter, it is required that it readily connects with the present memes of the memeplex. The latter is interesting because it caters for the maintenance of a memeplex as a configuration of memes which is stable as such, thereby including particular memes and excluding others.

Take for example the meme guiding the thought that in principle everything else is subject to human life, attributing the former the status of an object, available for human use and attribution of a relative value (price). The latter meme, we may call it human primacy, enables a firm to employ in principle everything it desires, provided that a price can be agreed. This meme connects with many others, for instance regarding ownership, for example profit as a guiding principle. Suppose that a meme is put forward affirming that 'natural resources are as valuable as human life', opposing the human primacy meme. It would result in conflicts with for example the guiding principles of ownership, control, and profit. The meme for 'equally important nature' would therefore not be coherent with other memes in the memeplex of the firm, not satisfying the acceptance principle.

Next, the data priority principle determining that an empirical observation yields a higher coherence of the relation is next of interest, showing that the character of the coherence of the memeplex is subjective and heuristic.

The Explanation principle shown in Table 13 introduces thirdly, the notion of broadening of a memeplex, and last the notion of deepening of the latter, through recursive selection into the developing complex (cf. Thagard cs, 1997). The memeplex broadens when it gains coherence, because it explains new facts. In the case of a firm, the latter implies that its current memeplex is capable of explaining new facts, meaning that the current memeplex can answer questions it has not answered to date.

Take for example a new-to-the-firm class of customer needs (customers) which a firm can satisfy, making use of its current capabilities, called penetrating a new market e.g. (Boston Consulting Group, 1968, Growth Share Matrix).

Last, the memeplex deepens when it explains the reasons why it holds water by way of others explaining mechanisms by which it operates, or strengthening it against falsification (cf. Thagard, 2007). The notion of mechanisms refers to changes of the relation between the memes and the memeplex, generating the behavior of the whole. Explaining and explained gain coherence when deeper memes are found for support.

For example: starting from the Growth Share Matrix, a business manager would be interested to change the business so as to both include more customers in the same markets and to penetrate new markets making use of new technology. However, it is shown that such an approach requires a large monetary investment and a steep increase of knowledge and effort, thereby introducing risks to the business. The latter explanation yields the answer that the more cautious approach choosing a single approach may lead to a higher return in the long term.

Thagard assumes an heuristic and transient understanding of coherence suggesting that the relation between coherence and truth is approximate rather than absolute: 'I take a theory to be approximately true if it is partly true, that is, if most of its claims are nearly true in achieving quantitative closeness to accepted values' (Thagard, 2007, p 41). We assume that people, in the absence of scientific theory, embrace memes which are approximately and heuristically true in the given circumstance.

Examples of Coherence of Memes in a Memeplex

We are concerned with a presentation in order to elucidate the internal structure of a memeplex through the coherence of the relations between the memes. Note that the latter is not to be confused with the connotative internal structure of a meme. The leftmost column of Table 14 shows the name of the relations as per the previous section, the second and third left columns show a description for each of the pair of memes respectively. The rightmost

column presents a description of their interrelation according to the principle in hand, and its conclusion.

Description of the relation	Meme p	Meme q	Relation p, q
Symmetry Two memes p and q	Ownership	Economic fruits	To own something implies to own its fruits.
cohere with each other equally			p and q cohere
Explanation (a) A meme coheres with what it explains: evidence or an hypothesis	Utility increases when risk decreases	Risk reduces happiness, thereby increasing disutility	q explains p. p and q cohere
Explanation (b) Memes together explaining some other meme cohere with each other	Increase of utility increases happiness	Decrease of disutility increases happiness	Happiness increases by increased utility or by decreased disutility. p and q cohere
Explanation (c) The more hypotheses it takes to explain a phenomenon, the lower the degree of coherence between them	Increase of utility increases happiness	Decrease of disutility increases happiness	Two hypotheses are required to explain the increase of happiness. \ p and q (of example b) cohere little

Description of the relation	Meme p	Meme q	Relation p, q
Analogy Memes explaining similar pieces of evidence cohere	Consumption increases individual utility through increased personal welfare	Consumption increases utility for society as the best products prevail through 'voting with the feet'	Utility increases through material consumption. p and q cohere
Data priority Memes describing the results of observations have a degree of acceptability on their own	The theory of utility posits that reduced risk decreases pain thereby increasing utility	An entrepreneur seeks a (particular) risk because of its potential return	The empirical observation made by the entrepreneur has priority over theory q has priority over p
Contradiction Contradictory memes are incoherent with each other	An ideal of humanism is to have control over the world and to have no external control	An ideal of humanism is that every person should pursue the humanist ideal	If every person has control, then at least some will experience external control. The statements contradict. p and q do not cohere
Competition Memes p and q are explanatorily connected if one explains the other or if together they explain a phenomenon	Progress implies that at a later date social utility is higher in every respect	Progress of society involves personal development	Personal contribution of an individual to social utility leads to progress for all society. Together p and q explain the progress of society. p and q cohere

Description of the relation	Meme p	Meme q	Relation p, q
Acceptance Acceptability of a meme in a memeplex depends on its coherence with them	Social utility involves all society. Profit is the principal guiding principle to achieve social utility.	Preserving nature as a guiding principle does not contribute to social utility.	q is not accepted in p p and q do not cohere

Table 14: Examples of coherence of memes and memeplexes associated with the firm

When the whole of the relations is coherent then the memeplex is maximally coherent, and with a chance to provide an explanation yielding the approximate truth.

Conclusion

First, I demonstrated through a discussion that memes can replace theories as the subject matter of the theory of explanatory coherence (and of coherent theories). The chosen ontological framework remains applicable, because although memes are defined as all conceivable answers to question, I suggested that they are recorded as *patterns* on the mind (mental representations) in the section The Processual and the Reific Nature of the Firm of Part One

I continued to functionally explain the theory of explanatory coherence, emphasizing its dynamic character. And last, I demonstrated the workings of its application through examples of the coherence of the relations between pairs of memes in the concrete case of the firm.

Thus, the theory of explanatory coherence enables an explanation of the organization of the memeplex of the established firm. This is not the same as to say that this theory explains any suspected workings of a memeplex or its morphogenesis. Instead the latter focuses on the coherence of memes itself, and whether and how 'new' memes from the environment of the firm may be selected as a part of the complex. The focus is on the resulting organization of the memeplex of the firm. Once in place the acceptance principle determines that the memeplex of the firm becomes resistant to the acceptance of new memes conflicting with the present ones in the memeplex, rendering the (behavior of the) firm inert.

Chapter 9

Enacting of and Inclusion by a Memeplex

'Quand vos plans sont arrêtés, tout est trouvé. Votre statue vit déjà. Les détails naissent et ils se disposent ensuite d'eux-mêmes' (Auguste Rodin, 1917).

('Once your plan is conceived the die is cast. Your statue is already alive. The details are born making themselves available consecutively from their own initiative' translation dpb)

I demonstrated the organization of memes constituting memeplexes, not how thoughts guided by memes motivate human behavior. But Mr and Mrs Jansen will surely confirm that people and not memeplexes bake bread. We are concerned with the relation between coherence of memeplexes and coherence of people's behavior. According to the proposition a firm emerges through interactions between minds and memeplexes (the proposition mentions ideas):

'From ideas of an economic and moral nature:

Does a firm emerge as a coherent pattern of behavior motivated by them in a wider societal context.

It emerges as a unity by the global behavior of a far-from-equilibrium system - of these ideas and that behavior- in social interactions of persons inside and with the environment of the firm....'

Meme and mind develop in a recursive process while interactions continue while the condition of double contingency is satisfied. When an individual (her mind) is attracted by a memeplex to the extent of enacting the latter, the mindset of the individual is such that it is included by the memeplex. A population is defined as a multitude of individuals whose mind is included by the memeplex.

When double contingency occurs (Luhmann, 1995) an event of communication is created, whereby individuals perceiving and expressing have an similar - different but sufficiently comparable to not interrupt the sequence - understanding of what was expressed and perceived respectively.

Although the process is reminiscent of a discussion between at least one individual. Simultaneity is not a condition, because reading a newspaper article or seeing a church (the edifice) does not necessarily take place at the time of its writing and its building respectively.

Attraction to the Firm through Socialization

Sequences of *expressions* and *perceptions* are series of subjective interpretations of memes as discussed in the section Memes Develop in Sequences of Events of Communication.

These sequences involve admitting memes for an individual's mind to consider, to commit to memory in association with others, and to react to (cf. Heylighen, 1998). We are concerned with the attraction between minds and memes, specifically regarding the ability of the latter to guide our thoughts.

The present frame of thought is that memes, through the experience associated with a (social) event, are recorded ('imprinted') as *patterns* in the mind (Heylighen, 1998; Heylighen and Chielens, 2005). Or in other words, the subjectively conceivable part of a memeplex is recorded in the mind of a particular individual.

'Imprinting' is in quotes, because a *pattern* is not physically imprinted on a substrate, but instead a *pattern* in memory generated by neuro-physiological processes. *Patterns* are generated by personal experience and enabled by personal neuro-physiological characteristics including sensitivity to stimuli, development of and experiencing and reacting to emotions. Events occurring with a higher frequency or with a higher emotional or sensual intensity result in an increased probability that a *pattern* corresponding with a particular meme becomes more prominent.

Take as an opposite example a child with limited life experience but able to *express* herself understandably. The latter is unlikely to surprise us by *expressing* something new or unfamiliar, because it is not part of (or constituted by) the child's experience (cf. Dennett, 1992). The whole of the encounters experienced by an individual will eventually constitute her life experience, and thereby constitute a personal mindset.

These patterns and their interrelations are personal, shaped in personal events often of a social nature, motivating to express acceptable behavior - understood in a gradual, not a binary sense - to society. Socialization means becoming included by memeplexes and learning to behave accordingly: 'Becoming socialised is achieved by becoming heteronomous: it involves knowing that the behaviours one produces have to be performed in a certain way, and acting accordingly' (Steiner and Stewart, 2009).

The reasons for such attraction are particular but unknown to the individual, who relinquishes autonomy to subject herself to the conditions of social interaction. Future exposure of the mind is in a self-reinforcing process determined in present social interactions to which the individual is attracted. The individual's mind is influenced in that particular way,

path dependent and in a particular order, resulting in a unique make-up of her mind, a worldview (Aerts, 1994).

Thus, the probability that an individual exhibits socially acceptable behavior increases when it is conditioned by reinforcement and restriction of *patterns* 'imprinted' through *socialization* and socially coerced. *Expressions* motivating the individual to show behavior qualifying as socially acceptable (favoring the conventions) have a higher probability to be repeated, reducing the probability of encountering different future experiences.

Memes guiding our thoughts regarding firms are discussed in Part 2. I demonstrated that many are historically ingrained in our traditions and our thoughts. Many people are raised, for example, with the thought that 'it is good to have a job, it is frowned upon not to, and bad to be on the dole'. We are familiarized with these thoughts and in order to be socially accepted, the latter guides us to avoid the risk of losing a job or to pursue it hard when jobless, lest we put ourselves at risk socially.

Enactment Generates the Next Real

A question underlying this study is whether people think and act autonomously, namely without external influence or control, or rather without any: 'We like to believe we do these things, but we don't' (Blackmore, 1999). A stronger thought is that the notion of people thinking of their own account is itself a meme: 'people think that they think' (Dennett, 1995). We are concerned with the motivation (what puts in motion) of individuals to think and act under the conditions of what their environment lacks.

First, regarding social forms Lenartowicz (2016) asserts, that: 'the state of being enacted opens up a path for the conceptualization of the emergence of an even stronger existence of social forms', emphasizing that, beyond routine or ritual, a 'stronger existence' may emerge from (multiple) individual behavior_as a social form with a proper identity, a unitary property beyond aspects such as 'esprit de corps' and 'group identity'.

The notion of a *social form* refers to a socially coded *identity*, the codes specifying its properties (Pólos, Hannan and Carroll, 2002; Baecker, 2006). The latter determines the behavior of the individual in the context of the social circumstance and personal conditioning: the individual acting on behalf of the form.

An *enacting* individual acts in accordance with codes, or in other words on behalf of a *social* form providing guidance to her actions by way of condition-action rules in particular, often social, circumstances (cf. Heylighen, 2005). By analogy, I argue that memes function as

coded rules for (social) conduct in the latter sense of *social forms*, and that they induce corresponding behavior when *enacted*.

Thus, two or more individuals act on behalf of a *memeplex*, the former the *population included by* the latter (Blackmore, 1999). The members of the *population* perceive similar answers, vielding coherence of their individually *enacted behavior*, not equal but concerted.

Moreover, the behavior of the system is determined by and it participates in the establishment of its *milieu: 'they enact a world'*, or taking an inward perspective: '.. the manner in which a subject of perception creatively matches its actions to the requirements of its situation' (Varela, Thompson, Rosch, 1992). Thus, enactment refers to the development of cognition of the behavioral enacted entity (system) in the course of interactions with its milieu e.g. (Weick, 1988). Enaction in the latter sense of 'having a way to interact with the environment' is therefore a fundamental feature of cognition (Stewart, Gapenne, and Di Paolo, 2010; cf. Lenartowicz, 2016).

Next, depicted in the scheme of (cf. Deleuze, 1968), *enactment* recurrently produces the new actual from the present real and the new real from the virtual (real). The virtual expands with the realizations of *enacted* memes. The actual is constituted by the present state of affairs of the system and of the *milieu*. Figure 3 depicts how an idea is selected from a meme and how the latter evolves through its realization.

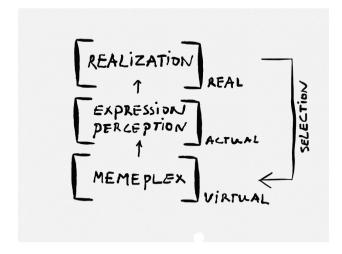


Figure 3: Selection of one idea

The 'memeplex-and-realization', the conjunction of a memeplex and its enactment, is the subject of the production of reality of a firm. The latter is a behavioral phenomenon

generated by *enactment* of a memeplex by members of its *population* interacting with its *milieu*. Memeplexes and the individual behavior they guide develop through *realization* and *selection*

Upward causation determines 'corporate' behavior by way of the coherence of individuals' behaviors. Downward causation determines their motivation to exhibit that particular individual behavior through the selection of ideas from memes as discussed previously (cf. Campbell, 1974). *Memes* are in a *continual* process of perfecting themselves through selection in their present actual (in the sense of a *monad*), while their *milieu* is subject to the same process, *continually* becoming and perfecting as a 'nomad' *environment*.

The lack *perceived* by the individual, depending on the circumstance, may inspire the question: How do I act good? and the suggested answer *enacted* correspondingly. *Memes* from the market system discussed in Part Two are thought to provide guidance concerning the latter moral (and perhaps economic) question: Get a job! Invest in a firm! Buy and consume!

Individuals and the Population of the Firm

Our concern is with the coherence of the behavior of individuals enacting a memeplex, or in other words how *social systems* favor coherent *enactment* and disfavor deviations.

First, individual behavior considered less socially acceptable is favored less thereby tending to occur less frequently. Hence the corresponding *meme* and its relation with others are reinforced to a lesser extent, decreasing its coherence with the *memeplex*.

Behavior induced by non-conformist *memes* weakens the *memeplex*, because the latter decrease the memeplexe's coherence, by competing with other memes, contradicting the latter, or by generating socially unacceptable behavior. Memeplexes-and-realizations propagate similarity, by selecting against memes of the latter kind. Moreover, *memes* favoring reinforcement of the *memeplex* itself or disfavoring competing *memeplexes* (structure) are promoted and reinforced and their opposites weakened (cf. Heylighen, Lenartowicz e.a., 2018).

People are capable of symbolic *cognition* enabling an understanding of imaginary events. The latter may be conveyed using narratives such as tales, where the characters are punished or rewarded for their behavior, whereby corresponding memes are selected and reinforced. Rewards (or lack of punishment) can be promised inducing reinforcement of desired behavior in a person through neuro-physiological processes, exploiting the capability

of people when they apply the reinforced behavior to their practical situations (cf. Heylighen, Lenartowicz e.a., 2018).

Selection of *memes* and *memeplexes* can be reinforced and coerced via emotions, counting as immediate and strong motivators capable of bypassing rational thought. Social systems can mobilize the emotions of their population to reinforce their motivation to *enact* them, for example: fear, quilt, shame, and disgust (cf. Heylighen c.s., 2018).

Thus, individuals are motivated in various ways to exhibit behavior which conforms to the part of the memeplex on their mind, distributed over the individual minds of the *population* (cf. Heylighen, 1998).

Take for example the Dutch Shell Corporation (Shell), a global oil and gas company which is too intricate and complicated to be observed and memorized by one individual (cf. Morton in Ten Bos, 2004, hyperobject). Glimpses taken by the individuals associated with a firm induce coherent behavior of the whole while they memorized only parts of the memoplex.

Next, behavior of individual members of a population guided by *memes* when interacting between them, with the firm and with the *milieu* can be typecast into normal repertoires. Regarding the firm, the subpopulations of individuals showing typical behavior are the stakeholders and may include employees, customers, investors, suppliers, and financiers.

The behavior of the members of the *population* is motivated by *memes*, independent of the individual persons, implying that they could in principle be expressed by anyone: a customer can also be an investor. The question whether a firm can consist of the behavior of one individual assuming multiple roles is theoretically trivial, because it requires at least some relation to what is considered external to itself (its *milieu*, controller *a*).

Take for example a baker who is also the only customer of her bakery. It is also practically trivial, because the baker would have to supply every need for the business processes. Take for example the bakery supplying itself with the required materials and equipment, requiring large involvement with other activities.

Thus, an individual acting for instance as a supplier, employee, owner and customer does not make the whole of her behavior a firm, suggesting that the behavior of the firm is made up of behaviors of a multitude of individuals *enacting* the part of the *memeplex* of the firm in their minds. The *memeplex* of the firm is distributed over the members of its *population*, and the induced behavior is recognized by an observer as a phenomenon of coherent behavior.

Observation of the (States of) the Firm. Stakeholders and Self

The employee's pin-stripe suit, the marble facade, and the robust interior design activate mental representations in an observer based on previous experiences. The observer infers that the observations correspond with a corporate bank. However, an observer with a different history may infer that she visits the cabinet of the President. We are concerned with the role of the observer in the establishment of behavioral patterns through (re)cognition.

First, an observation is defined as an operation whereby a distinction is made independent of the substrate whence it is generated: 'Observation is introduced here as a theoretical concept of difference. Observation is making a distinction. An operative foundation, whether of the mind or of communication, is not crucial for this definition, but it does assume that observation can be accomplished as an operation and as such is itself an operation (that is, it can observe itself only with the help of another operation). Operations of the mind and of communication proceed blindly. They do what they do. They reproduce the system' (Luhmann, 2002, p 179). The quote pivots around the notion of the system's operation of autonomously observing.

Next, the behavior of the observer and of the observed are themselves *distinguishable* through the presence of this operation. *Random* behavior is indistinguishable, because observing from the present state every following state is equally probable. Future behavior generated by the multitude or system cannot be distinguished from the environment, or from its own previous states. The latter prevents cognition, because no distinction can be made between its spaces or states. Thus, just because it can be observed demonstrates that the observed behavior is not random, but necessarily coherent.

Suspecting that a particular next state will occur (through repetition), in third place, an observer focuses on a behavioral coherence of a multitude, or in other words she distinguishes a pattern: 'The real world gives the subset of what is; the product space represents the uncertainty of the observer' (Ashby, 1962, p 258 emphasis of the author). A 'product space' of possible next states changes when the focus of the observer changes: 'The 'constraint' is thus a relation between observer and thing (what is observed dpb); the properties of any particular constraint will depend on both the real thing and on the observer. It follows that a substantial part of the theory of organization will be concerned with properties that are not intrinsic to the thing but are relational between observer and thing' (Ashby, 1962, p 258 emphasis by the author). For example, the cognitive domain of the observer determines her relation to an outboard engine as a device for processing toxic waste, generating heat, vibration, waves, gases or noise, or for facilitating maritime transport.

An observer distinguishing a *coherent behavioral pattern*, say a firm or a football club, and considering (suspecting) it important enough, may assign an *identity* to it, commit it to memory and assign a name to it. Though these cognitive operations are at the discretion of the observer, the *identity* does not belong to the latter, but to the relation between observer and observed: '.. *only the observer observes and he alone is accountable for any distinctions made*..' (Maturana and Varela, 1972). Thus, the observer identifies aspects of the behavior of the observed that are important for self-reference of the former.

Next, second order observation takes place when observing an observation, enabling the observer to take the perspective of the observed on its *milieu*, including the observer (cf. Luhmann, 1995). In the case of a firm, the latter for example involves the understanding of one stakeholder of the interests of another.

In addition, an observer can second-order observe herself making an observation, in order to understand one's own role in relation to another. For example, a bank employee may wonder if an envisioned user would indeed be so deeply interested in the new product as assumed in the bank's customer's business plan, thereby assessing the justification of the firm's request to extend a credit facility.

Last, an observer can treat recursively generated states of a system (including its own states) as objects of further interactions, observing itself as an observer, referring to self-consciousness and self-observing behavior (cf. Maturana and Varela, 1972). The latter can cater for example for the notion of performance, because of the ability to interact with consecutive and imaginary states of an observed system.

Expansion of the *cognitive* domain into the domain of interactions with mental states of the system enables non-physical interactions between systems such that they *orient* each other towards interactions within their respective domains. In regards to the firm, this kind of observation refers to the development of responses to situations making use of 'what if' scenarios.

Thus, members of different subpopulations associated with the firm observe, represent, and voice different perspectives, directly and through the observations of the others, of self and of the firm. Anthropomorphic notions like performance, intention, use and function are particular to people. They may not be relevant to firms, because importance attributed at the scale of the individual human being is not by definition the same as those attributed by the firm.

Conclusion and Presentation of Stakeholders' Memes

In Table 15 I categorize the memes presented in Table 11 of Part Two into memes guiding all associated individuals and those guiding specific individuals where the market system is in vigor. Memes guide the individual and her personal development in a social context offered by our proposed understanding of humanism and utilitarianism, and thereby the development of society indicated in the rightmost column.

General	Focus
Develop (yourself) to achieve these connected ideals.	Individual
Maximize control and minimize control over me.	Individual
Affirm that property and the rights to the economic fruits are protected.	Individual
Affirm that human life is invaluable (cannot have a price), and all else is not (can have a price).	Individual
Affirm that education is available, in particular for me.	Development
Pursue own goals as a minimum to increase social utility.	Development
Every act (or absence of act) has utility: do not opt out.	Social
Participate by allowing others access to utility or else sabotage the providence (invisible hand) by denying access.	Social
Make a personal effort in order to increase social utility.	Social
Maximize social utility through acts leading to maximum utility and minimum disutility for the most members of society.	Social
Trust that the market distributes utility fair and even when demand and supply equilibrate.	Market
Affirm unrestricted markets.	Market
Affirm that the control and the size of the government itself is limited.	Government

Table 15: Memes associated with the firm relevant for all members of society

First, the moral foundation is provided by a social understanding of humanism and social utility respectively, acceptance of the confinement coerced by the thought of utility, and faith in equal and fair distribution of the latter through the markets.

Next, in these bounds the individual is guided to pursue control, personal development, and contribute to the development of society ('progress'), given that everything else is subject to human life and progress. The role of the government is subject to the latter perspective and is expected to contribute to protect ownership, and to provide means of personal development, mainly education and employment.

Thus, the presented memes provide a common perception and expression for the members of societies where the market system is in vigor. In the Table 17 until Table 20 the focus is shifted from general to specific memes in vigor amongst the members of the subpopulations of the firm providing individual guidance.

Employment

Contribute to society: ... get a job,...

Affirm the generation of jobs, and that jobs are available for me.

Table 16: Memes associated with the firm guiding towards employment

The memes shown in Table 16 guide the individual to seek employment in order to contribute to society with her utility, trusting that others are guided in the same way. The latter is reinforced by the individual's choice of government officials guided by the thought that to create employment is a responsibility of the government.

Investment

Affirm that property and its rights to the economic fruits are protected.

'Vote with the feet' (on the financial markets)

Be active regarding the (supervision of) the conduct of the invested business.

Contribute to the solving of problems by establishing a firm or making an investment.

Invest in order to increase control of uncertainty and income through the economic fruits thereof

Invest in firms to contribute to the development of society laying a claim (and a commitment) to future cash-flows.

Contribute to society: .., save, invest.

Table 17: Memes associated with the firm guiding to make an investment

The memes exhibited in Table 17 guide the individual to make an investment first to help solve a problem by establishing a firm, second to gain a return which is also competitive, next to establish a connection between current action and future effect, and last to elect public officers who are guided by the thought that property and the rights to the economic fruits must be protected by the government.

Customer

Consume.

'Vote with the feet' (consumer markets).

Contribute to society (choose value for money).

Table 18: Memes associated with the firm guiding to consume

The memes presented in Table 18 guide the individual first to consume and second that one contributes to society by choosing to consume one product rather than another.

Government

Affirm that property and its rights to the economic fruits are protected.

Affirm the generation of jobs, and that jobs are available for me.

Affirm the markets operate unrestricted such that utility can be maximized (laissez faire policies).

Contribute to society.

Affirm that education is available, in particular for me.

Table 19: Memes associated with the firm guiding to elect a liberal government

The memes presented in Table 19 guide the actions of the government, focusing first on the rights entailing protection of property and ensuing rights to economic fruits, next on the protection of the unrestricted working of the markets, in the third place on the creation of jobs.

The guiding principle is the continual economic and moral development of society in a social humanist and a social utilitarian sense, whereby the latter are meta-memes integrating others. An individual is therefore understood as a social individual and utility is understood as social utility.

Thus, the latter representation of the memes guiding the thoughts and actions of the individuals associated with the firm shows four behavioral subpopulations. When enacted these memes instigate behavior which is on average identified with the latter.

This categorization is in accordance with a narrow understanding of the stakeholder theory (Freeman and Reed, 1983). The latter theory seeks to identify the main influences on the firm in regards to development of a strategy and business conduct of the firm. An important

difference between the present framework and the stakeholder theory is the influence of suppliers on the firm, including the suppliers of financial services, for example a bank.

It appears from the previous analysis that the wider culture of the market system fails to cater for memes which guide individuals to exhibit behavior identifying them as a supplier. It appears that a supplier and a firm differ in the same way as a firm and a customer.

Depicted in our adopted process ontology, the latter yields the thought that the firm and the supplier are part of a larger process. In the latter view, the supplier is nested in the process that encompasses the firm, or in other words its memeplex is integrated into that of the firm up to the point where a product is used or consumed by a final user.

In the special case that the supplier provides financial services to the firm, in some cases - for example a mortgage or a guaranteed loan - particular rights associated with ownership are deferred from the owner of the firm to the financial institution.

The members of the *population* by definition make different *observations* of the firm and different *observations* of each other's *observations*, *self-observations*, and *observations* of the states of the firm. Thereby they determine the coherence between the behavior of the individuals and groups of individuals (stakeholders) of the firm, observing the behaviors of their individual *milieus* and thereby generating the behavior of the firm as a whole as the firm's *population*.

Examination of the Validity of the Memes of the Firm

In order to establish the validity of the list of memes presented in Part Two, we are presently concerned with the establishment first of whether the identified memes are enabling or contributing to explain individual behavior in the context of the firm, and second whether no others are required to explain the behavior of the firm.

Next, I suggested that a subpopulation is defined as a multitude of people enacting the same part of the same memeplex, thereby showing coherent homogeneous behavior. We previously suggested that there is scientific consensus on the kinds of stakeholders associated with the firm, including the owner (shareholder), employee, government, and the customer. Note that I suggested that the supplier is identified as a firm in itself - the topic of our discussion - thereby, contrary to some of the literature, not identified as a stakeholder.

The left columns of Table 20 up until Table 24 show the memes of the firm, and the right column shows an assessment of their relation with the behavior of the associated individual in the context of the behavior of the firm. They are labeled contributing or enabling according

to the kind of processes generated by their enactment: contributing means that a meme contributes to the enactment of the firm, without being indispensable. Enabling means that their enactment is uniquely required for the operational closure of the firm. Note that in some cases memes show in more than one class, because of their shared antecedents. Note especially that the presented memes are neither intended normatively or in any way valid or true in themselves. They derive from analysis of the market system, assumed to provide widely accepted beliefs and assumptions concerning the conduct of everyday life. Therefore, assuming that the market system is an important source of moral and economic memes producing the firms we see today, these generate the memeplex of the latter.

General	Enabling / Contributing
Develop (yourself) to achieve the two connected (humanist) ideals.	Enabling because instructing others implies the same personal effort.
Maximize control and minimize control over me.	Power as a source of continual difference with the environment. Contributing because other such sources are imaginable.
Affirm that property and its rights to the economic fruits thereof are protected.	Enabling assuming that ownership is Enabling to establish a relation with future returns. In relation to government, first legal and thereby political, and second its enforcement may entail violence, in principle a governmental monopoly.
Affirm that human life is invaluable (cannot have a price), and all else is not (can have a price).	Enabling, because the human individual is central, everything is a potential subject of utility for others.
Affirm that education is available, in particular for me.	Enabling assuming that personal development is indispensable for continual increase of utility and progress for all members of society.
Pursue own goals to increase social utility.	In principle contributing because one can not seek utility for others only outside of oneself. Enabling in the light of a social understanding of humanism, of social utility and unrestricted markets.
Every act (or absence of act) has utility:	Enabling, because increased pleasure (and little

General	Enabling / Contributing
do not opt out.	pain) is desired and every act - including absence of the latter - generates social utility.
Participate by allowing others access to utility or else sabotage the providence (invisible hand) by denying access.	Enabling in practical terms, assuming that individual contributions generate social utility, and that unrestricted markets allow distribution thereof. Evidence suggests that negation of the latter, a planned economy whereby utility is determined by a centralized planning function, is impracticable.
Make a personal effort in order to increase social utility.	Enabling, because its negation does not lead to the ideal, and merely instructing another person implies the same personal effort.
Maximize social utility through acts leading to maximum utility and minimum disutility for the most members of society.	Enabling because every act generates utility, and is set in a social context.
Trust that the market distributes utility fair and even when demand and supply equilibrate.	Enabling assuming validity of the assumptions of social utility, and the invisible hand and unrestricted markets.
Affirm unrestricted markets.	Enabling, assuming markets and the existence of the invisible hand.
Affirm that the control and the size of the government itself is limited.	Contributing, different governmental systems exist leading to different sizes and there is no evidence for a reason for this assumption.

Table 20: Assessment of the validity of the relations of general memes and the firm

Employment	Enabling / Contributing
Contribute to society:, get a job,	Enabling because without personal effort to
	develop and generate utility an external force is required, for which there is little evidence.
Affirm the generation of jobs, and that	Enabling assuming that jobs are a means to

Employment	Enabling / Contributing
jobs are available for me.	develop and contribute utility. An alternative for a
	societal function generating jobs is also to be considered governmental.

Table 21: Assessment of the relation between memes associated with employment and the firm

Investment	Enabling / Contributing
Affirm that property and the ensuing	Enabling assuming that ownership is enables
rights to economic fruits are protected.	establishing a relation with future returns. First
	legal and thereby political, and second its
	enforcement may entail violence, in principle a
	governmental monopoly.
'Vote with the feet' (on the financial	Contributing in theory, because the utility of a
markets)	product or service can be monitored by a
	regulator. In practice the investor's requirements
	are only known to the latter, therefore enabling.
Be active regarding the (supervision of)	Contributing because monitoring could in
the conduct of the invested business.	principle be catered for by others (such as
	stakeholders). Enabling when assuming the
	relation between investment and future returns.
Contribute to the solving of problems by	Contributing , because other ways are imaginable
establishing a firm or making an	to solve problems.
investment.	
Invest in order to increase control of	In principle contributing because rights similar to
uncertainty and income through the	ownership laying claim to future proceeds exist,
economic fruits from property.	making use of financial and legal instruments.
	Enabling in the light of the market system,
	because evidence that a commons model is
	impracticable and the relationship to the future
	proceeds originating from ownership represents
	the stronger belief.
Invest in firms to contribute to the	In principle contributing because rights similar to
development of society laying a claim	ownership laying claim to future proceeds, exist,
(and a commitment) to future cash-	making use of financial and legal instruments.

Enabling / Contributing
Enabling in the light of the market system,
because overwhelming evidence that a commons
model is impracticable.
Enabling because without availability of
investment an external force is needed to
develop. But there is little evidence for such a
force.

Table 22: Assessment of the relation of memes associated with investment and the firm

Customer	Enabling / Contributing
Consume.	Enabling in practical terms, because demand (for utility) is required for the firm to be required to supply.
'Vote with the feet' (consumer markets).	Contributing, because the utility of a product or service could also be determined by a regulator, as a planned economy. In practice customer desires are known by the latter, therefore enabling.
Contribute to society (choose value for money).	Enabling assuming maximization of utility and consumerism, because an alternative would not achieve that ideal.

Table 23: Assessment of the relation between memes associated with consumers and the firm

Government	Enabling / Contributing
Affirm that property and its rights to the economic fruits thereof are protected.	Enabling assuming that ownership is required to establish a relation with future returns. First legal and thereby political, and second its enforcement may entail violence, in principle a governmental monopoly.
Affirm the generation of jobs, and that jobs are available for me.	Enabling in the sense that a substitute of this function would also regulate on behalf of all members of society.

Government	Enabling / Contributing
Affirm the markets operate unrestricted	This function can be operated by an independent
such that utility can be maximized	regulator. However, the latter would operate on
(laissez faire policies).	behalf of all the members of society and would
	thereby in fact be governmental. Hence, enabling
	in the light of the market system.
Contribute to society.	Enabling because without personal development an external force would be required to cater for development. But there is little evidence for such a force.
Affirm that education is available, in particular for me.	Enabling in the sense that a substitute for this function would regulate also on behalf of all members of society.

Table 24: Assessment of the relation between memes associated with the government and the firm

Note that in some cases memes are presented in more than one of the above categories of stakeholders with a different relation to the firm, because of the different nature of the relation between each stakeholder and the firm. We first established in Table 20 up to Table 24 that the derived memes are enabling and contributing in many cases and contributing in some, implying that the former have no alternatives (principally or practically) to feature in a model of the firm.

Next, in case behavior is noticed - a stakeholder identified - which is unexplained by a meme from the ones listed in the listed Tables then a meme is missing, implying that an additional meme would be required to underlie the behavior of the firm.

But the behavior of the latter (apart from the role of the supplier) is explained from the aspects of the market system and the integrated meta-memes. Thus no other memes are required to explain the behavior contributing to the behavior of the firm and the list is complete.

Main Concepts

Name	Definition or Description
Memeplex	Coherent complex of memes. Internal organization by explanatory coherence. In full recorded in the individual minds of all the members of the population as a pattern.
Realization	One event of <i>expression</i> and <i>perception</i> under the condition of double contingency.
Memeplex-and-realization	An <i>autopoietic</i> system in the social sphere constituted by a <i>memeplex</i> and its <i>realization</i> by its population. This is the object of evolutionary processes.
Partial memeplex	Part of an entire <i>memeplex</i> -distributed over multiple individuals - recorded in the mind of one individual.
Enactment	Cognitive operation whereby a person acts in accordance with or on behalf of a memeplex.
Population	Multitude of people <i>included by</i> a particular memeplex. See included by.
Observation	(Re)Cognition of a behavioral <i>pattern</i> .

Table 25: Main concepts first appearing in Part Three

Part Four -

Coherent Behavior of People is the Phenomenon

Making use of the Game of Life, I start this Part with a suggestion for a practical notion of emergence. I continue to use this notion to examine the development of the organization underlying systems in general and I extend it to include the development to autopoiesis. I shift focus from the systemic aspects of autopoietic systems of Part one to the identity of the system as the pivot 'around which selection operates'. Next I discuss autonomy and the ensuing design conditions of heteronomy and precariousness applied to the firm, and I suggest an enactive approach to cognition catering for these conditions. I continue to present evidence first for the view that a loss of autonomy is the principal reason for the 'death' of firms, and second that the positive effect of corporate transactions on shareholder value is limited. Last, I present the remaining main concept - the transaction - first appearing in this Part.

Chapter 10

Emergence up until Autopoiesis

According to the proposition a firm becomes a temporarily stable *pattern* of behavior generated by ideas:

'It emerges as a unity ..- of these ideas and that behavior- in social interactions of persons inside and with the environment of the firm.

As this unity, it:

Becomes a self-referencing system once the body of ideas is coherent from a multitude of related ideas in a network.

We examine the process of becoming a self-referencing network, focusing first on the situation of the constituent processes before emergence takes place. Next we focus on the various ways the elements can organize during the latter process. Third, making use of the example of the Game of Life, we examine the shift of ontology from the last point before emergence takes place until right after. We continue to examine the Game of Life for the emergence of an autopoietic system, and lastly introduce the notion of identity as a pivot of the resulting cognitive process.

Assemblages as Loci of Morphogenesis

When coherent behavior is observed, an observer says in hindsight that what *emerged* from a multitude of initially incoherent (*random*) behavioral processes, was '*in statu nascendi*'. But what occurred to produce coherence? An observer is not equipped to focus on *randomness*, but requires a behavioral *pattern*. Unable to focus on an incoherent multitude she may develop a suspicion observing adhering elements, for instance based on previous experiences. We are concerned with an understanding of what takes place prior to and at the *emergence* of a firm, and the notion of an *assemblage* indicating the locus of the emergent phenomenon.

Emergence takes place in interactions between behavioral elements of a nascent *system* in its nascent *milieu*, from a successor of which our suspected system emerges next. The latter therefore takes place embedded in (*milieu*), or neighbored by (*environment*) other such elementary behavioral processes from which other systems may emerge, developing relations by adhering.

The definition of the verb to cohere is 'to form a unified whole' (Oxford Dictionary online last visited 2020). To say that behavioral processes cohere in these early stages would imply intentionalism from us as observers, because there is no overarching organization (whole) to cohere with. The behavior - we cannot speak of operations - of the adhering behavioral

elements of the *assemblage* in focus - the latter is not unitary therefore we cannot speak of constituent behavioral elements - is affected by others and vice versa - we cannot speak of interaction in a cognitive sense because an *assemblage* has no *cognitive domain* (which is reserved for cognitive entities). Last, we cannot speak of focus, because an observer is incapable of focusing on adhering elements' incoherent behavior.

Individuation was previously introduced as a process whereby operations and structure develop recurrently and interdependently in a system. But at this point there is no system, and therefore no operations or structure. Instead I suggest the notion of 'making sense' developed by Deleuze and Guattari, and extended and clarified by Delanda (Weinbaum, 2017, p 171). An assemblage, doing what it does, relative to others, starts to make sense of neighboring ones, and it starts to be made sense of, in a bootstrapping process. Operations and primitive cognition develop, thereby potentially debouching into individuation.

Thus, an assemblage is a locus of adherence or primitive coherence of elementary behavioral elements to neighboring ones, making differences and exhibiting behavior. They may be taken up in their myriads in a structure as a rhizomatic system. Initially the latter appears in the focus of curious and barely behooved neighbors suspecting a pattern, coherence still developing. Object and subject originate from the same source and are indistinguishable (not present). They define themselves at once making sense of their milieus, are being made sense of thereby developing boundaries.

Examples of the adherence of memes are first, the thought that the tasks involved in one's current employment can be performed at one's own risk instead, and second that one's savings presently taken to the bank might also be invested in equity.

Organizing of a Memeplex

I suggested that assemblages <u>get_hooked</u> up (Deleuze and Guattari, 2004, 'taken up in a structure') into potentially larger and lasting complexes in a process reminiscent of morphogenesis, but without any genetic connotation. Relative behavior produced by various memes are the phenomena (Deleuze and Guattari, 2004, 'body withour organs') of assemblages. Those behavioral traits do as they do, and in their multiplicity they are taken up in a structure to become a rhizome. The nature of the latter mechanism is nested and recurring, whereby the complex is constituted of individual memes and smaller memeplexes.

The mechanism reminds of morphogenesis because the next state of a system unfolds from the present one, but it is different, because the rules of the unfolding are not pre-set, but depending on what is on offer from the *milieu*. What can the shape of this process be,

whereby memeplexes are constructed from smaller elements? We are concerned with a mechanism whereby a memeplex emerges from its milieu, becoming increasingly stable at different scales, and increasingly interacting with neighboring processes. Last, thinking of this process, we must keep in mind the rhizomatic nature of the becoming system, namely that a rhizome is not a product of one selective mechanism, but instead an exponent of an heterogeneous multiplicity: '..a rhizome is not amenable to any structural or generative model. It is a stranger to any idea of genetic axis or deep structure' (Deleuze and Guattari, 2004, p 12). Thus, it is an exponent of the developments of the assemblages doing what they do.

Let us turn to a generalized understanding of the development of complex forms from simple ones: 'The time required for the evolution of a complex form from simple elements depends critically on the numbers and distribution of potential intermediate stable forms' (Simon, 1962, p 471). First, development of systems from subsystems and of supersystems from systems is faster and more robust than through sequences of random selections from large numbers of components. The capacity to search for comparable properties in others is limited, thus growth occurs through clustering.

Thus, such a complicated and rhizomatic memeplex develops through intermittent complexes of simpler memeplexes forming subsystems.

As a reference, *random* behavior, means that the latter is *incoherent* for the observer 'beyond our powers of perception' (Wolfram, 2002). An *irreducible* system is the most economical description of its own behavior - there is no shortcut rule to describe the latter - and the observer can therefore not *reduce* it to a rule. The behavior of an <u>incoherent</u> multitude is irreducible: no repetition is observed, from which rules for predicting future behavior can be derived.

But a behavioral *pattern* occurring at an hierarchical scale is a manifestation of the coherence of the behavior of its parts. In case there is a *pattern*, the observer can generate a prediction of the system's future behavior without having to wait for the system to 'run' until that point. The presence of *patterns of* behavior implies that the latter can be compressed into a rule.

Three kinds of *redundancy* are identified as a property of a system of behavioral elements integrating others and integrated by others (Simon, 1962, pp. 478-):

<u>a)</u> the reuse of behavioral *patterns*, whereby few kinds of subsystems are (by repetition) arranged in various ways. Applied to memes, an example of the latter is the business

conduct derived from the efficiency principle for the pursuit of profit (Taylor, F.W., 1911, Principles of Scientific Management], which has found its way into management of government institutions.

<u>b)</u> near decomposability of systems means that subsystems constituting a system have more properties than required for the constitution of a 'supersystem'. The stronger bonds exhaust through integrating into subsystems, the weaker ones integrate subsystems into systems. Maximum explanatory coherence is the strong connection eventually holding together a memeplex, and weaker explanatory coherence determines connections to others.

<u>c)</u> redundancy can be caused by a stable relation between a given state and next states of a system, thereby repeating the behavior of the latter. Examples of this kind of redundancy are a tradition ('this is how we do it in this firm'), and a procedure (first deliver the goods then send the invoice).

Thus, coherent behavior is characterized by *redundancy*, random (incoherent) behavior is not, and the behavior of an *assemblage* only to a limited extent.

Emergence of Organization: Shift of Ontology

The difference between a heap and a whole refers to a difference between the behavior of the single constituting elements and the behavior of the *unity* arising from it: '... the totality is not, as it were, a mere heap, but the whole is something besides the parts ..' [Aristotle, Metaphysics]. Emergence, observing a phenomenon from outside, and self-organization, observing the constituent processes of the phenomenon, observe the phenomenon taking opposite perspectives as it were (cf. Prigogine, 1984; Gershenson and Heylighen, 2003).

We are concerned with a demonstration of the nature of emergence through a discussion of the dynamics of the Game of Life (henceforth Life) (Conway, 1973). In order to better understand emergence as it unfolds, let us follow it from up close, toggling between modes of observation as we wish. The objective is not to liken a cell to a person and the emerging 'creatures' to human organizations by way of a simulation.

At its smallest (micro) scale, rules guide the change of state of individual cells, caused by the input states of other cells. Set in motion, the cells' behaviors cohere into behavioral 'creatures' emerging (self-organizing) at its macro-scale.

Shifting our focus from the micro-scale to the macro-scale and back represents a cognitive operation (cf. Dennett, 2004) of a transformational behavioral process between the cells.

The board of Life is a two dimensional grid of cells, whereby a change in one cell recursively induces reactions in neighboring cells. The latter represent a cell's *milieu*, an immediately adjacent subset of 8 cells out of the *environment*, all the cells of the board.

The state of a cell is represented by its color, black or white, and governed by rules taking input from the condition of the (perceived) state of its *milieu*, and its own present state. The behavior of a cell is the representation of its sequence of states (a sequence without changing states is also behavior).

Every cell is consecutively made active in some order. First each cell tallies the states with the value black of its 8 neighboring cells, comparing the tally next with the values of its rules and last setting its state in accordance. The rules are:

- IF count is 2 THEN the next state is unchanged
- IF count is 3 THEN the next state is ON (black), regardless the current state
- IF any other count THEN the next state is OFF (white)

Life is a two-dimensional cellular automaton because it interacts with its eight neighboring cells on a plane (Von Neumann, 1966; Wolfram, 2002).

A cell behaves in accordance with their rules and the states of the cells in its *milieu*, thereby changing the states of the cells in its *milieu* at the next cycle. The rules remain unchanged as the game develops, but the cells' *milieus* and *environments* change, reciprocally influencing the cells' next state.

Figure 4 depicts an initial condition on the board of Life. The state ON of a cell is represented in black, the state OFF in white.

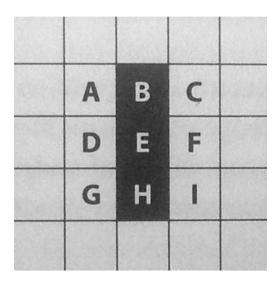


Figure 4: Game of Life, where the initial conditions are a vertical rectangle

Starting from a vertical arrangement of three adjacent black cells and all neighbors white, given the rules, the cells' next state develops so as to form a horizontal bar shape. Thereby D and F have three neighbors and are ON at the next click. B and H have one each and so they will be OFF. A, C, G, I and E have 2 neighboring cells ON and so they will remain unchanged at the next click.

Figure 5 shows the state of the cells at the next state of the former arrangement as depicted in Figure 4:

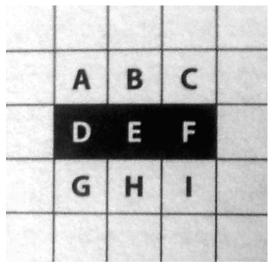


Figure 5: Development of the vertical rectangle at the next state

After execution of the rules governing each cell, all cells but E changed their state, resulting in the change of the vertical bar to horizontal. All involved cells showed behavior, E remained unchanged. At the following cycle the bar is vertical again, followed by an alternation of horizontal and vertical shapes while the game is active.

Another set of initial conditions is shown in Figure 6 as a square of four black cells.

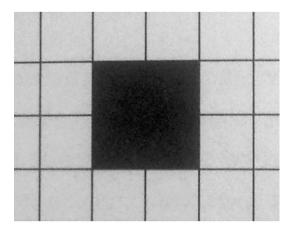


Figure 6: Initial conditions are (and remain) a centered square

The behavior of none of the cells changes at the next click, because each one has three neighbors switched ON, and the square remains square.

Figure 7 shows the initial conditions posed by another arrangement of cells.

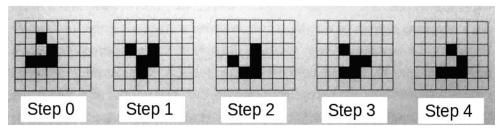


Figure 7: Initial conditions of a 'Glider'

At the scale of the individual cells the rules are executed at every cycle following the rules set out previously. However, the observer can also focus on the scale of the *pattern* arising from the cells on the board.

The latter results in the observation that the Glider depicted in Figure 7 moves one step to the southeast at every cycle via three intermediate arrangements. It continues to move in that direction until it has arrived at the end of the board.

Different *patterns* are observed moving through the cycles from arrangement to arrangement, started from different initial conditions and governed by the same rules. Changing shapes represent their behavior and inspire their name: Eater, Puffer Train, Spaceships (various classes), Spacerake, Herschel Glider, Loaf and Boati. I refer to the *emerging patterns* as creatures.

An Eater can for example 'eat' a Glider as shown in Figure 8. Different kinds of creatures behave differently because they die out, oscillate with a periodicity (up to 144 cycles), create other ones, such as new Gliders, at an interval (up to 256).

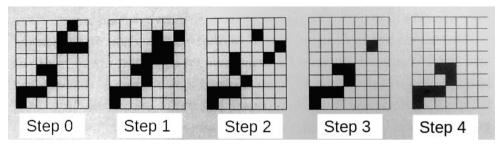


Figure 8: An Eater encounters a Glider

The lifespan is the period between its conception and the generation where a creature becomes periodic or static: the creature R-Pentomino lasts 1,103 generations, Acorn 5,206, and Rabbit 17,331. The latter belong to the Methuselah Configurations with an initial condition of less than ten ON cells.

Thus, the focus of the observer has changed from observing individual cells to observing the behavior of creatures representing behavioral *patterns* of organized cells. The creatures' behavior is observed as a *unity*, depending on its changing arrangement and that of its *milieu*, appraising its functionality and calling it by its name. Through self-organizing, enabled by the focus of the observer, a creature emerges from the grid of cells.

The scale of the observation increased, because first more cells are in focus, and second because their *pattern* is more coherent, exhibiting more organization between behavior of cells. The ontology of simple behavior based on sequences of ON and OFF states of cells was enriched with a plethora of creatures showing persistent complicated behavioral *patterns*.

The ontology and the epistemology of Life changed when the focus of the observation toggled between the micro- and macro scales. First the focus was on the behavior of individual cells and their rules, but emerging *patterns* draw the focus to a different scale of

observation. Next, what the observer can know is extended with creatures and they are knowable through their behavior. The ontogeny is that simple individual local behavior observed in an interactive network mindlessly generates richer behavior.

The *importance* attributed by the objects of observation, cell and creature, differ at different scales. A cell behaves as a result the *importance* it assigns to behavioral changes of the 8 cells in its *milieu*. A creature behaves as a result of the functionality endowed by its organization versus that of its *milieu*. The behavior of an individual cell is unimportant for a 'creature' and vice versa. What is, for example, important for an individual is not necessarily important for the firm.

Creatures are studied by Life Hackers, categorized by their behavior, assigned names and designed. The latter implies to set the initial conditions, enabling the dynamic *pattern* to move and interact in that particular way, given the rules and the *milieu*. The Hacker predicts what happens when creatures meet (e.g. a Glider meets a Steam Train) and improves their functions, individually or organized. Thus, creatures are designed to primitively make sense of their *environment*, their organization catering for their functionality to maintain them, enabling them to be made sense of through its *identity*.

Emergence of Autopoietic Organization: Shift of Cognition and Autonomy

Having demonstrated that an organized *pattern* can emerge from the grid of cells guided by simple rules provided by the Game of Life (Life) we are concerned with an examination of the ability of the latter to bring forth an *autopoietic system* (Beer R.D., 2004, 2014, 2015).

A Glider as a *pattern* consists of 5 ON cells in its *milieu*, see Figure 7, regenerating the necessary arrangement of cells for its maintenance: '.. a glider is a coherent localized pattern of spatiotemporal activity in the Life universe that continuously reconstitutes itself (Beer, R.D., 2004, p 5).

But the latter characterization is incomplete in the *autopoietic* sense. To recognize the ON cells in the Glider arrangement, distinguishing the Glider *pattern* from the environment, they must be surrounded by OFF cells.

The ON cells participate in the production of the neighboring OFF cells and vice versa, an example of interaction system and *milieu*. The OFF cells function as a *boundary* for the ON cells, necessary for the existence and the propagation of the Glider.

A Glider's internal states influence the part of its *environment* through immediately adjacent OFF cells delineating its *milieu*. Reciprocally, perturbations in its *environment* are represented by changes of the OFF cells that directly surround it. And the latter are in turn affected by the cells surrounding them. The states of those cells in its *environment* are not observable by the Glider, because it is only capable of interacting with its *milieu*.

Interactions which are intolerable without disintegrating the *cognitive domain* of a system designate parts of the latter as off-limits. Exclusion serves as a self-constraint of its behavior in order to secure its viability. At each step cycle the state of the Glider changes, therefore sensitivity to perturbations is state-dependent: 'with each perturbation orienting the unity to different possibilities for future interaction' (ibid, p 10). Behavior as a sequence of interactions of a system corresponds to a trajectory through its *cognitive* domain.

Thus, system and *milieu* develop jointly under the pressures of the environment: 'An environment can only select from among the interactions available; it cannot in general place a unity into an arbitrary desired state... Thus, identical environmental perturbations can affect a glider differently depending on the state the glider is in when they occur. The converse is also true' (ibid, pp. 9-10). Perturbations caused in the Glider's environment are perceived through its *milieu*. Its organization determines the Glider's domain of interactions, its structure specifies the perturbation it can cause for its neighbors.

Through the Glider's behavior on an empty grid, shown in Figure 7 the latter moves 1 position horizontally and 1 position vertically, passing through 4 states regardless of its position. State 1 and 3 are identical under an operator of a ¼ rotation and a reflection, as are state 0 and 2. From the internal perspective of the Glider itself, the two remaining states differ only in the state of the central cell and the one below it, its limit cycle. When the grid is not empty, its state, its position, and its orientation towards the obstacle determine its evolution after they encounter it.

The fact that this particular *pattern* can be recognized first independent of its placing on the grid, and second through its (predictable) observable interactions with other creatures suggests that it has an *identity*, justifying the name Glider. Its behavior, generated by its autopoietic organization, determines an individual as a member of the particular class of Gliders. Thus, the organization of the Glider in its milieu determines that its operational closure is maintained, and that it is autopoietic in silico.

The precursors of a creature are its initial conditions, enabling its emergence and restricting its range of future states (its basin of attraction). A Glider's precursors can be an incoherent

multitude of cells or shrapnel from a previous encounter with other creatures, because they are not (yet) organized as one. A precursor is not recognizable by an observer because it has no organization, no corresponding behavior and therefore no *autopoietic identity*. The question remains whether and at what exact point a Glider comes to be an autopoietic entity, or whether it is a persistent *pattern*.

First, if the precursor is considered part of the organization of the Glider, then if perturbed into becoming a precursor from which a new Glider is produced, it is a persistent but temporarily perturbed entity.

Next, if they are one, it is not considered a part of its organization, and the Glider emerges from the debris of the first one. However, the emergence of the latter can be delayed for an arbitrary period, with a selected set of initial conditions. In the latter case it is not *autopoietic*, because by definition an autopoietic system is *autonomous*, and it would not (could not) allow such delay.

The presented dichotomy is problematic, because *autopoiesis* is either present or absent and there is no middle ground. In order to solve the problem I suggest a precursor such that it is itself not *autopoietic*, but capable of producing an *autopoietic* variant, a parent but not a child (cf. Jagers op Akkerhuis, 2014). The period between that last precursor and the first *autopoietic* one can be arbitrarily long, but the following individuals are *autonomous* and their intermittent periods are self-determined.

Behavioral Identity of a Firm is Invariant

Our concern is with the consolidation of the concepts discussed so far with a special focus on the notion of *behavioral identity* in the *autopoietic* framework. *Identity* is understood as the point of reference for the two sides of the *autopoietic* process, namely the system's cognition of others and vice versa (Varela, 1997).

An *autopoietic* system creates an *identity* and a *milieu* emerging from a (wider) *environment* and they are construed through interactions (cf ibid). Note that organisms not social systems are the original subject matter of the cited article, but I suggest we continue to take our literal view in order to examine its applicability here.

An *identity* is defined as a 'unitary quality, a coherence of some kind' of a process, 'hallmarked by operational closure' (ibid), interacting without a central controller, in the sense of the previously introduced machine. Control is instead distributed throughout and non-substantial, namely not designated to the (constituting) elements from which it emerged.

Thus, *identity* is understood as behavioral coherence *emerging* from systems' components' interactions, itself interacting.

The *emergent identity* is the 'point of reference' for a domain of interactions (ibid). I demonstrated previously that the *importance* of interactions taking place at the scale of the whole is different from the scale of its constituent elements. We can appreciate that the organization of the latter, as per its *identity*, creates a perspective (to whom it may concern) from which interactions take place.

Thus, its *identity* is the reference for the interactions the system engages in, first because it is an exponent of its organization and determinant for its cognition, and second because it enables relations with its *milieu* and determinant for its capability for *sense making* and then *individuation*.

From the tenet of our developing framework, the *enactment* of memes realizes them as the firm's behavior, and actualizes as memes and eventually memorized (virtual) again. The memes of the firm continually realize and regenerate the network producing it, constituting it as a *behavioral identity*.

This *identitary* perspective on *autopoiesis* shifts the focus from process modalities (e.g. operational closure and organization) to the behavioral *identity*: 'For as long as it exists, the autopoietic organization remains invariant. In other words, .. to think of it self-referentially as that organization which maintains the very organization itself as an invariant' (Varela, 1997). Thus, the firm separates itself from an *environment*, maintaining its *organization* invariant to remain its distinction, lest it dissolves and regresses.

Cognition was defined in Part two as the capability of a system to identify what is missing, namely a persisting lack. A cognitive system identifies a perturbation from its *milieu* as a risk for its *operational closure* and hence for its *autopoiesis*, evoking action to compensate for the perceived perturbation.

The latter 'acts on what is lacking' in order to maintain its identity: 'In brief, this permanent, relentless action on what is lacking becomes, from the observer's side, the ongoing cognitive activity of the system, which is the basis for the incommensurable difference between the environment within which the system is observed and the world within which the system operates' (ibid).

The acts of the firm are rooted in the differences between the perspectives of its observers - stakeholders - and that of the firm. Or in other words, lacks are perceived on all sides and in pairs, and assessed: 'This amounts to elaborating an interpretation relative to this

perspective. Whatever is encountered must be valued one way or another – like, dislike, ignore – and be acted on some way or another – attraction, rejection, neutrality' (ibid). For example the shareholder may perceive a lack of return, the customer purchasing power or quality, and the employee safety or security. Each observes these vis-a-vis each of the other stakeholders, observing them and their observations, vis-a-vis the firm and reflecting on their own states, in order to determine whether action is required and which one.

Conclusion

I show how the focus shifted from an individual element to an emerged entity, leading to a shift of ontology, epistemology and attributed importances. The adherence and organization of individual memes can generate a new behavioral *unity*. I continued to demonstrate that this *emergent unity* can further cohere to become *autopoietic*, suggesting a shift of the focus to the *behavioral identity* as a pivot in the cognition of the system - and by it.

For the unitary behavior of firms is made up of the enactment by people of the memes to generate their behavior. However, the memes, not describing the firm, do not necessarily bear a direct relation to the latter. Thus, we are enacting the memes of the firm everyday, but without having them in mind *continually*.

The lack at the basis of the cognitive operation of each of the stakeholders of the firm originates from their relation to it. Each assesses the actual lack in others, the firm and their own, and act according to their perception of the memeplex. The customer for example may believe that the price of the product is too high and assess that the return required by the shareholder is high. The shareholder may agree with the customer, and assess that the employee costs are too high.

The balance of the lack of each of the stakeholders and the ensuing acts generates the behavior of each and hence the behavior of the firm and thereby its behavioral identity. The latter determines how the firm is *organized*, how it is *perceived* by its *population* and how it *perceives* its *environment*.

Chapter 11

Autonomy and Cognition of the Autopoietic Firm

According to the proposition the firm acts as a unity, whereby:

".. As this unity, it: ..

Acquires and maintains a behavioral identity at its global scale. ..

Ceases to exist when its autonomy is lost ..'.

A critique that led to this research project involved the argument that firms are peoples' tools, upholding that firms are heteronomous, 'wielded' as instruments by *autonomous* individuals. A second perspective, defended in this thesis, involves *autonomy* of the firm and *heteronomy* of the associated individuals. Taken to its extreme the latter is also unrealistic, because their relation is usually not slavery.

One weaker interpretation is that people and firms have influence on the other's actions, while both are *autonomous*, raising the question of the nature of the relation between their *autonomies*. A second weaker interpretation is that *autonomy* is reinforced by *heteronomy*, extending the repertoire of interactions of the party seeking *heteronomy*.

Our assumption that a firm is *autopoietic* implies that the latter is *cognitive* and *autonomous*. First, we are concerned with the nature of *autonomy* regarding the firm and with a suggested relation to *heteronomy*, understood as its semi-antonym, and secondly our concern is with an *enactive* understanding of *cognition*.

Enactive Approach to Cognition: Precariousness as a Design Condition

An operation of an *autopoietic* system is only relevant to its maintenance. While interacting, its internal state changes in a manner relevant to its maintenance enabling it to engage in another *cognitive* interaction (cf. Maturana and Varela, 1972, p 13).

These kinds of systems are inductive: what is expected to take place again is engendered by what occurred before (cf. Varela, 1997). Their organization is conservative and repeats behavior because it is expected (suspected) to solve a problem again, erasing a perceived lack.

The embodiment approach to cognition involves the notion that a body is crucial as a locus for cognition. A conservative interpretation is that functions of the body merely support cognitive operations and a radical interpretation that the body constitutively performs cognitive operations. The enactivist approach to cognition belongs to the second category, defined as an autonomous system (cf. Routledge, 2014, Di Paolo, Thompson, p 68).

Self-individuation, central in the enactive approach, is defined as the process whereby a system, in the latter sense, establishes itself through its identity vis-a-vis others and itself. In other words, cognition takes place in the process of self-individuation.

Enactivism enables a distinction between cognitive and non-cognitive, because it explains how systems self-individuate through adaptive autonomy. The latter kind of system is both operationally closed and precarious (Maturana and Varela, 1972).

First, internal processes of a system may be enabled by the outcomes of internal or external processes, while they may enable processes inside or outside of it. Operational closure means that the organization of a system is such that the internal processes enable each other. Specifically, all the processes belonging to it enable at least one other process belonging to it. and all of the latter are enabled by at least one other process belonging to it.

It is not required that the system is fully independent from external processes. The present kind of system consists of memeplexes, knowable through their *realization*. The meaning of operational closure of a memeplex-and-realization of a firm is that the act following from a meme belonging to the firm enables at least another act internal to it and is enabled by another act also internal to it. External memes are not excluded from this process. The focus of the observer determines the boundaries of the system and thereby the enabling and enabled processes.

However, the condition of autonomy in the autopoietic sense is not satisfied, because the latter system can 'freeze' or become periodic. Instead the latter requires spontaneity, enabling it to maintain itself in a steady state through its capabilities to change, remaining in the domain of its autopoietic organization, pivoting around its identity.

Next, precariousness is introduced as a quality of a system's organization, because operational closure does not cater for renewal. A process belonging to the network stops or decays when the enabling relations established by the operationally closed network are ineffective. Precariousness is a quality of the system which only encompasses enabling processes whereby processes individually or in a combination enable another internal process. Precariousness is an additional organizational design condition, because the enabling relations between processes must be redundant.

Last, the operationally closed and precarious system maintains itself in part through the processes which constitute it: '..., because these processes are precarious, the system is always decaying. The "natural tendency" for each constituent process is to stop, a fate the activity of the other processes prevents. The network is constructed on a double negation. The impermanence of each individual process tends to affect the network negatively if

sustained unchecked for a sufficient time' (Routledge, 2014, Di Paolo and Thompson, p 72]. The system doesn't freeze into immobile patterns, but generates spontaneity in its interactions with other processes.

In the case at hand, precariousness means that the behavior of individuals of the subpopulations making up the firm enable its continuation. Precisely, each of the stakeholders - examples given in Part Three - enable the continuation of the firm but capable of its discontinuation at any point. Each must continue to positively contribute to the whole. For example, the customer must continue to purchase the products or services, the investor must continue to invest (not withdraw from the venture), the employee must continue to provide labor, and the government must continue to ensure that property is safe, personal development is provided and the markets are unrestricted.

Cognition as a Transaction Erasing Differences

We are concerned with an examination of the meaning of *cognition* of a human organization, starting at the concepts of difference and distinction: 'The distinction between the world as sensed (characterized by state descriptions dpb) and the world as acted upon (characterized by process descriptions dpb) defines the basic condition for the survival of adaptive organisms. .. Given a desired state of affairs and an existing state of affairs, the task of an adaptive organism is to find the difference between these two states, and then to find the correlating process that will erase the difference. Thus, problem solving requires continual translation between the state and process descriptions of the same complex reality' (Simon, 1962, p 479 emphasis dpbl.

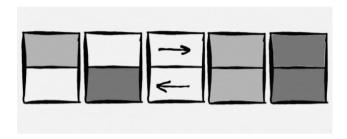


Figure 9: Making and erasing distinctions

Figure 9 depicts the latter understanding concerning the making and erasing of differences of a system in an interaction with another party. The first two squares (left of the arrows) represent the parties prior to the interaction, for example Jansen Bakery and the potential customer for a bread.

The difference perceived by each between their desired state and their actual state respectively - there is a lack in both perspectives - is represented by the two colors of the first two squares.

The differences are mutually *recognized* from their commonality, because Bakery and customer are part of each other's *milieu*. In Figure 9, the latter are represented by the third and fourth squares (right of the arrows), and the internal differences in both parties to the interaction can be erased.

Thus, the system compensates for relative differences by erasing the latter through adaptation of its organization to the conditions of the *milieu*. The activities of a firm (its business processes) consists of operations induced by its *cognition* of external differences, and erasing them for compensation.

Differences between internal and external differences occur, because future and present states and acts are connected because of principles guiding people's actions. A strong example is profit as a guiding principle whereby today's acts have an effect on future cash-flows and the economic fruits of the present value of one's property.

I suggested previously that the memes derived from the market system determine the nature of the firm, but not of its business processes, guiding individuals to enact behavior adding to its behavior as a firm without describing it. The firm's normal business is to compensate for perceived differences between its *milieu* and its *autopoietic structure*, namely its physical realization.

The *cognitive* domain of the firm is the distinguishing and the erasing of the kind of difference that this particular firm engages with in its particular way. This approach is

inspired by the notion of Challenge Propagation: 'From the point of view of an individual agent, on the other hand, the trace is a <u>challenge</u>: a situation that incites action, in order to remedy a perceived problem or shortcoming, or to exploit an opportunity for advancement (Heylighen, 2012) (Heylighen, 2015-I, p 8 emphasis by the author).

I noticed in Part Three that the supplier is not identifiable as a stakeholder - a subpopulation - through the memes of the firm. I suggested that individual businesses are nested into a transcending process on an industry sector scale, often referred to as value adding processes. Depicted in the suggested process ontology, the business processes of the integrated firms are nested in sequences of differences, firms sequentially supplying others.

For example, Jansen Bakery may say We're hiring! and Investment opportunity! and they may request a proposal for a bigger machine, expressing differences. The latter may be responded to respectively with: I am looking for a job. Is the vacancy still open? What are the terms of the investment? and Can we make you an offer for a machine?

Until erased these differences indicate a lack of staff, funding and equipment, but once hired, financed, purchased, the difference in Jansen (and the other party) is erased and consequently new differences are created between the suppliers and their *milieu*.

Next, a supplied machine requires metal, plastic and ceramic materials, and mechanical and electro-mechanical parts, each requiring making and erasing new differences.

Thus, a part of the entire field of connecting differences is claimed by the firm. Figure 10 visualizes how the operations of the latter are a part of a larger field of differences.

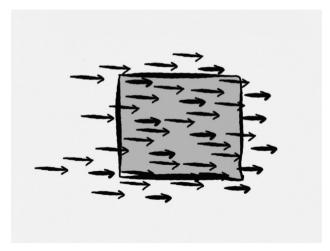


Figure 10: Firm integrated in a field of differences

Business processes connecting differences - making and erasing - are depicted as arrows in a network. The square represents a firm erasing differences in its scope *organizing* and operating its business processes, solving problems.

Limited and Unlimited Increase of Repertoires

We are first concerned with interactive behavior that parties are individually not capable of but which is limited to their complementarity. *Orientation* in the *autopoietic* sense refers to a continual mutual restriction of the *cognitive domains* (*repertoire of interaction*) of *autonomous* parties, whereby the operations of the latter are restricted to parts of their individual domains of interaction (cf. Maturana and Varela, 1972).

In the latter case social interaction is not discontinued while parties continue to understand the *expressions* of others. Double contingency (Luhmann, 1996) forces participants to adjust their behavior such that the social interaction can continue, forcing the other to act on a part of their *cognitive domain*.

The behavior of the *orienter* (the one doing the *orienting*) results in a restriction of the behavior of the *orientee* (the one being *oriented*) to a part of the whole repertoire. These roles alternate, whereby *orienting* and being *oriented* occur in a sequence (cf. Maturana and Varela, 1972). The behavior of a system is therefore restricted by its own *cognitive* domain and oriented by its *milieu*, whereby current behavior is a product of previous interactions.

Thus, the available interactions are potentially large but finite, because what is created is immanent in the *domains* of all the participants. *Coupling* means that behavior causes others to adapt their behavior, influencing their *autopoietic* structure, but not their *organization*.

Conservation of this behavior results in a history of *structural coupling*, whereby compensable structural change is induced in the *autopoietic* organization.

Second, our concern is with an increase of the *autonomy* of behavioral entities through increasing their *heteronomy*. The latter behavioral process involves the choice which memeplex to enact, thereby superseding restrictions to (and in) interlocutors' domains, whereby interactions '.. *constitute the possibility of enacting worlds that would just not exist without them*' (Steiner and Stewart, 2009, p 529). Potentially unlimited novelty is enabled, because the interactions of a system are extended from conditions 'offered' by other domains to what is enabled.

A heteronomous system is in: '.. a state or attitude proper to an organism, a person or a group. It consists in receiving the principles that govern the action of the system from external resources, whose existence and content are largely independent of the system in question' ibid, p 529). The external sources governing the system are normative providing meaning to enabled interactions between the individual and *milieu*.

The notion of *heteronomy*, caters for individuals allowing diverse memeplexes to guide them. Newly acquired behavioral features allow access to a wider range of interactions, implying that *heteronomy* reinforces their *autonomy*. For instance, the individual seeking guidance asking: 'How should I live?' and: 'How do I act good?' increases her *autonomy* allowing inclusion by choosing another *memeplex*. However, *organization* and possibly the *operational closure* of the present partial memeplex of the individual may change, causing *natural drift* in order to regain *autonomy*.

Last, the latter notion of *heteronomy* is attributed to the individual (ibid, p 530), whereby preexistence of social structures is assumed. However, the point of departure of the present study is oppositional to the view that *cognition* of the firm is a functional exponent of human *cognition*. We suggested that the firm is *autonomous* and *cognitive*, and therefore *unitarily autopoietic*, and thereby that the firm may itself pursue *autonomy* through increasing its *heteronomy*.

In order to bridge the latter gap, I suggest that human agency and social structures presuppose each other (cf. Giddens, 1976). The latter depicted in the current framework implies that memeplexes guide individual human action, causing the individual to generate the memeplex in a continual co-constitutive process. Thus, I suggest that a *memeplex-and-realization*, seeking *heteronomy*, increases the *autonomy* of the individual and of the firm at once.

Conclusion

I demonstrated that a firm as a behavioral phenomenon is *autonomous* and *cognitive* and how these aspects of the firm interconnect. To that effect I suggested adopting an *enactive* approach to cognition characterized by *operational closure* and *precariousness* of the network. I explicated cognition in the case of the firm as a process whereby a lack in the parties associated with the firm is made and erased in a series of transactions.

Furthermore I suggested that *autonomy* increases through (occasionally) increased *heteronomy*, thereby establishing the operational connection between *autonomy* and *cognition*, because the precarious system requires innovation enabled by occasional *heteronomy* in order to remain operationally closed.

Chapter 12

Evidence that Autonomy is a Necessary Condition for Autopoiesis of the Firm

According to the proposition:

As this unity, it:..

Ceases to exist when its autonomy is lost'

The claim that firms are *autopoietic* systems requires that the latter act so as to maintain *operational closure* without external influence. The latter claim is therefore supported by evidence of the *autonomy* of firms while they operate, and conversely by evidence that a loss of *autonomy* is associated with the firm's end.

We are concerned with the presentation of evidence first of the connection between the end of the firm and a loss of their *autonomy*. However, the study producing the evidence is founded on a definition of the demise of a firm as a change of its ownership, or in other words a corporate transaction.

A much heard argument to explain the occurrence of the latter is their supposed added value for a firm's shareholders thus generated by the directors. But the human agency implied by the latter argument belongs to the doubt which instigated this study. Next therefore, I present evidence against the supposed increase of shareholder value through corporate transactions.

Thereby a path is paved for my suggestion that corporate transactions are themselves generated by a memeplex through their enactment.

Evidence for the Relation between Reduced Autonomy and 'Dying' of a Firm

Liquidation and bankruptcy are often considered the predominant causes for the demise of firms. Firms' liquidation frees up capital to finance technology driven innovation again, the Schumpeterian case.

We are presently concerned with the cause for the end of the existence of firms, and its meaning in the sense of its *autonomy*. Comparing the creative destruction hypothesis with the outcomes of empirical data shows that a loss of *autonomy* rather than liquidation or bankruptcy causes the firm's demise (Daepp, Hamilton, West, Bettencourt, 2015). This definition concerning the nature of failure of a firm deviates from the commonly accepted one. A critique to this approach is that the end of a firm would be attributable to reduced autonomy and thereby be external to management control. However, my argument is founded on the premises is that the end of the firm is in many cases caused by a corporate

transaction instigated (or at least supported) by them. The processes with at least one of the stakeholders ceases to be enabling, and the operational closure is lost, whereby at least the autopoiesis will change, thereby the organization. The latter causes the identity of the firm to change, and the firm is fundamentally not the same. In rhizomatic terms this means that the number of dimensions changes and therefore the rhizomatic system undergoes a metamorphosis. I claim that bankruptcy or liquidation are extreme cases, whereby autonomy is completely lost inducing the firms demise (in the thermodynamical sense or decomposition).

This study was undertaken in the discipline of organizational ecology: '.., in which companies are seen as units of selection in markets and their longevity is the result of their successes of learning and adaptation' (ibid). The 'mortality' of firms (quotes dpb) was researched making use of the autonomous submission of sales reports to the tax authorities is assumed a valid proxy for the organizational autonomy of the (no longer) submitting firm.

Submissions of every company active in the United States of America are registered in the Compustat database, containing selected data about firms worldwide, maintained and marketed by Standard & Poor's financial services (visited www.compustat.com). The dates of submission of tax returns, the actual submission, and in case it ends the reasons for ending (but not for starting it) are recorded. The later data is entered by firms' representatives and not formally checked, and therefore its validity is unknown.

This research involves the analysis of data of approximately 25,000 publicly listed firms (traded on a stock exchange) in the period 1950 to 2009. The moment of 'birth' of the latter was defined as the year of the first reported sales, and the date of their 'death' as the year when sales ceased to be reported. Thus, the period between the first and the last submission is their 'life'. Note that the quoted words chosen by the authors have a metabolic connotation which I suggest to avoid.

The frequency per cause for ending a submission is categorized as presented in Table 26, respectively as a change of ownership (e.g. merging), defaulting (e.g. liquidation), and other (e.g. reasons unclear or not identified). Further details underlying the causes are not recorded on intake.

Reason for End of Existence (%)		
Mergers and acquisitions	45.1	
Other	28.0	
Unlisted	15.2	
Bankruptcy	4.5	
Liquidation	3.5	
Privatization	2.8	
Reverse acquisition, Buyout, New format	1.2	

Table 26: Frequency of reasons given by firms for ending submission sales (Daepp e.a., 2015).

First, the principal cause of the end of firms shown in Table 26, categorized as Mergers and Acquisitions at 45.1%, is changed ownership. Next, the cases representing the 28.0% categorized in Other were unspecified.

The category Unlisted (15.2%), third, comprises cases where firms were transferred from public to private ownership, technically removing the latter from a stock exchange. Details of the record and the particular circumstances are not specified. For example it is common to delist a firm in order to (temporarily) lift regulatory scrutiny attached to public listing so as to facilitate implementation of change. We assume that the delisted firm can not be considered *autonomous* in the meanwhile, because of a steep influence on the business conduct from the new owners.

Next, the categories Bankruptcy and Liquidation shown in Table 26 represent 4.5% and 3.5% of the causes for ending a firm respectively, together 8.0% of the total. Last, the categories Privatization (2.8%) and Reverse acquisition, Buyout, New format (1.2%), representing situations whereby ownership transfers to staff or an external (e.g. private equity) party, together comprise 4% of the total causes. As a critique, first this involves one study albeit extensive, to some extent corroborated by studies of firms' growth curves during their existence, and second it concerns data of publicly listed firms, thereby representing a fraction of all firms.

Approximately 8.0% of the recorded cases where firms stopped *autonomously* submitting were identified to be caused by bankruptcy or liquidation, leaving approximately 92% for other causes. Removing the cases of the category Other from the latter, identified approximately 64.0% of the cases as caused with some certainty by a change of ownership and an association with another firm. The authors conclude that the latter occurs more often than an '*organisational demise*' analogous to thermodynamic death in biological systems (Daepp c.s., 2015, p.6).

Thus, this study offers support for the thought that firms frequently cease to exist as such for reasons other than a purely Schumpeterian scenario. Specifically, support is offered for the thought that firms frequently end, because *autonomy* is lost in a corporate transaction.

What can be inferred from the latter outcomes? First the data does not comprise the modalities of the transaction, namely the operational integration or instead a portfolio situation at arms length. For example, an acquired firm may become part of an investment portfolio and keep its *autonomy*, or it may be purchased for turnaround purposes, and lose its *autonomy*. Also a firm may merge into another and lose *autonomy*, or in a reverse case the firm may combine into a new vehicle with the new found partner yet remain *autonomous*.

Next, the study is founded on the recorded end of firms' submissions implying that, in the previous examples, the firm's data are consolidated into the acquiring or the dominant firm's and it is operationally turned around and merged, respectively.

Thus, although the study offers no detailed evidence concerning the circumstances of ending submissions, I suggest it is plausible that the recorded firms will have undergone external operational influence afterwards. The latter implies that their *autonomy* will have decreased and that their business processes and the organization thereof will have changed.

Evidence for increased Shareholder Value in Corporate Transactions

I previously presented support for the thought that the end of a firm is caused more frequently by a loss of *autonomy* from corporate transactions, than by a loss of organization from firms' demise.

However, the main reason for engaging in the former is commonly thought to be increased shareholder value. And the corporate directors contracted by the owners for that purpose are considered to initiate these transactions. Take for example assumptions of increased revenue through cross-selling, and decreased cost through reduction of corporate overhead. Pursuing the latter increases profit, thereby increasing corporate value, and the sought after relative performance on the financial markets e.g. (Rappaport, 1991).

Thus, their assumed operational effects effected through human agency are commonly thought to motivate corporate transactions. The latter hypothesis apparently opposes the premises underlying the present study.

We are therefore concerned with the examination of the evidence concerning the increase of corporate value caused by corporate transactions.

First, operational arguments and increased shareholder value are considered relevant but not crucial differentiating factors on the track record of investment banks and advisory firms competing for corporate financial and valuation services during corporate transactions (private conversations senior investment banker 2018).

Thus, if maximized financial performance is not the main criterion by which the decision is taken to engage in a merger or an acquisition, room exists for other explanations.

Next, the question can be raised how often these transactions actually increase financial performance at all. The performance of corporate transactions is empirically examined in outcome studies and event studies (Tichy, 2001a; Coscelli, 2001; Tichy, 2001b).

Outcome studies examine the success of a corporate transaction measuring the response to the announcement of the latter on the value of the firm's equity on the stock markets. The performance of merged or taken-over firms is compared with those of their main competitors. In 11% of the cases the value increased and in 58% the value decreased after the event compared to a non-merging control group.

Event studies compare the performance of the shares prior to the transaction with their performance after the transaction. Performance of stock prices of parties to the transaction are compared with comparable firms and with a baseline industry performance, showing that net overall gains from a transaction are on occasion positive.

From the evidence it appears that there is a short-term weak positive correlation - not a causal relation - between the changing stock price and the transaction, and that there is no long term positive, or even a negative correlation between corporate transactions and the stock price. Outcome analysis and event studies show that corporate transactions do not consistently generate shareholder value in the long term

The frequency of corporate transactions suggests that directors and shareholders are sensitive to the commonly accepted rationale that shareholder value is created. But it is higher than would reasonably be expected from measurements, suggesting that there are other causes for their instigation.

Conclusion

I demonstrate through a discussion of evidence that first the main reasons for firms' demise is a loss of *autonomy*. The latter takes place because of their engagement in corporate transactions. Next, I continue to show that the validity of the claim that the widely accepted cause for their occurrence, the pursuit of shareholder value, is uncertain.

Main Concepts

Name	Definition or Description
Transaction	Making of and erasing one particular difference between a series of differences concerning a firm. One instance whereby a problem concerning a firm is solved.

Table 27: Main concepts first appearing in Part Four

Part Five -

Model of the Firm as an Emergent Phenomenon

I suggest an explanation of the nature of the firm focusing on the point of its establishment, the stage where it exists, and on the point where it ends, making use of the conceptual framework developed so far. Specifically I present a list of memes, their enacted behavior and the operations of a firm they enable so as to show that the operations of the firm are operationally closed and precarious. I continue to utilize the thought experiment I first suggested in Part One, now applied to hypothetical real-life scenarios, focusing on the firm as an autonomous behavioral unity. I conclude this Part with an overview of the these points and stages, and the changes taking place in terms of autopoietic theory.

Chapter 13

To Become a Firm

According to the proposition:

"... As this unity. it:

Becomes a self-referencing system once the body of ideas is coherent from a multitude of related ideas in a network

Acquires and maintains a behavioral identity at its global scale ...

I suggested a relation between a firm's autonomy and the stages of its existence. Our concern in this chapter is to apply the developed framework to the becoming of the firm.

In order to enable comparison between the traditional perspective with the proposed second perspective, I make use of business cases of hypothetical real-life situations as thought experiments.

The exact point where a firm comes to be is when not the individuals but the memeplex, through enacted behavior by the population, generates behavior as if the memeplex is autonomous, structurally coupled with the individuals coherently enacting. The latter implying on the one hand the self-maintenance of the memeplex and on the other hand the maintenance of patterns of behavior of the individuals who enact the memeplex. Taking an outside perspective, we may refer to this point as its establishment, not only in a legal sense but in a wider sense. And taking an inside perspective we may refer to its emergence, the firm's memes and the entailing behavior first becoming autopoietic and precarious.

Prior to establishment, the memes and their realization are individual assemblages, their enacted behavior not coherent as a firm (its prediction an answer to the proverbial million dollar question). The firm first becomes a behaviorally coherent entity when the memeplex (to be) becomes organized and explanatory coherent. From the point of establishment onwards, the associated individuals become heteronomous in relation to the firm (to be), becoming members of a population (to be). Once established, the morphogenesis of the firm is determined by the development of a memeplex through the selective processes of the enactment of the available memes.

Take for example the points 1 to 3 of the list exemplifying stages of a start-up shown in the Introduction (p 15), where individuals float ideas to envisioned stakeholders (the job of the entrepreneur), seeking them to allow themselves to be included by the memeplex by modulating the latter until it is explanatory coherent. Emergence takes place at the point where all involved agree for their part: an angel investor, the bank, the supplier of software

and computers, the landlord, the launching customers, the employees, resulting in goaheads given, contracts signed, and orders placed.

The present conceptual framework predicts that once a memeplex is *enacted*, whereby individuals relinquish autonomy acting on behalf of the firm, the behavior of the members of the population becomes realized as a firm. Depicted in the start-up illustration discussed on p 15, the point where emergence occurs is not located before point 4.

The example may suggest the framework addresses start-ups in particular, raising the question whether there is a difference between the autonomy between founder owned companies and 'managed companies'. The present framework explains that also a smaller company is run by the enactment of the population of the memeplex. However, a founder owner can change the memeplex and corresponding commitments without further discussion with others, because the memes concerning the owner are assigned a large weight relative to the other stakeholders. Larger companies will have more variation of stakeholders and a larger population to convince of the continued erasing of their differences with the firm. This leads to the conclusion that there is no fundamental difference between firms of different kinds and sizes.

BrainParent and BrainChild

I suggested previously that events taking place prior to *autopoiesis* - *assemblages* - are not a phase of its existence, because there is no rhizome yet. Contingent on the circumstances offered by the *environment*, an *assemblage* may not be taken up into the rhizomatic organization (structure) at all.

An assemblage has no population, because people do not act coherently on behalf of memes related by an organization. The latter raises the question of how the assemblage of heteronomous enacted memes becomes an autonomous behavioral unity.

Once taken up in a rhizomatic structure, the assemblages come to be different from the environment (distinct from it, a metaphorical 'child') through adherence and coherence subsequently. The part of its environment with which they interact becomes a milieu, from which the firm emerges. However, without self-referencing selection to increase coherence the emergent firm is not a metaphorical 'parent' (cf. Jagers op Akkerhuis, 2014).

Imagine the point where a rhizome system becomes *autopoietic* at a next state. Until that point the next state is generated by external influence, but from that point on the generating

of the next state is internal to the *assemblage*, hence becoming the 'parent' of its future states

Thus, an *emerged* firm no longer requires the intervention of a particular person to maintain itself, generating its own 'brainchild' (cf. Dennett, 1995), having become a meme, *realized* through *enactment*, and regardless of the presence of a person, depicted in Figure 11.

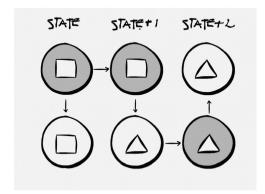


Figure 11: Visualisation of a conceptual parent and child

The circles shaded gray represent the locus of control. In the upper row the memeplex is conceived by the founder, the firm the firm in statu nascendi. The latter is in control, because the former only exists as a pattern on the mind of the founder, which is thereby the temporary environment of the memeplex, Having discussed the memeplex and its foreseen enactment with the stakeholders and failed (firs column), twice and succeeds (second column), enactment of the memeplex is the beginning of the enactment of the memeplex. The people associated with the firm, its population, act in accordance with, or on behalf of the firm.

At the initial state 'state' the *environment* generates the organization of the *assemblage* of memes, at that point neither parent nor child.

At state + 1 a complex of assemblages is again generated from its environment – the founder has first failed in her discussion with he subpopulations (stakeholders) - but at the second attempt the resulting memeplex generates itself. It is a metaphorical parent but not a child, or in other words it is adopted by its environment (cf. Alchian, 1950).

At state + 2 an organization is generated by the memeplex that is itself generated in state + 1, thereby advancing to parenthood. The *assemblage* becomes reproducing itself of its own

account (a parent and a child) under the conditions of its *environment*, no longer an assemblage, but a rhizomatic self-referencing system.

The Population of a Start-up

The memeplex of the firm is coherent when it reflects the interests of all the different stakeholders of the firm-to-be at once. Or in other words: the differences made by all are erased by the firm. *Inclusion* of customers, suppliers, investors, banks, landlords, and employees, by the memeplex is initially observed by the founding entrepreneur. In this section we shift our focus to the *population* and the *subpopulations* at the early stages of the firm.

The firm is established (emerges) by answering questions concerning how to erase a particular difference in the current *environment*, for example in a better, cheaper, faster or just in a new way. The latter is initially, tentatively, ventured by the entrepreneur. The corresponding developing memeplex typically but not exclusively includes plans of production, supply chains, offices, financial arrangements, accounting systems, human resources management, marketing and sales plans.

The founding entrepreneur initially acts on behalf of the unfounded firm, considering its potential by taking the meme's eye view regarding the differences with the future stakeholders. Differences remain unerased until the memeplex is explanatory coherent in relation to other available memes inside the memeplex and substitutes outside of it. The individual stakeholders, included by overlapping parts of the memeplex, *recognize* (or suspect) a potential to operate as a *unity from their subjective* differences with the firm (cf. Ten Bos, 2004, glimpses].

Prior to discussions with envisioned stakeholders, the founding entrepreneur makes recursive second order observations, namely observations of herself as an observer of envisioned stakeholders and their respective observations. Conversely, the stakeholders gauge the capabilities of the firm to be to erase their differences.

Take for example the questions: What are the customer requirements, What are the terms of the investor, Which are the government regulations? On the part of the founding entrepreneur, similar questions concern different customer requirements, and differences in the terms of investors.

I suggested that these questions originate from the tendency of the individuals to increase their *autonomy* through increased *heteronomy* by considering alternative ways to erase their

individual differences by asking their particular question to different memeplexes. Take for example another investment opportunity yielding a higher return and another supplier offering a more appealing or a cheaper product.

The founding entrepreneur and the envisioned stakeholders consider alternatives and integrate *memes* in a selective process. What remains stable under their scrutiny forms an *explanatorily coherent* memeplex, such that the *differences* of all the stakeholders may be approximately *erased*.

Thus, individual stakeholders were *autonomous* prior to emergence (establishment), and in control of the selection and organization of memes. The enacted memes in the *assemblages* were *heteronomous* and malleable by the entrepreneur and the stakeholders. After establishment the firm's memeplex is stable and *autonomous* when enacted, now a rhizome, and the founding entrepreneur and stakeholders are included by the latter, reflected in the popular Dutch saying that the firm 'gaat staan' ('stands up').

The individuals act on behalf of the memeplex, committing and doing their part as agreed, for example according to the business plan. The firm is in business, the first orders are taken, agreements and leases are signed and followed up, harnessing it and ensuring that the memeplex is *enacted*, *realized* as a firm.

Thought Experiment

In Part One I presented a thought experiment making predictions in various business cases, taking the traditional view. We are presently concerned with the generating of predictions making use of the developed framework, examining the validity of the latter in our mind.

The *cognitive* capabilities and the *autonomy* of Jansen Bakery, again the object of our attention, are examined by the effect of various perturbations on the firm. In order to test the assumption that Jansen is a behavioral *autopoietic unity*, the former are assumed to be determined by how Jansen makes and erases differences, and the latter by its *autopoietic* organization, realized by the arrangement of its business processes.

Thought Experiment

Once its memeplex takes effect and the ensuing behavior vis-a-vis its *milieu* becomes stable, the *realization of* Jansen Bakery becomes *self-referencing* and it can become a 'parent'. The stance changes in all aspects from tentative, for example: Which bread product does the customer require? to concrete, for example: Can I take your order?

Jansen Bakery can self-reproduce as an *enacted* memeplex including its functions for self-reproduction, because a causal relation with the future is established through the connexion between ownership and economic fruits and lasting employment.

The process of making and erasing differences has become irreversible: the memeplex and realization of Jansen is *autonomous* and the members of the *population* are heteronomous. From that point onwards Jansen Bakery acts *autonomously* and it is at once *recognized* by its stakeholders

Chapter 14

To Be a Firm

According to the proposition a firm:

".. As this unity, it: ..

At that scale it attributes importances different from the local scale of its components.

Makes sense of itself as distinct from its environment.

Organizes itself from its former structure vis-a-vis its environment - which also continually develops ..'

A firm is made sense of through its *identity*, distinguished from other kinds of organization and other firms, and *cognitive making and erasing differences* concerning its *population*.

The stakeholders of the firm are its *observers*, thereby considered important (differently) as per their different *observations*. The latter (members of) subpopulations of stakeholders allow themselves to be guided by the memeplex of the firm, thereby increasing their individual *autonomy*. The *differences* they *make* are *erased* by the firm and vice versa, through transactions.

This ability of the firm to *erase differences* by acting on what is lacking generates a stable behavioral entity by which the firm cognizes and is recognized is knowable. The cognition of a firm is distributed, because the latter consists of interacting stakeholder processes precariously, without a center.

To cater for the lasting *coupling* with the nomad environment of the firm, novel behavior is generated (differenciation) by way of the *precariousness* of the processes of the firm under the condition of *operational closure*. Thereby the *enactment* of parts of the memeplex including subpopulations (and hence their behavior) is continual and positive. In other words: all the subpopulations are required to actively make and erase their differences with the firm and ceasing *enactment* implies a threat to the existence of the firm.

Thus, the firm is a *behavioral entity emerging* from the behavior of the members of its population, its *cognition* distributed, conversely, and the firm is itself a memeplex distributed over the minds of the members of its population.

Toy Model of the Firm

Our concern is to present the effect of the enactment of the memes of the firm and the processes enabled by the latter, together generating the behavior of the firm.

The memes presented in the leftmost column of Table 29 originate from the derived memes presented in Table 12 of Part Two. In Table 29 the *subpopulations* of the firm are presented as the headings of the categories Customer, Employee, Government, Investor, and Members of Society.

The majority of the memes guide members of society in general, not members of particular subpopulations. Other memes are particular for a subpopulation, thereby distinguishing the *behavior* of their members from the general public and of the members of other *subpopulations*.

In order to make the connection with the operational closure of the entire memeplex, I have first presented the enacted behavior of individuals in the column second from the left. Next, in the rightmost column I identify the (operational) process which is enabled by the behavior presented in the column second from the left.

Thus, I show that where a meme is unavailable as a guiding principle for the members of society or for the members of a *subpopulation* then the *operational closure* of the firm is at stake. Moreover, the latter shows how the system is *precarious*, because withdrawing the positive contribution by any one of the stakeholders implies immediate risk for the *operational closure* of the entire system.

How do I act good?	Enabling (Enactment)	Enabled (Contribution)	
General Members of society			
Trust that the market distributes utility fair and even when demand and supply equilibrate.	Act trusting you will fairly receive your utility.	Personal contribution to social utility and progress of society Common understanding of moral and economic issues. Availability of <i>enactment</i> of memes in the same spirit.	
Affirm unrestricted markets.	Elect a government which facilitates free markets.	Avoid restrictions of markets.	
Develop (yourself) to achieve these connected ideals.	Develop yourself and society through education and jobs.	Supply of people motivated to receive education. Supply of skilled people for jobs in firms.	

Election of a government Affirm that property and its Act confidently knowing rights to economic fruits that the government politically motivated to protect thereof are protected. protects one's economic property. interests Safe and unrestricted interactions with firms such that social utility can be generated. Affirm that the control and Elect a government of a Election of government the size of the government liberal capitalist nature, i.e. motivated to reduce / simplify itself is limited belief in deregulation and regulations, thereby reducing thereby reduced size. its size Increase employability of Make a personal effort to Develop oneself to develop develop in order to increase society, particularly skills people through their concerning technology and development. social utility. customer behavior. Maximize control and Act such that one's control Motivate people to increase minimize control over me is maximized and control autonomy. over one is minimized. (increase autonomy). People who are motivated to pursue education, jobs, investments in order to maximize their autonomy. Affirm that human life is Consider the primate with Availability of natural resources invaluable (cannot have a the market system. All else at a price. price), and all else is not can in principle be assigned (can have a price). a price. Pursue own goals as a Pursue individual goals. Increase in social utility. minimum to increase social

utility.

Affirm that education is available, in particular for me.	Opt for a government which provides education such that one can progress	Election of a government enabling personal development through education. People expect that the government provides education.
Every act (or absence of act) has utility.	Do not opt out of the market system.	Willingness of people to adopt the market system in order to increase utility and achieve humanist ideals.
Participate by allowing others access to utility or else sabotage the providence (invisible hand) by denying access.	Do not opt out. Make a personal effort in order to increase social utility.	Strong motivation to participate lest I sabotage the development of society.
Maximize social utility through acts leading to maximum utility and minimum disutility for the most members of society.	Do good acts (in the social utilitarian sense)!	People having a common understanding of pursuing 'good acts' in a social utilitarian sense.
	Employee	
Contribute to society:	, get a job,	Availability of employable people.
Affirm the generation of jobs, and that jobs are	Elect a government subscribing to job creation.	Availability of jobs.

available for me.

Investor			
Invest in firms to contribute to the development of society laying a claim (and a commitment) to future cashflows.	Save and invest to increase one's utility.	Preparedness to make investments in firms in order to reap future returns. Availability of funds for investment.	
Affirm that property and the ensuing rights to the economic fruits thereof are protected.	Elect a government which protects property.	Security of ownership and return.	
'Vote with the feet' (financial markets)	Seek highest relative price to quality on the financial markets.	Motivation of a firm to show high relative price to quality (high present financial performance).	
Contribute to the solving of problems by establishing a firm or making an investment.	Leverage contribution to oneself and to society.	Motivation for founding, entrepreneurship, and investment.	
Contribute to society:	Save money from income Provide risk bearing capital making investments.	Preparedness to make risk- seeking investments.	
Be active regarding the (supervision of) the conduct of the invested business.	Vote with the feet on the stock markets.	Motivation of a firm to show high relative price to quality (high present financial performance).	
Invest in order to increase control of uncertainty and income through economic fruits.	Assess future risk and provide risk bearing capital.	Preparedness to invest in firms.	

Consumer						
Contributing to society through consumption	Consumption of goods and services.	Demand for products and services.				
'Vote with the feet' (consumer markets).	Purchase products with perceived value for money.	Motivation to buy products providing value for money. Availability of suppliers delivering perceived value for money.				
Government						
Affirm that property and its rights to the economic fruits thereof are protected.	Elect a government who protects one's property.	Political interest to protect economic interests. Supply of people considering it safe to make investments.				
Affirm the generation of jobs, and that jobs are available for me.	Elect a government providing jobs.	Political interest to supply jobs. Supply of people who are confident that they can get a job.				
Affirm the markets operate unrestricted such that utility can be maximized.	Elect a government ensuring unrestricted markets.	Political interest for economic liberalism.				
Contribute to society.	Contribute to the market system.	Political interest to enable economic progress for all society through education, jobs and protection of property.				

Table 28: Memes, their enabling enactment, and enabled processes

First, in some cases memes shown in the leftmost column of Table 28 are similar, although having a different background. They may thereby evoke similar behavior and exhibit commonality of behavior for the particular subpopulation. The latter redundancy is due to the common source from which they were derived. Overlapping entries are not removed so that they are traceable to the source. Next, memes pertaining to the firm are derived from the

memeplexes encompassed by the market system, but their connotation does not (directly) concern the firm

Memes are *continually* tested and scrutinized through their *enactment* for their everyday explanatory and predictive powers, and the ones coherent with the memeplex are selected. The members of the subpopulations continue to take the memes of the others into consideration, making second-order observations. People *enact* these memes because they expect them to make and erase differences of individuals and for the firm to approximately explain their realities to the extent that they are again invoked (allowed to guide), and thereby maintained. Thus, reinforcement or weakening of memes generates a more *explanatory coherent* memeplex.

The Formal Organization of Firms as an Evolved Meme

We seek the description of the nature of the firm. Firms are often characterized by their organizational form (e.g. line, project, matrix organizations), and therefore the notion of organization seems to merit a discussion.

First, organizational relations often noticed in human organizations including firms can in systems theory be categorized as formal organizations, referring to relations of subordination, namely the existence of boss systems and subordinate subsystems (Simon, 1962).

Next, formal organization is often visualized in order to capture the hierarchy making use of organigrammes, widely applied in business and in organizational science in order to characterize firms by their formal organization. Thereby groups of employees report to (are subordinate to) a boss, and groups of bosses report to (are subordinate to) a boss on a higher level of hierarchy.

However, in the present framework, the *organization* of the firm as a *unity* emerges through self-organization, and the latter hierarchical nesting in a single direction is unaddressed at this point.

In systems science integration of hierarchical systems does not necessarily involve subordination, but organizational scales, whereby integrating systems are the *environment* of the integrated (nested) one. The latter interpretation of hierarchy is multidirectional, whereby nested systems mutually interact to a various extent: 'I shall use hierarchy in the broader sense ..., to refer to all complex systems analyzable into successive sets of subsystems, and speak of 'formal hierarchy' when I want to refer to the more specialized concept (concerning human organization dpb)' (Simon, 1962, p 468). Thus, in general an

integrated system is not necessarily operationally subordinate to the integrating system, but we may choose to make the distinction.

Latter specification raises the question why hierarchy has taken this interpretation in the case of human organization. According to Simon, first the number of interactions in the social sphere is limited by the serial character of human interaction, including: one at the time, limited hours per working day, days per week, and limitations to the time consumption involved in a role and the maximum capacity for number of roles. Next, for example: one can coordinate the tasks of dozens but not of hundreds, and employees within the formal organization of one department have more intensive contacts between them than with employees of different departments. Thus, Simon (1962) attributes the formal character of human organization to practical social behavioral aspects.

However, making use of the present framework, I suggest that these practices tend to beget a social acceptability of their own, thereby tending to become ossfied as memeplexes. Or in other words, I suggest that they should not in se be treated as a part of the nature of the firm. I instead suggest, in accordance with the general model of Simon, that nesting and integration are understood as a product of coherent behavior of people, generating integrated spheres of organization. Not the fact that the organization of the firm concerns human activity determines its hierarchies, but selective processes to which memeplexes and their enactment are subject. Formal organization is not an immanent property of an individual person nor of a multitude of people, nor is it per se immanent in the memes associated with the firm, but a meta-meme concerning the organization of human effort.

Making use of idioms and rationale so far developed, I therefore suggest that a 'boss' is a member of a population expressing the behavior associated with the memeplex by which she is included, embodied by a person held accountable, charged with securing of the *enactment* of a memeplex by its population.

Thought Experiment

We are presently concerned with the generating of predictions concerning the existence of a firm, making use of the developed framework.

Sale and Purchase of a Product

A customer wishes to purchase a loaf of bread in one of the shops of Jansen Bakery, making a difference between the present (or expected) and the desired personal state when she is (or expects to be) hungry and sets out to mitigate or avoid the latter.

The erasing of a difference on the part of the customer occurs through eating bread, having first purchased it. The repetition of this making of a difference by the customer is noticed by Jansen as a *behavioral pattern*, and reciprocally Jansen is recognized by the customer by its *identity* as a Bakery.

First, I suggest to call the difference made by the firm the 'service offering', because selling a loaf of bread is a *cognitive* operation that enables erasing differences within Jansen Bakery and thereby within all the stakeholders. Jansen *recognized* the making of a difference by the customer as an interaction in its repertoire (in its *cognitive domain*).

Next, I suggested in the chapter Autonomy and Cognition of the Autopoietic Firm that differences are made from differences with all the stakeholders, including funding, labor, materials supply, government licensing and taxation. And the need to erase them arises from the need to erase the latter at once. For example, in the present case the employees keep their jobs, the investors gain a return on their investment, the customer obtains a loaf of bread to satisfy her hunger, and the government collects tax income.

Last, the buyer purchases (and eats) and makes a payment for bread, sold to her by the firm having received the payment, both the buyer and Jansen Bakery erased their differences at once.

The primary processes of Jansen Bakery are unchanged and therefore its organization and therefore the *cognition*, *identity*, and *autonomy* of Jansen are unchanged. Jansen's behavior does not change from this *expression*. Its *autopoietic* organization is unchanged and therefore its *autonomy* is unaffected. The latter interaction will not stop Jansen from being a firm, or a bakery, or from being Jansen Bakery or from being perceived as such by others or itself.

The differences with the stakeholders of the latter are also erased, whereby the operations remain closed and the precarious relations are positively satisfied by the firm. The stakeholders can be expected to continue to enable Jansen Bakery's operations: going-concern until a next state, but not a new stage in the existence of Jansen.

Fresh Flowers

Jansen Bakery perceives a decrease of visiting customers and sales volume.

Jansen perceives the repeated making of a difference in the behavior of customers, resolving to ask the question how to increase sales, seeking guidance and after considering various memes resolving that an increase of visits of customers to the shops may ultimately increase sales.

Jansen Bakery selects the answer from its repertoire of interactions that placing fresh flowers in the shops by the staff increases the number of customer visits. Although the situation is extraordinary, this is not a different stage in the existence, because the latter problem is solved by making use of the existing repertoire of interactions. Jansen's behavior changes through its *expression* of presenting flowers in the shops.

Through improved customer experience from the vase with fresh flowers on the till, the difference made previously by the customer is erased, because a visit is better appreciated. The difference in the customer having been erased, correspondingly erases the differences in the firm, because the perceived decrease in sales is stopped, and thereby the stakeholders can continue to positively contribute. For example the employees keep their jobs, the investor sees increased revenue at small cost, and taxes are paid.

The primary processes of Jansen are unchanged and therefore its organization, *cognition*, *identity*, and *autonomy*, and the relation with its stakeholders, having temporarily experienced a reduced active contribution remains stable.

The flowers might be important and even 'a unique selling point' of Jansen Bakery, but in an autopoietic sense they have a structural (not organizational) autopoietic character and will not stop Jansen from being a firm. or a bakery.

Pinch of Salt

Jansen is informed that the customers desire saltier bread.

Because of a decline in sales taking place Jansen Bakery acquires information concerning customer satisfaction. It surfaces that a difference occurs in Jansen's milieu, concerning the customer taste, namely a desire for saltier bread. Jansen considers making a difference in the recipe of bread in order to erase the difference.

The latter implies changing the recipe and the *realization* of the production and purchasing business processes. Although this (kind of) interaction occurs infrequently and its *autopoietic structure* - its physical manifestation - changes, it is in Jansen's cognitive domain, because its *organization* is unchanged.

The saltier bread better meets the customer's taste thereby erasing the difference. Correspondingly, the difference in the firm is erased, because the sales remain stable. The *operational closure* of Jansen remains intact, whereby the employees keep their jobs, investors see stable returns, and the customer's taste is accommodated.

This situation does not usher in a different stage in the existence of Jansen. Its primary processes and therefore its *organization*, *cognition*, *identity*, and *autonomy* are unchanged.

When a pinch of salt is added to their bread Jansen will still be a firm, a bakery and Jansen Bakery.

Introduction of a Semi-Related Baking Product

The lunchrooms that Jansen Bakery supplies (business-to-business) are making inquiries for sour-dough bread, because their customers ask for it.

Not supplying the lunchrooms involves a risk for Jansen Bakery that these large accounts source their entire requirement, including the traditional bread products, elsewhere. The possible difference for Jansen is the risk of a steep drop in sales.

Ingredients and production processes of sourdough bread are different from traditional products, because it rests on fermentation of dough instead of the application of yeast to the latter as a leavening agent (Wikipedia last visited 2021, Lemma sourdough). This interaction is not in its *cognitive domain*, because the organizations of the corresponding business processes are different, and the latter would have to change.

However Jansen, seeking to keep at least the current lunchroom business, is forced by this inquiry to operate outside of its *cognitive domain*. In order to erase the difference, the *organization* of Jansen changes, and therefore its *autonomy*, its *cognition* and its *identity*.

Jansen Bakery cannot rely on its existing memeplex and is forced to improvise in order to maintain its operational closure. Jansen cannot rely on recognition but instead on a new course of action, because the interaction is not in its current *cognitive domain*. It seeks to enable the change of business processes consulting with different memeplexes (consultants, suppliers) obtaining answers.

Through this change of organization, the risk of a decrease in sales is reduced by erasing the corresponding differences with Jansen's *milieu*. As a result the employees assume for instance an increased probability of continued employment, investors assume a potential for increased future revenue and returns at a reasonable investment.

The change of Jansen's primary processes implies a change of its *organization*, its *cognition*, *identity*, and autonomy, breaching its *operational closure*. The latter interaction is extraordinary and not in Jansen's domain, and thereby a different stage in its existence.

During the change from one *organizational* regime to the other, when Jansen is improvising, the latter does not rely on its *cognitive domain*. Coerced by the precariousness of its system to seek new answers Jansen is *heteronomous* in order to increase its *autonomy*.

Jansen Drugstore

A steep perceived decline of the bakery business forces Jansen Bakery to increase its returns by adding new business. The case under consideration is the addition of general supplies to the current bread assortment.

As a traditional bakery, Jansen is *organized* for baking and selling bread products, off late including sourdough bread. The business processes of a grocery shop, and their *organization*, are different to those of a bakery. Because the interactions required by the differences associated with a grocery business is not in its current *cognitive domain*, Jansen does not recognize (or even suspect) the consequences for the *organization* of the business processes, forcing Jansen to interact outside of its *cognitive domain*.

Jansen's behavior would change through a radical change of its primary processes, whereby its *operational closure* is likely to be lost, and therefore its *organization*, and its *identity* (from a baker to a drugstore) and even as a firm. The situation is extraordinary from Jansen's perspective, seeking answers from elsewhere, becoming *heteronomous* in order to ultimately increase *autonomy*.

Thereby the continued positive contribution of the stakeholders to Jansen is uncertain, for example because jobs are not guaranteed, investors may not see a satisfactory return to compensate for their elevated risk, the customers may become confused with the services offered.

Executing this plan will likely pose difficulties for Jansen Bakery, because the interactions required for the envisaged changes are not in its domain. The probability that operational closure is breached increases, thereby ushering in a different stage in its existence. To remain a bakery and in addition to *emulate* the behavior of a drugstore takes a relatively large improvisational effort from Jansen.

Reorganization of Jansen (population change)

Jansen concludes that employees resist the change to Jansen's *organization* resulting from the envisioned turnaround to a drugstore, and resolves to change the *population*.

Prior to the change to the organization of the business processes, Jansen was *autopoietic* and *autonomous* in relation to the members of its *population*. The processes connected with the new business require changes to the memeplex, forcing Jansen Bakery to improvise mostly unguided, operating outside of its *cognitive domain*, changing its *organization*, its *autonomy*, and *cognition*.

The latter implies that the stakeholders are not guided by the memeplex ('tools for thought') familiar to them, but are confronted with new, unfamiliar and incoherent ones. The stakeholders make their first order and second order observations, *enacting* the previously coherent memeplex, invoking answers from others.

Removing an individual does not in se change the business process of the firm, because the existing memeplex remains the same. However, the removed employee no longer acts on behalf of the memeplex and their realization is removed from the *autopoiesis*. Thereby the behavior of the latter becomes less prominent for the remaining employees, becoming susceptible for other behavior and guidance by different memes.

Dismissal of employees to recruit others enables access to different memes, under the condition that the latter can become coherent with the remaining parts of the present memeplex. However, such change often takes place under the pressure of social processes, and the newly recruited employee may not be capable to put new processes into effect by deviating from the existing memeplex in isolation.

Chapter 14

To Stop Being a Firm

According to the proposition,

".. As this unity. it: ..

Ceases to exist when its autonomy is lost'

We are presently concerned with an explanation of how firms end. We suggest approaching this topic by showing how a firm ends by losing its *autonomy* to an extent, ultimately leading to its demise, first making use of the theoretical framework and next by connecting the latter with previously presented evidence.

First, I suggested that firms are *autopoietic* and, according to *autopoietic* theory, systems end because they lose their *autonomy*, rendering them unable to maintain their *autopoiesis*. Their *organization* lost and unable, mustering interactions required for coupling with their *milieu*, they consequently cease to be such a system, degrading into their constituent processes.

Next, the common perspective on the end of a firm is a state of bankruptcy (or liquidation), because the service offering of the firm has become obsolete. Thisperspective fits the economic and moral picture of 'creative destruction', whereby the firm as a system decomposes (in a thermodynamic sense), thereby making the allocated capital available again for investment in an alternative firm.

However, I previously presented evidence supporting the thought that the principal reason for ending a firm is not bankruptcy but corporate transactions, whereby firms combine with others in a merger or by an acquisition, under the condition of operational integration of the merging firms to some extent of the involved firms, whereby their *autonomy* is affected.

Next, I suggested that corporate transactions are often justified making use of arguments involving financial advantages such as synergy and efficiency, becoming manifest as increased shareholder value when the integration takes effect operationally. Instead I presented evidence showing that the creation of shareholder value from corporate transactions is in fact limited.

Thus, we assume that corporate transactions are the most frequent cause for ending a firm and that the arguments concerning shareholder value offer a weak foundation for their instigation. The latter statements raise the question why firms end if not for increased shareholder value, suggesting that a path is cleared for the thought that corporate transactions are a principal reason for the end of firms through the loss of *autonomy* they entail.

Reducing the Autonomy of the Firm

A weak (contribution to an) interaction belongs to the *repertoire* of a firm, drawing from its *cognitive domain*, without consequences for its *autopoietic organization*. *Differences are made and erased* from answers available in the memeplex. Interacting parties can remain *autonomous*, for example a customer and a supplier can take their business elsewhere including recurring orders.

Thus, autonomous interacting parties orient one another through coupling into behavioral patterns. An interaction is stronger when one party changes its organization in order to develop behavior specifically trained to couple with the behavior of another, becoming structurally coupled. Natural drift means that a system reorganizes itself while it remains operationally closed.

A strong interaction takes place when the firm is confronted with a *difference* for which answers to *erase* the latter are unavailable. The *organization* of the firm must change in order to cater for an interaction outside of its existing repertoire, whereby the memeplex is extended or changed. The firm may suspect what is required and, applying memes suspected to provide answers, the firm *improvises* (cf. Luhmann, 1995).

Incapable of responding in its *domain* or suspecting answers outside of it, the firm's *operational closure* is breached. The memeplex loses *explanatory coherence*, because new questions are asked of existing memes or the latter are disregarded without justification, and new memes are introduced without selective scrutiny.

Further degeneration thus means loss of the firm's *operational closure* and thereby its *autopoiesis*, disorganization beyond repair, lack of catering for interaction and failure to erase differences. Thereby the firm ultimately disintegrates, degrading into other forms of organization. The physical realization of the latter bankrupts or liquidates, the lights go out, the assets are auctioned off by the administrators, a financial haircut ensues for the financiers, the staff is let go and the memeplex dissolves.

Heteronomy caused by Corporate Transactions

In a 'corporate transaction' usually two firms - referred to as OldCos - merge, or one acquires another to merge into a NewCo.

An operational integration, involving the integration of firms' business processes, is opposed to one for strictly financial, administrative, or legal reasons, without integrating the business processes.

Absence of influence on the business processes implies no change of the acquired (or smaller) firms' *organization*.

Take for example the case where a smaller firm is taken over by a larger one to hold it as an investment, strictly for its financial return, as an *autonomous* unit of business. The nature of the transaction is not operational, because little influence is exerted by the acquiring firm on the operations of the acquired firm, thereby leaving the *autonomy* of the latter intact. In an extreme case only the ownership of the acquired firm changes.

In a less extreme case, their post-merger *autopoieses* are intact and unchanged. An integrating *autopoietic* system (acquirer) may *orient* the integrated one (acquired) to exhibit behavior in a subset of its *cognitive domain*, requiring the latter to change its *autopoietic structure* only.

Take as an example of the latter the case where operational influence between the Oldcos consists of costs cut through shared services or centralized distribution, revenue increased through combined sales and distribution shared with other firms in the integrating group of firms

Consider next an example of an operational merger of equals, whereby overlapping business processes of the OldCo's are shared and similar processes combined. These changes affect the *autonomies* of both firms, because the business processes change and thereby the *organization* changes. The OldCo's become *coupled*, and over time *structurally coupled* into the NewCo in this case, and the Oldcos *autonomy* is restricted to the domain of the operationally merged Newco.

Last, the OldCo having the upper hand in the transaction has more influence in the implementation of the operational merger, and thereby over the other OldCo, reducing the *autonomy* of the underlying OldCo up to full heteronomy. Its *autopoiesis* is at risk, because an enabling process in a precarious system cannot itself be autopoietic by definition. However, one of the OldCo's may choose to increase its *heteronomy* by engaging in a corporate transaction with a firm enabling it to increase its *autonomy* through the extension of their combined *domains*.

Creative Destruction as a Special Case

We are concerned with a comparison of the present framework - firms end because their *autonomy* is reduced - with the theory of creative destruction explaining the demise of the firm, part of the theory of economic change of Schumpeter.

First, the notion of creative destruction is considered its pivot: 'the central point ...' that capitalism can only be understood as an evolutionary process of continuous innovation and 'creative destruction' (Freeman, 2009).

Next, the notion of innovative power is associated with 'Unternehmergeist' (Schumpeter 1942, translated 'wild spirit'), by means of which the entrepreneur disturbs economic equilibria of demand and supply creatively identifying new utilization of scarce resources thereby generating innovative activities.

Technological change generates new solutions to (existing) problems, next, leading to innovation of products and processes. Replacing a product or service no longer serving the customer's requirements with an improved alternative, for instance, generates technological progress in a semi-evolutionary selective process.

Last, a firm's returns decrease when customer requirements are no longer met. Bringing forth an obsolete product, the firm finds it exceedingly difficult to attract investment for maintaining and improving its business processes, eventually coercing it to end for a lack of investment. Thereby the invested capital becomes available once more for alternative investment in a firm that brings forth a product better meeting the customers' requirements.

Thus, technologically more advanced business is selected for its capacity to generate a better return on investments on the financial markets. Or in other words, investors coerce an increase of the firm's financial returns, lest they invest their capital elsewhere, thereby motivating the firm in advance to organize its business processes accordingly. According to this theory, the latter mechanism benefits society because investment is made available where it (ultimately) maximizes the utility of all members of society.

The present framework explicates that the existence of a firm ends when the latter loses *autonomy*, usually because of engagement in a corporate transaction, and occasionally because entering into bankruptcy or liquidation procedures.

First, having become operationally integrated, the *cognitive domain* of the integrated firm becomes to a varying extent determined by the integrating one. In the extreme case of an (fully operationally) integrated OldCo becoming fully subordinate to the integrating one, through a transaction, the *autonomy of* the *latter* is reduced to nil. In an extreme case, the latter scenario implies that the integrated firm disintegrates into its constituent parts and its demise.

However, the present value of the integrated firm is derived from its capability to generate future cash flows, and thereby from its business processes and their *organization*. On short

notice, the latter is therefore less likely from an operational perspective, because value would be destroyed.

Next, in the case of bankruptcy, the firm folds, because finally not meeting its (financial) obligations. The firm is not viable and the theory of creative destruction predicts that the investment is reallocated as a result of the firm's liquidation. In the present framework the firm is unable to meet the requirements of the stakeholders, at least of the investor. The latter no longer enable the continuation of the *precarious* operational processes, whereby the *operational closure* is breached and the firm ends.

Thus, I suggest that taking the perspective of the present framework, creative destruction is an extreme case of a firm losing *autonomy*.

Thought Experiment

Our concern is presently with the generating of predictions concerning the end of a firm, making use of the conceptual framework.

Take Over another Bakery

Jansen Bakery receives a teaser letter concerning the acquisition of another traditional bakery, and to consider as a possible extension of the present business.

The *cognitive domain* of Jansen Bakery does not cater for the required interaction associated with taking over a firm. Jansen can only resort to *improvisation* hypothesizing that acquiring this new business involves an increase of the sales revenue and return, under the condition that the interaction implies that Jansen is able to *emulate* the business processes of the inquiring bakery.

The latter implies that the *cognitive domains*, and hence the *organization* of the business processes of the acquiree and Jansen Bakery are sufficiently similar to rubrizice in the same *autopoietic class*. Acquiring the other firm, Jansen could draw on the same part of its *cognitive domain* - regarding the operations, not the take over processes - thereby limiting the extent of the risk to its *autopoiesis*.

Increased volumes, a single point of contact, and standardization of the purchases (e.g. materials, equipment) of the NewCo may result in better purchase prices to offset the investment. The difference in the *milieu* of Jansen is erased when the employees of the OldCoS keep their job, the investors see an increased revenue on their investment, and more customers are serviced at the quality standards of Jansen Bakery. The arising

difference is erased, because of the perceived opportunity of increased sales at a reasonable investment

The situation is extraordinary, because a take-over is not in the *domain* of Jansen. However, the business processes of the OldCos being similar, the operational consequences of the merger do not induce a new stage in the existence of Jansen, but depending on the operational conditions it may usher in a new stage for the acquired firm.

The primary processes of the former are unchanged and therefore its *organization*, *cognition*, *identity*, and *autonomy*, and of the stakeholders are unchanged. Depending on the scale and depth of the integration, the business processes of the latter will change, and therefore its existence as an *autopoietic unity*.

Divest a Business Process

Jansen Bakery receives an inquiry whether it wishes to divest its logistical business processes, seeing an opportunity to focus on baking and selling traditional bread products.

This interaction is extraordinary for Jansen, first because divesting a business process and next to involve a logistics supplier instead, is not in Jansen's *domain*, forcing the latter to *improvise*.

First a difference is made by a suggested improvement of the service offering, and second by a decrease of the cost of sales incurred by a highly efficient specialist food distribution company, enabling Jansen to focus on baking and purveying bread. Also, Jansens investment in trucks is freed up to reinvest in the business processes associated with manufacturing traditional bread.

The *difference* in the *milieu* of Jansen *is erased* when the employees keep their job, the investor sees a decreased cost and a reinvestment into an activity generating more revenue (compared to logistics), customers are serviced, and employees keep their employment by the new supplier (logistics company).

Assuming that outsourcing business processes concerning a supporting business process, does not change the *organization* of Jansen, because it is not critical for Jansen's service offering, thereby leaving its *cognitive* domain, its *autonomy*, and its *identity* unchanged. Assuming unaffected business processes the divestment does not usher in a new stage in the existence of Jansen

Outsourcing a primary business process to an external entity, say baking bread, would present a stronger case, because the *autopoietic* organization, *cognition* and Jansen's

control reduces. Jansen's *identity* changes: it still belongs to the *class* of firms, but instead of a bakery it becomes a wholesaler.

Conclusion

According to the proposition the firm in its various stages:

(To become)

Becomes a self-referencing system once the body of ideas is coherent from a multitude of related ideas in a network.

Acquires and maintains a behavioral identity at its global scale ...'

(To be)

".. At that scale it attributes importances different from the local scale of its components.

Makes sense of itself as distinct from its environment.

Organizes itself from its former structure vis-a-vis its environment - which also continually develops ..'

(To stop being)

".. Ceases to exist when its autonomy is lost often because it associates with another firm"

A firm exists between its predecessors and its successors, neither of them firms but (potential) constituent elements of a different organization.

The stages of development of a firm start from a meme *enacted* by a founding entrepreneur, via an *emergent behavioral identity* with stakeholders, via occasional organizational upheaval and corresponding *natural drift*, and loss of *operational closure*, to its demise, its observers degenerating into other forms of organization.

In Table 29 I summarize how the *autonomy* of the firm depends on its stage of development taking perceived perturbations, namely what causes it to operate on a part of its domain, into account

	Operational Closure	Cognitive Domain	Organization	Structure	Self- Governing \ Directing
Become	Not Applicable	Developing	Developing	Adopted	Heteronomy
Ве	Intact	Inside	Unchanged	Adapt	Autonomy
Ве	Intact	Outside	Changed	Accomodate	Autonomy
Stop	Not Intact	Outside	Changed	Improvise	Heteronomy

Table 29: Summary of autopoietic parameters of the firm

The first column of Table 29 shows the potential stages of development of the firm: the state prior to being a firm, while it is one, and when it stops being a firm. The first row of Table 29 shows the main parameters of *autopoietic* systems, namely *operational closure*, *cognition*, organization, structure, and *autonomy* as a system.

Prior to *de facto* being a firm, there is no *operational closure* and the memes are *assemblages*, with the potential but no guarantee of becoming a firm. The job of a founding entrepreneur is to weigh, combine and distribute different and alternative memes, floating the resulting would-be memeplex with envisioned stakeholders, until widely considered to be *explanatory coherent*. The firm has no *organization* nor an *identity* and the founder *autonomously* determines the faith of the firm to be.

In the cell of Table 29 titled 'structure' the first cell indicates that the firm to be is adopted into the environment (cf. Alchian, 1952). Becoming a firm, its memeplex includes its stakeholders, distributed over the members of the latter, yet sufficiently coherent for lasting enactment. The memeplex-and-realization is operationally closed, autonomous and cognitive, with an organization and a structure, a behavioral identity by which its observers recognize it.

The firm is capable of adapting its behavior to the requirements of its *autopoiesis*, specifically in its *milieu*. The individuals included by the memeplex *enact* the latter, acting on behalf of the firm.

In case no *answer* is available to the questions posed to the firm through its *milieu*, it makes use of the *interactions* in its *domain*, enabling its *interactions*. Its *operational closure* intact, its *domain of interactions* and its *autopoietic structure* may change.

When the firm doesn't have sufficient elbow room to maintain its *operational closure*, because it loses its *autonomy*, then its *autopoiesis* ends, its *organization* fails and ultimately the firm degenerates into its constituent elements.

Part Six -

Conclusion and Bottom Line

The product of the present study is intended to serve as a foundation for the development of a theory for the nature of the firm as an emergent phenomenon. I first present conclusions about the validity of the product in the latter sense, the impact of the outcomes taking a wide view. I continue to present a detailed critique on elements of the study, and I make recommendations for future work based on the present work.

Chapter 15

Evaluation of the Study

Assessment of the Validity of the Product

The product of the present study consists of a coherent set of statements originating from or inspired by existing theories, together constituting a conceptual framework. First, the proposition, as a kernel, together with the abducted concepts and the corresponding arguments for and against their present application forms the framework, as an integrative foundation on which to build a theory.

Theoretical development

I offer the present framework for further mutual critical scrutiny by a wider audience. For lack of empirical testing, I thereby understand the validity of the present framework - as the basis for a theory - to include first its **internal consistency**, next the extent of its **connections to existing theories** including the **strength of its foundations**, thirdly **the validity of the method**. Last, its power to **explain the behavior of the firm** theoretically - making use of a thought experiment.

Explanatory power

The framework expresses a view distinct from the traditional view in the sense that the behavior of the firm can be explained without making use of the assumption of a particular personal contribution.

In the latter sense does the second perspective oppose the traditional view, which assumes that individual agency, for example the 'wild spirit' of the entrepreneur, is required to bring about (economic) change in the firm.

The thought experiment shows that the suggested framework is capable of explaining relevant hypothetical business situations, and that contrary to the traditional view, the behavior of a firm can be seen as an autonomous *unity* throughout the stages of its existence.

The suggested framework provides an alternative explanation for the behavior of a firm. However, in order to develop the present conceptual framework into a theory it is required that it is formalized and extensively empirically tested.

Internal consistency

The concepts of the framework presented in the Table of Concepts are first linguistically defined or described in commonly accepted terms, their source a dictionary, or from metaphysical statements, for instance in the case of difference and repetition, or in terms of the latter or another concept.

The main concepts used throughout the thesis and in the thought experiments are introduced in Part One until Part Four, and presented in tables at the end of each Part and in the Table of Concepts at the end of the text, including the lesser auxiliary or illustrative concepts.

Apart from a preliminary test of the explanatory power of the framework, the purpose of the thought experiment is to establish through their application that the framework is consistent. Both through the verification of their relations making use of the latter table and through their application in the thought experiments I suggest that the conceptual framework is internally consistent.

Foundation

I have chosen processes to be the foundation of my framework, thereby determining the foundations for our thinking about the present topic in general and of the firm in particular. First, the latter has far reaching implications including linguistic ones, whereby reference to objects conflicts with the processual nature of the subject matter.

Next, although 'the firm' may not exist (sic) in a strictly processual sense, in order to enable a discussion of the phenomenon called the firm (a linguistic object), I made the connection with the notion of a machine as a locus of coherent behavioral change to cater for observations of the behavioral phenomenon.

According to Deleuze, next differences originate from deeper mechanisms capable of differenciation (sic), implying that these mechanisms are capable of generating novel behavior, whereby differences with other behavior can come to be. I have understood the latter in the sense of chaotic processes, whereby non-stochastic terms are capable of generating unpredictable or random behavior. Thereby they provide the novelty compared to the current state of affairs of the observed system which is represented by the notion of differences.

Thus, the chosen foundation caters for both the processual nature of the firm and for a view that the firm is a *behavioral unity* (thing-ish).

Connection to existing theories

I showed in Part One how the subject matter of this study is connected with other disciplines. In order to keep a distance from particular thoughts and traditions especially regarding human agency I suggested a multidisciplinary approach, and systems science as a neutral point of departure.

Next, precisely allowing the doubt of the agency of the individual person regarding the firm (asking 'who has whom?') center stage, I reduced connections with theories from some scientific disciplines. More so because I view the firm as a behavioral phenomenon, focusing on the aspects of *emergence* and *autonomy*.

Next, I researched the state of the art regarding systems science in general and application of the latter to social sciences. What sets the present framework apart, is first the suggested foundational view of the firm as a process, next my processual depiction of the connected theories, and finally the integration of the latter to cater for an applicable conceptual framework explaining the nature of the firm from first principles. The applied approach is connective and integrative, allowing access to a wide body of theory, catering for a Popperian selective process with other theories through testing.

Last, I previously wrote about the existing body of theory, having taken us to the current point: 'But at this point later in that year (2020 DPB) it seems already less unlikely that humanity, forced by the changing circumstances of the covid-19 virus, would suddenly 'migrate' to a different paradigm'. A renewed discussion of some scientific views perhaps considered to be not mainstream may serve us well to discover new avenues.

Validity of the Method

Abduction in itself is valid as a scientific method for the development of a theoretical framework, and for use in everyday life. In general, starting with limited evidence, a hypothesis is built by collecting support and secondary evidence around the limited evidence.

In the case in hand, the method involves collecting of support first around evidence for the relation between the ending of a firm and the decrease of its autonomy, second concerning evidence for the thought that the justification of corporate transactions to increase shareholder value is limited, and last by taking the perspective of the firm as an emerging system. I derived a proposition catering for these assumptions, and I collected arguments supporting (or disprove) the former. However, the evidence from which the assumptions are derived is few and, although having received attention, not mainstream.

Overall, the validity of this work is limited principally, because it is tested to a limited extent, although the preliminary outcomes are promising. As a foundation for a theory it can be considered valid, because it offers a rich, internally consistent and testable conceptual framework, although not without speculation.

Impact of the Study taking a Wide View

First, I wrote in the Acknowledgements that: 'The qualification that my motivation must be fickle and variant, because morality is, does not apply to the nature of my research subject, because I explore the development of a durable instrument. Awareness of the nature of the firm might better equip people for their dealings with firms in the long run'.

I suggested that firms are important for people, because they are involved in many aspects of their lives, and because of the extent of their influence. At this point, I believe that many people are not fully aware of the nature of the nature of their relations with firms.

Thus, I believe that people who have dealings with firms (virtually everyone) would benefit from awareness of the latter relations, the restrictions they impose, in what way and at what cost, enabled to make fair decisions, for instance regarding their relation to the firm.

I suggested that the belief that people are *autonomous* is widely accepted, having control over their actions whilst experiencing little external control, and the firm, analogous to the tool in the hands of a carpenter, is not. Therefore I continued to suggest that people pursue the humanist ideals of maximum individual control and maximum individual freedom from control. This pursuit of *heteronomy* in order to ultimately gain *autonomy* yields the paradox that people allow an increase of *heteronomy* in relation to firms in order to increase their *autonomy*.

I demonstrated that the firm, emerging from the ensuing coherent behavior of people, becomes *autopoietic* and thereby *autonomous*. From the point where it emerges, the firm pursues to maintain its *autopoiesis* manifesting as its *identity*, ultimately at the expense of all else. People relinquish control to the firm by way of allowing the former to guide their thoughts, thereby acting on behalf of the latter. Thus, different from the traditional view, people's control over the behavior of firms (the firm's performance) is limited. This paradox resolves itself in the difference between what people believe to relinquish and what they believe to gain.

Next, in the Introduction I demonstrated that firms play a role in some of the current societal problems, thereby posing an indirect threat to humanity, and I expressed the wish to contribute to the resolution of the latter by shedding light on the underlying mechanisms whereby the firm comes to be.

I suggested that the firm emerged from individual behavior induced by the enactment of the memeplex of the market system by which a vast majority of the world population, the members of its population, is included. Next, the firm is allowed little elbow room to

participate in their solution, because the cosmology of answers (and questions) provided by the market system is so ubiquitous, and because it does not take solutions for many societal problems into account. It is said that: 'Move the cheese if you want to move the mouse'. Thus, to change the behavior of a firm through changing its nature, the instruction to change is not addressed to the members of its population, but to all members of society.

Assuming that many of the latter are *included by* the memes generating the kind of firm we see - including its unwanted or semi-wanted behavior - changing the corresponding views requires a change of view on a societal scale and therefore political involvement. However, the policy maker should bear in mind that the importances attributed by the firm as an *autopoietic* system is different from that of people (not all cheese is equal).

Critique on Individual Topics

The meme is a main concept in the present framework with a particular role. However, the latter is not unambiguously defined in the literature, for instance lacking a basic unit or measure, thereby remaining subject to scientific discussion. Moreover, the definitions and the alternatives I identified do not capture the foreseen role unambiguously and consistent with other main concepts for example an idea, an expression, and (inter)action.

Having said that, the word is widely used by a plethora of online communities, both to indicate individual expressions (usually pictures) and the category to which the latter contributes - an individual picture and in the sense of the *connotative* commonality. I resolved to suggest a processual foundation for the concept a la Deleuze, and a statistical definition akin to biological use of species, to cater for what individuals can conceive. Moreover, inspired by the philosophy of Luhmann, I connect this notion with an event of communication, enabling the use of the notion of double contingency. My suggested integration and application of concepts enables explaining the connotative and mobile nature of social systems - and of their nomad environment - as well as their selective mechanisms, but this important concept remains subject to discussion.

Next, the emergence of a firm requires that its internal operations are precarious, namely continually and positively enabled by other such processes. I suggested that the latter are realized by the firm's subpopulations, requiring an explanation catering for the emergence of the latter. How, in other words, does a particular individual come to be a member of one or more subpopulations of the firm thereby enabling emergence of the latter?

I assumed that an attraction (or a repulsion) develops in a series of encounters between individual minds and memeplexes, to the extent that an individual allows the latter to guide

her thoughts and actions. Thus, the individual's mind attunes to the perceived social acceptance of the enactment of the memeplex, so as the latter attunes to minds in their myriads of encounters. I have found support for thes processes but not evidence.

Next, during emergence of the firm observation of it transposes from one scale to another. I examined the emerging process up close making use of descriptions of the behavior generated by (or in) the Game of Life. My justification for the latter approach is not to simulate in order to clarify an organizational principle, but to observe a system in the process of organizing, namely structuring the space of which it is part. Thus, I examined *emergence* and *autopoiesis* as they take place in a simple system, developing into a different (additional) ontology.

Moreover, I assumed that the notion of emergence can be extrapolated to systems with higher levels of complicatedness like firms, suspecting that the ensuing behavioral complexity is perceptible. The latter suspicion is justifiable when the phenomenon in our focus - the behavior of the firm - is indeed recognized as a human organization, analogous to the method whereby (cf. Wolfram, 2002) visually recognizes complexity of behavior of cellular automata. Or in other words: random behavior interspersed by persistent order generated by conflicting forces - a hallmark of complex systems - justifies the suspicion that a complex system is at work.

Next, I presented the discussion concerning the applicability of *autopoiesis* to social systems in brief, starting with the inventors of *autopoietic* theory, and I pointed out that reservations remain. However, even though the discussion seems to be paused, and the thought has strong promoters, the topic remains controversial. Through a conceptual separation of the biological social from the symbolic social, a relative safe haven is established to enable application of *autopoiesis* to social systems, but remains subject to discussion.

I started this study from the assertions that a firm can be autonomous, and that person and firm can not at once be autonomous (flawed it turned out later), From this premises I inferred that a person, at least when dealing with a firm, is capable of losing or relinquishing their autonomy. Seeking support in the literature, I concerned myself with the ongoing discussion about agency and structure, which has a rich history but remains as yet unresolved. Thus, with the benefit of hindsight, I might have done a better job critiquing the traditional view, had I chosen a different object. I believe that a discussion of intentionalism can be instrumental to reach this objective, and this is part of my recommendations

Last, although the topic of novelty holds no direct relevance to the arguments regarding the nature of the firm to be fully developed, it is correlated to the potential advantage attached to

the emergence of new firms. The latter is to some extent addressed, first by introducing the notion of differenciation in Chapter 4, catering for a metaphysical notion of the generating of novelty. Second, novelty is catered for through variation by the connotative nature of memes and the associative nature of memeplexes. Last, in the section addressing the beginning of a firm, the founder starts from the making of a difference. Thereby it is assumed that she endeavours this because she suspects an advantage. Moreover, the generating of novelty is not limited to the starting of the firm, but at ony point in its existence, for instance through the introduction of a novel product, a business process and an investment policy. Having said that, the concept remains implicit in the thesis, although its importance cannot be overestimated for the continuation of the firm as an autopoietic system.

Future Work

Consolidation

The study builds on systems science and it is complementary to the body of theory of the firm, including systems theory of the firm, capability-based theories, and theory of economic change. The main gap between the said theories and this thesis is a difference of conceptualization and implementation of the way the behavior of a person associated with the firm is guided by it, and vice versa. For example, these theories often presume the existence of the firm and how it might function, and I believe this thesis can help clarify the core concepts, for instance rules, routines, and competences.

Thus, I recommend that the mentioned conceptual gap is studied with the final objective to enable comparison of the present conceptual framework with the existing theory. I suggest that an alternative is possible through a discussion of intrinsic (and teleologic) intentionalism and extrinsic intentionalism in order to redescribe and reframe them. We could take the intentional stance (Dennett, 1987), asking: How would this person act, given those circumstances, and given what they believe in? What is her course of action that can plausibly be expected? And that is what we predict she will do. The latter would not have excluded the autonomy of persons (which they have, even if they resort to heteronomy on occasion), while facilitating the conceptualization of memes.

Formalization of the Framework

To enable such a study, generating evidence from empirical data instead of a thought experiment, I recommend that the framework is formalized as a model and quantified. I suggest that Chemical Organization Theory (COT) provides an instrument to describe the

transformative processes whereby memeplexes and their realization develop, making use of reaction equations (Dittrich and Fenizio, 2007; Hevlighen, Beigi and Veloz, 2015).

First, a COT model consists of one or more *reactions* transforming one or more *species* (Veloz and Razeto-Barry, 2017) into one or more others consuming and producing *species*. A reaction is represented by the implication sign noted as →. *Species* are conceptually equivalent to *memes*, because of their connotative nature. Memes transform from a wider cultural environment to the memeplex of the firm, realizing the latter and involving (instances of) the mind of at least one person. Thus, the locus of the transformation is the individual mind (cf. Luhmann, 1995; Spencer-Brown, 1969), represented by the implication sign.

Next, the general form of a reaction is r:Input \rightarrow Output as a condition-action rule, namely: IF one or more expressions of *memes* are perceived THEN transform them into one or more other expressions underlaid by *memes*, noted as $r: x_1 + x_i + ... \rightarrow y_1 + y_j + ...$. Whereby, in the case of an operationally closed system, x_i and y_j belong to the same set and the transformation concerns the organization of the memeplex (not individual memes). The whole set of reaction equations is equivalent to a memeplex. One reaction equation is equal to a partial memeplex, namely the part of the entire memeplex pertaining to one person.

Asking the question, receiving one or more *answers* for consideration, selecting one, and making the transformation, takes place in the individual (implicit) mind (cf. Heylighen, 1998). A reaction thus represents one transformation in a sequence of events under the condition of double contingency. The individual may get answers from different cultural realms, including outside of the firm, for example an employee of a firm struggling with a management problem, turning to the textbooks of management science, to her experience as a board member of the sports club where she encountered a similar case, or to her religion to ask the corresponding question. An individual takes a decision about which answer she is to enact: 'In other words, we must presuppose that the information does not understand itself and that a particular decision is necessary in order for its utterance' (Luhmann, 2002, emphasis by the author). The latter is catered for by the disjunction operation, represented by multiple reaction equations to represent simultaneous enactment.

The AND operation in the general COT model, next, is represented by + signs, collating the *species* into the Input and the Output terms. When the species are chemical substances, for example, the relation (+) is determined by their individual physico-chemical characteristics. I suggest that the nature of the AND operator between the perceived expressions on the Input term and the expressions on the Output term (between memes forming memeplexes) is provided by the paired conditions of maximum explanatory coherence.

Last, infrequently used *memes* are little reinforced, disappearing from active use but not from memory. A new meme may, on the other hand, enter the system adding a part from its *milieu*, adding a meme to the equation and the memeplex. A newly introduced meme is not necessarily unprecedented (Weinbaum, 2017, 'thought sans image'), but new to the memeplex. A *meme* remaining in the reaction is a catalyst, neither consumed nor produced. Suppose that the mind of a person is such that it is attracted by a particular meme x (part of a memeplex y in memory). The latter *meme* can become a catalyst for other memes of the memeplex, because when x is invoked also the other memes in y are.

From the comment on the indvidual topic regarding the creation of novelty, I recommend that this subject is made explicit, during the stage where the firm is established and during its existence.

Development to a theory

In order to be developed into a theory, the presented framework requires further studies aimed at its extensive testing against practical business realities.

Industry Sectors, Classes of Firms and Particular Firms

Often the subject of government policy is not the firm but the industry sector. I recommend an examination of industry sectors represented as memeplexes and their realization, whereby the individual firm is integrated as an *autopoietic unity* into their *milieu* or *environment* as an industrial ecology. The objective is to better understand the development of the memeplex of the firm as a *unity* operationally integrated into the memeplex of the industry sector, and of the influence of governmental industry policy on the individual firm.

The focus of the present study is on the conceptual nature of the firm, but it does not cater for a specification of the memeplex of a class of firms. I suspect that often business processes are modular, in the sense that a particular organization of such processes in the memeplex of a firm determines to which class the firm belongs. Thus, I recommend that, starting from the suggested general framework of the firm, successive models are drawn for classes of firms.

Memes in Wider Society and Politics

Change of the nature of the firm requires that memes and their enactment in society change. The latter may for example be brought about making use of legal instruments via the political route, and of instruments leading the common opinion. Take for instance recent discussions concerning the legal measures governments might impose on firms to comply with agreed

sustainability goals. I recommend next an examination of the connections and their directions between the memeplex of the firm and the political sphere.

A Meme's Eye View on Corporate Transactions

Evidence suggests that the majority of firms end in a corporate transaction. However, I suggested that the argument of increased shareholder value does not justify the latter. I recommend an investigation of the effects of an operational merger of two firms on their memeplexes, and how the business processes are affected because of integration taking the 'meme's eye view'.

Corporate Resilience

First, the *autopoietic* nature of the firm implies it is *autonomous*, acting only so that the *operational closure* remains. Next, a precarious design of the system requires the production of new solutions, innovation. Thirdly, the behavior of the members of the population of the firm is coupled with continually changing exigencies of the (nomad) social environment. Next, for lack of innovation, the solutions provided by the firm may not solve the problems presented by the environment. Thus, the firm ceases to exist unless the stakeholders continually affirm their stake and the coupling with the milieu remains intact.

Individuals' decisions to increase their heteronomy, asking a question is asked to multiple memeplexes and choosing one for enactment, may cater for innovation. For example in order to evaluate an investment, an investor may take the perspective of a chartist taking past performance of a firm on the financial markets as a basis. Alternatively she may take the perspective of a fundamentalist, taking the soundness of the firm's economic fundamentals as the basis for her evaluation.

Thus, firms seem resilient to change, and implementing lasting change requires an understanding of their *operational closure*, *precariousness*, *and heteronomy* of their memeplex and realization. I recommend researching the resilience of firms in the face of internal and external change.

Artificial Intelligence of the Firm

I demonstrated that a difference in autonomy between people and firms can occur, one having a net control over the other. A possible source of this perceived power is a difference between cognitive capacities of parties (cf. Weinbaum, 2016). In light of the latter, I recommend a study into firms as artificial intelligence.

Chapter 16

Bottom Line

The traditional assumption is that the individual person has control over the behavior of the firm. From a human perspective, the behavior of the latter is widely considered to be malleable and an instrument of the former. Moreover, the firm is considered to be functional, useful and its behavior (performance) is measured to anthropomorphic standards.

I suggest however that the latter assumptions are doubtful, because the influence of an individual on the behavior of the firm is limited, while the influence of the firm on the individual's behavior is extensive. This doubt moved me to critique the traditional view on the firm and to suggest a second perspective, namely that the behavior of the firm is autonomous, depending on the stages of its development - becoming, being and ending of a firm

Thus, the final objective of my research project is to explain the nature of the firm answering the sub questions: How does the firm come to be? How does the latter behave?, and How does it cease to be? Thereby I focus, secondly, on the autonomy of the firm in stages of its development, keeping in mind the firm's behavior vis-a-vis the associated people. The nature of my study is exploratory, setting out to lay a foundational conceptual framework for the development of a theory.

The concept of an *idea* is defined as one answer to a particular question, representing a *solution* to a *problem* respectively. A *meme* is defined as all conceivable answers to a particular question with a *connotative* internal structure. *Explanatory coherence theory* applied to memes explains how they interconnect to become maximally coherent, thereby evolving to complexes of memes - memeplexes.

Having proposed an evolving system of *coherent enacted memes* I continue to suggest that a persistent yet variable *behavioral pattern* arises. Specifically, therefore the object of the latter evolutionary process - what evolves - is a memeplex in conjunction with the generated behavior (*perceived* and *expressed* and therefore *realized*) *enacted* by people in a particular dynamic (social) environment.

Thus, I assumed that the (kind of) firm we currently encounter emerges from behavior generated by the *enactment* of memes originating from the market system, the widespread Western cultural body guiding our thoughts and actions. The suggested memes 'of' the firm are derived through an analysis of the market system encompassing meta-memes, for example humanism, utilitarianism, belief in progress, and ownership.

Next, although these memes are constituent to its operational 'business' processes, they are not specific for a particular firm, but instead commonly believed, *realized* to firms through

their *enactment*, and fed back to the market system as a cultural body. The *emergent* aspect of the firm becomes apparent through the *enactment* of memes, however without the latter positively describing the former, or in other words the firm is not immanent in the memes.

Thus, I suggested a framework to explain coherence of human behavior into the firm as a unitary organization, whose behavioral pattern can be recognized, and, because it is autopoietic it is itself autonomous and cognitive. Moreover, I suggest that the latter is precarious, because the firm only remains operationally closed if all internal operations continually positively contribute to the autopoiesis of the latter. A continual risk of losing the connexion with a precarious process and thereby of breaching operational closure requires ongoing innovation of the business processes and their organization.

In order to increase their autonomy overall, people may choose to increase their heteronomy by selecting an answer from a variety of memeplexes they have access to and acting on behalf of the latter. The individual associated with the firm may allow the memeplex of the latter to guide her thoughts and behavior, but may also consult with other memeplexes in the wider cultural environment.

Thereby, novel memes can be injected, or new combinations formed, enabling innovation required to maintain operational closure in the precariousness of the organization of the operational business processes. The latter determines the relation between stakeholders, and the firm, and thereby the range and effect of interventions by individual people in the firm's operations that can realistically be expected.

Next, the present conceptual framework is first internally consistent, because I suggest the notions of difference and repetition as the metaphysical basis, thereby declaring process ontology the basis of our thoughts. Thereby I conceptually connect object and process, whereby a new real recurrently develops by restricting the virtual, and a new actual develops from the previous real - and so on. Second, every concept is defined in terms of one or more others, or from the primitives. Thirdly, I enable the discussion of the firm as a *unity* with an *identity* making use of the notion of a machine.

The latter opposes the traditional view of the firm as an object converging to a Leibnizian monad ideal unless forced to (temporarily) deviate by circumstance. For example a practical human organization is often assumed to be an aberration of an ideal 'type' and a deviation is assumed to be directed to reach that ideal.

Last, I preliminarily tested the framework for consistency and explanatory power making use of a thought experiment by way of business cases, discussing the traditional and the

proposed second perspective respectively. First in Part One I described the behavior of a firm taking the traditional perspective, whereby the individual person is the agent, and second in Part Five I described the latter making use of the framework. I showed that, although people are indispensable, the behavior of the firm is independent of the behavior of the particular individual.

The study provides a critical multidisciplinary complement to the traditional views of the firm. The presented ideas may prove interesting for a varied audience, including scientists interested in the firm as their subject matter, such as economists, business and management scientists, business strategists, corporate psychologists and sociologists. Secondly, policy makers, pressure groups including unions, and businesses including the people professionally 'included by them' may find resonance with some of the suggestions, in particular regarding the relation between the individual and the firm. Thirdly, the outcomes may be relevant for people included by the memeplex of firms, at this point virtually everyone on Earth. Even those retreating to a cabin in Alaska will require tools such as an axe and a stove, from a firm, disallowing them to cancel all dependency. Access to the present ideas enables the members of the firm's population to reassess their relations to the firms they do business with

Just because beliefs of people in a wider cultural sphere are at the basis of the nature of firms as it is explained here, I suggest that the presented insights can contribute to a more sustainable future.

Table of Concepts

The objective of this section is first to establish a list of words I use to identify concepts and theories and their relations in the scope of this thesis.

Having established this, I suggest that the reader heed this remark: 'I do regard them (definitions dpb) as unimportant. I neither believe that definitions can make the meaning of our words definite, nor do I think it worth bothering about whether or not we can define a term (..); for we do need undefined primitive terms in any case. I may sum up my position by saying that, while theories and the problems connected with their truth are all-important, words and the problems connected with their meaning are unimportant' (Popper, 1959). The author may have had physical systems in mind when he wrote these words, whereby the range of interpretations of a particular phenomenon, or, conversely the range of definitions of a particular word or phrase is perhaps smaller relative to the social sciences.

One of the tasks in the latter case, from a processual perspective, is to identify relationships between concepts and problems and their importance, not meanings of words in se. Having said that, the definitions are exactly the explications of relationships with other meanings.

Second therefore, the purpose of the Table of Concepts presented in Table 30 is to verify the internal consistency of the framework through cross-referencing of concepts.

Concept	Definition or Description		
Adopt	To choose to take up, follow, or use (Oxord-English Dictionary		
	online last visited 2020). Of an assemblage or a system: its		
	behavior to be connected with or integrated into that of another		
	assemblage or system.		
Actual	Current structure of the system and of its environment (cf.		
	Waddington, 1952; Simondon,1958; Deleuze, 1968).		
Answer	Representation of a solution of a problem. See Question.		
Assemblage	Phenomena resulting from differences between series of		
	(behavioral) differences between which coherence is possible so		
	as to be taken up into a rhizome. For example: 'Assemblages are		
	individuals in the making that can be found at diverse states of		
	consolidation and coherence' (Weinbaum, 2017, p 171). See:		

Multitude, System.

Associated with Of a person with a firm: relation between a member of the

population of the firm and the firm from the point of view of the

former, stakeholder, See: Included by, Population.

Attractor Stable attractor: regime of behavior of a system which it cannot

easily leave. Unstable attractor: regime of behavior of a system

which it cannot easily stay on, repeller.

Autonomy Of a system to have control over its acts without external

interference, in view of its self-referencing character. Re

autopoietic system: ability to control its acts so as to maintain its operational closure and to stay on its cognitive domain. Antonym:

Heteronomy

Autopoiesis Process whereby a system maintains its operational closure

intact: its set of elements, now its *components*, is closed and maintained. They contribute to the maintenance of its *autopoiesis*,

including the functions which maintain its reproduction.

Autopoietic systems are autonomous and cognitive by definition.

Behavioral entity Phenomenon which can be perceived by it expressions, namely

behavior.

Boundary The locus of the distinction between *components* of a system, and

others. For a firm: the distinction between coherent behavior of the persons *included by* the firm and other behavior (excluded by

it). See Milieu, Identity.

> particular class: an organization, a firm. A firm is capable of emulating the repertoire of interactions of the other firms in its

class.

Closure (autopoiesis) Point in the *autopoietic* process where no new species (*memes*)

are produced from the *components* of the set. Point where an attractor is reached. 'Thus, closure can be seen as an attractor of the dynamics defined by resource addition: it is the end point of the evolution, where further evolution stops' (Heylighen, Beigi and Veloz, 2015, p 12). See Maintenance (autopoiesis), Operational

closure (autopoiesis).

Cognition Operation of the making and erasing of differences between

series of differences. In other words: solving problems in order to

maintain the operational closure of an autopoietic system. The latter results in a process whereby, given an actual, the (new) real is produced from a virtual and an actual from the existing real. See: *Pattern, Expression, Perception, Realization, Reduction*.

Cognitive domain (autopoiesis)

The repertoire of all the interactions of an *autopoietic* system as determined by its *autopoietic* organization (cf. Maturana and Varela, 1972). Capability to perceive redundancy, actual. Also repertoire of interactions.

Coherence

See Pattern, Explanatory Coherence

Component

An element or part (of a processual nature) integrated into a system thereby composing it and integrates (processual) parts. Also component part, composing element.

Connotation

Descriptive of the non-denotative internal relations between the

ideas of a meme.

Continual

Used in the sense of ongoing, non-stop. Different from

Coupling

Restricting mutual behavior from *cognitive domains* to a subset. Processes between *autopoietic* systems such that their interactions are mutually restricted. See: Cognitive domain,

Structural coupling, Orientation,

continuous, the opposite of discrete.

Culture

'The set of .. social practices associated with a particular field, activity, or societal characteristic' (Merriam Webster online last visted 2020). A human *expression* in a social context which is observed as a *pattern*. Not in the sense of behavior which is associated with the population of a country (e.g. Japanese, or French culture) or in the sense of corporate culture.

Double contingency

Condition to orderly communication such that first a person expressing expects to be understood by the ones perceiving, and second expects to understand the expressions of the latter (Luhmann, 1996, Communication that is not mutually understood will not continue). Note that the persons involved do not necessarily have the same understanding.

Flement

A party of an interaction of a processual nature. When integrated into a system: component. See part.

Emergent behavior

Unitary (macro) behavior originating from the behavior of constituent (micro) elements of a system in the focus of an

observer.

Emulate Literal: 'Reproduce the function or action of (a different computer,

software system, etc.) (Oxford-English Dictionary online last visited 2018). Understood as: reproducing the behavior of a

system by another system.

Enactment (Enaction) Cognitive operation whereby the system acts on what is lacking.

E.g. for a person to act in accordance with, or on behalf of, a social system. See: Social system, Cognition, Structural coupling,

Milieu.

Environment What a multitude can observe and interact with. Different from

what an observer of the multitude sees as the environment of the

latter. See Milieu.

Explanatory Coherence Correlation between ideas such that the complex renders an

approximately (heuristically) true representation of reality.

Expression (Physical) act following from the operations of an autopoietic

system, e.g. because of a perceived external perturbation.

Counterpart of *perception* as per double contingency. Expressed and perceived together realized. See: *Perception*, *Realization*.

Form (Social -) A socially coded entity.

Heteronomous Acceptance to be led by an external entity and therefore to

relinquish autonomy in respect to the entity. Antonym of

Autonomous.

Idea One answer to a particular question, representation of one

solution (of many) for a problem. Comes into being when double

contingency takes place. See: Answer, Question, Problem.

Solution.

Identity (autopoietic) Property assigned to an autopoietic unity by an observer, by

which it is cognizable. See: Behavioral entity.

Importance A distinction which is significant or meaningful for the observer,

because it bears a relation to its autopoiesis, i.e. operational

closure. Also meaning.

Included (by)

Of a person by a firm: relation between a member of the

population of the firm and the firm from the point of view of the

memeplex of the latter. See: Population, Associated with,

Heteronomous.

Individuation A process whereby the structure of an assemblage or a

	rhizomatic system determines its operation while its operation determines its structure in a <i>milieu</i> . Also self-individuation.		
lata anatia a			
Integration	To be integrated: for an element in a multitude to become a		
	component in an autopoietic system and a part of its organization.		
	To integrate: or all the present <i>components</i> to accept an element		
	as an additional <i>component</i> of the system. The state of the unity		
	at the higher scale (i.e. emerged) determines whether the element		
	is integrated. See Component.		
Maintenance	All the <i>components</i> consumed by the set are produced by the set		
	of components. An attractor is reached when the set of		
	components is reduced. 'Thus, self-maintenance too can be seen		
	as an attractor of the dynamics defined by resource removal. The		
	combination of resource addition ending in closure followed by		
	resource removal ending in self-maintenance produces an		
	invariant set of resources and reactions. This unchanging reaction		
	network is by definition an organization' (Heylighen, Beigi and		
	Veloz, 2015, p 12). See: Closure, Operational closure.		
Meme	All the conceivable answers to a particular question. Recorded in		
	the individual mind as an 'imprinted' pattern. See: Idea, Answer,		
	Question, Problem, Solution.		
Memeplex	Coherent complex of memes. In full recorded in the individual		
	minds of all the members of the population as an 'imprinted'		
	pattern.		
Memeplex-and-	An <i>autopoietic</i> system in the social sphere constituted by a		
realization	memeplex and its realization by its population. Descr. subject of		
	cultural evolution. See: Social System.		
Meta-meme	A meme concerning another meme, for instance providing a		
	description, a specification or a definition of the latter. Examples:		
	the firm, organizational types, cultural aspects of the market		
	system. See: Meme, Memeplex.		
Milieu	What an observed multitude can interact with. The part of the		
	environment which an observed system is <i>coupled</i> with. See		
	Environment.		
Multitude	A set of <i>elements</i> or <i>parts</i> in the focus of an observer. See:		
manitudo	Assemblage, System, Randomness.		
Observation	(Re)Cognition of a behavioral pattern.		
Observation	(1.6/00gillion of a beliavioral pattern.		

Operational closure Of a system, when the conditions of *closure* and of *maintenance*

are satisfied then a system is operationally closed. Every current *component* of an *autopoietic* system is replicated (and no more) including the *components* required for its replication (and no

more). See: Maintenance, Closure, Autopoiesis.

Organization The set of relations between the *components* of an *autopoietic* system which defines it as a system of a particular *class* and

which quarantees its operational closure.

Orientation Restricting the *cognitive domain* of one *unity* by another.

Processes between *autopoietic* systems such that their interactions are restricted. Also: mutual orientation. See:

Coupling, Structural coupling.

Part A party to an interaction which has a processual nature.

Component when integrated into a system. See Element.

Partial memeplex Part of an entire *memeplex* -distributed over multiple individuals -

recorded in the mind of one individual.

Pattern Correlation of redundant behavior of an interconnected (human)

multitude such that an observer can observe (cognize) it as a regularity. The latter is reducible, because aspects of its

underlying structure can be inferred. See: Reduction.

Perception Reception and interpretation by a system of an expression from

the milieu of the latter, given its autopoietic organization and

environment. Counterpart of expression as per double

contingency. See Expression, Realization.

Population Multitude of people *included by* a particular memeplex. See

Included by.

Problem Making of a difference between series of differences. Erased

when threatening the system's operational closure. Represented by a question. Subst. Lack. See: *Answer, Question, Solution*.

Process Repetition of a difference between series of differences.

Ontological.

Question Representation of a problem. See: Answer, Question, Solution.

Randomness Behavior of a multitude of *components* without observable

pattern. Also a state of a multitude where the probability of the occurrence of every next state is equal. The system's structure does not lead to behavioral coherence, which in turn does not lead to a structure of ideas which leads to coherence. Incoherent

behavior of a multitude is unobservable (imperceptible), it is

irreducible. See Reduction.

Real Next structure of a system selected from the virtual, under the

conditions of the actual (cf. Waddington, 1952; Simondon, 1958;

Deleuze, 1968).

Realization One event of expression and perception under the condition of

double contingency. See: Meme. Memeplex. Enactment.

Expression, Perception.

Reduction (to a pattern) Cognitive process whereby a pattern is derived by an observer

from the coherent behavior of a multitude of *components*. Opp.:

irreducible. See Cognition, Pattern.

Rhizome An acentered system as a 'machinic' network of finite automata.

Also: rhizomatic system

Self-organization An autopoietic system is operationally closed. External influence

by definition induces it to organize itself, whereby its operations

come to increasingly cohere. See: Organization, Milieu.

Self-referring Descriptive of a system whose state depends on its operations,

and thereby on its organization at a previous state. Used as a

substitute of self-referencing. See Self-referencing.

Self-referencing Descriptive of a system whose state can only develop from its

own operations, and thereby from its organization at the previous state. Used as a substitute for self-referring. See Self-referring.

Social System Autopoietic system of communications that maintains its particular

operations and that interacts with other autopoietic systems (cf.

Luhmann, 1995).

Socialization The process of learning to behave in a way that is acceptable to

society (Oxford-English Dictionary last visited 2018). Understood in this thesis in the sense of conditioning in social processes.

Solution Erasing a difference between series of differences. See *Answer*,

Question, Solution.

Structural coupling A process whereby two or more systems lastingly *orient* the

others while their operational closure remains intact. Their

autopoietic organization can change. See Orientation, Coupling.

Structure Formal: the particular arrangement or pattern of a group of related

things (Oxford English Dictionary last visited 2018). Usually

	understood as that arrangement of <i>components</i> which defines its (physical) manifestation, namely the arrangement that realizes a system of a certain <i>class</i> as a particular system. <i>Autopoietic</i> :		
	systems which belong to the same class are in the same niche,		
	but the structure of each generates its particular manifestation.		
System	Multitude of components with observable lasting coherent		
	behavior.		
Transaction	Making of and erasing a particular difference between series of		
	differences concerning a firm. One instance whereby a problem		
	concerning a firm is solved. See Problem, Solution.		
Unity (autopoietic)	Property attributed to the behavioral identity of a system,		
	indicating that it can be observed (cognized) and delineated as an		
	autopoietic system.		
Virtual	The possible (next) structures of the system cf. Waddington,		
	1952; Simondon,1958; Deleuze, 1968). See Actual, Real		

Table 30: List of concepts of the framework

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